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Original Article

The effect of Parent Education Through Blended Educational Content on Improving Children's Constipation: A Randomized Clinical Trial

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Abstract

Background and aims: The lack of acceptance and insufficient cooperation of the child or parents are among the critical causes of constipation recurrence and inappropriate response to treatment. This study investigated the effect of blended educational content on parent education compared to routine education.

Methods: Overall, 70 children with constipation were included in this randomized clinical trial study. Mothers were allocated to two control and intervention groups. Blended educational content in 6 1-hour sessions (2 sessions on how to encourage children to defecate on time, 2 sessions on nutrition to relieve constipation, and 2 sessions on lifestyle related to constipation) in the form of PowerPoint, video, and animation, and questions and answers through a virtual group were presented to mothers. The outcomes were measured by Rome III criteria before and six months after the start of treatment, and the data were analyzed using SPSS 20.

Results: The training of mothers had a significant effect on reducing the symptoms of constipation, including the history of bowel movements ≤ 2 times a week, excessive stool retention, painful bowel movements, bowel movements with a large diameter, and abdominal pain ($P < 0.001$).

Conclusion: Parents should be educated with blended educational content to speed up recovery, reduce the treatment period, and prevent the recurrence of children's constipation. This method is suggested for use in medical centers to speed up patients' recovery.

Keywords: Education, Blended education, Constipation, Children

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Introduction

Constipation hurts the physical, emotional, and social health of children. In addition, it imposes a heavy financial burden on the healthcare system (1). Among the essential causes of constipation recurrence and inappropriate response to treatment are a lack of acceptance and insufficient cooperation of the child or parents. The collaboration of the child and their family is essential in treating children's constipation. Children depend on the family for care, and the role of parents in child care is vital in child treatment and recovery (2).

Educating parents is the first step in the non-pharmacological treatment of functional constipation. Parents should receive correct information about symptoms, risk factors, and suitable treatment options. Children should also be involved in age-based educational programs, leading to favorable results (3). New information technology developments have provided suitable education opportunities, including electronic education and increased learning effects (4). Blended learning is a teaching method that combines traditional classroom instruction with e-learning content to create a more effective and flexible learning experience (5). Learning through Smartphones or online education is rapidly changing the face of higher education. This educational method's advantages include lower cost, flexibility, ease of access, universality, and the possibility of self-direction in learning and adaptation to individual learning goals (5).

Therefore, due to the need for follow-up and long-term care for the effective treatment of constipation and the lack of a virtual education study in this field, this study aims to investigate the effectiveness of educating parents of children with constipation through the production of blended content in their treatment process.

Materials and Methods

Trial Design

This randomized clinical trial evaluates the effect of blended educational content in parent training on treating and reducing children's constipation symptoms compared

to routine training methods.

Participants

Seventy children with constipation were referred to Hajar Hospital in 2022 and selected based on the inclusion criteria. The children were randomized into two control (n = 35) and intervention (n = 35) groups (Figure 1).

Inclusion Criteria: The inclusion criteria included an age range of 4–14 years, constipation based on Rome III criteria, and parental consent to participate in the study (6).

Exclusion Criteria: Children with large and small intestine diseases, systemic diseases, such as hypothyroidism and Hirschsprung's disease, non-compliance with treatment, withdrawal from the study, or non-cooperation in the follow-up.

Interventions

In the first session of attendance at the clinic, the mothers of both groups received routine training on constipation treatment, which included encouraging children to drink plenty of water and high-fiber foods, not to hold stools, to go to the toilet, as well as training mothers regarding drug therapy. Then, the Messenger communication program (a new generation of messengers with features such as video calling, video and music sharing, and the possibility of conversation) was installed on the mobile phones of mothers of the intervention group. The researcher joined the mothers in a joint group called the constipation treatment training group in the same Messenger, and the process was explained to them. After the mothers of the intervention group went home and started drug therapy and behavioral and nutrition therapy for children, their virtual training was also started through the joint group in Messenger. Virtual training in six sessions, for one hour over two weeks over two weeks by the researcher. Two sessions were allocated to learn how to treat a child with constipation and the necessary encouragement. In addition, two sessions focused on the effect of nutrition and medicine in relieving constipation, and two other sessions concentrated on lifestyle and the impact of movement on the treatment of constipation. In addition, to improve learning, suitable clips for mothers and children, including explanations of the researcher's training sessions, which were accompanied by sound and form, were shared in the group. The possibility of continuous question and answer was established in the group, and the explanations and relevant clips were periodically repeated. This process continued until the end of the 6-month study.

Outcomes

At the end of 6 months, both control and intervention groups were evaluated according to Rome III criteria, and the study results were statistically analyzed. It should be noted that the educational clip was sent to the hospital's

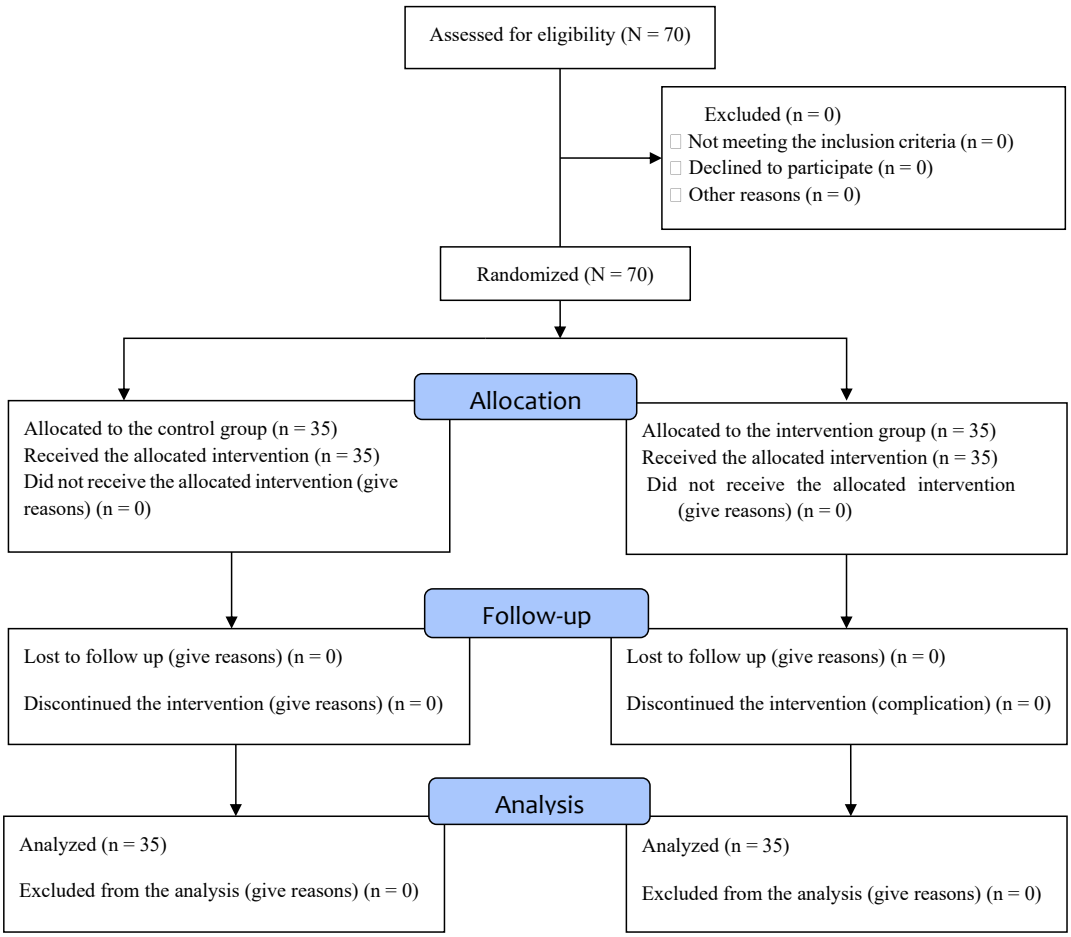

Figure 1. CONSORT Flow Diagram of the Study Population

research council and the biomedical ethics committee of the medical school for approval before starting the study. Nutrition education was based on Nelson's book and Karen's nutritional principles, and behavioral education was based on the book Punishment and Encouragement of Young Children (7, 8).

Sample Size

Overall, 70 children with constipation were selected for investigation based on the following formula and previous research (9). These children were randomly assigned to intervention (n = 35) and control (n = 35) groups.

$$n = \frac{\left(z_{\alpha/2} - z_{\beta}\right)^2 \times \left(p_1\left(1-p_1\right) + p_2\left(1-p_2\right)\right)}{\left(p_1 - p_2\right)}$$

where $Z_{\alpha/2}$ and Z_{β} represent the confidence level (95%) and the power of the test (80%), respectively. Further, $p1$ and $p2$ denote the proportion of subjects with and without constipation in groups 1 and 2.

Randomization

Participants were randomized into the control and intervention groups using a card-draw method. Each of the 70 study entry cards was numbered. Thirty-five cards were designated for each of the intervention and control groups. The cards were shuffled and placed in a bag. As each participant entered the study, they drew a card, which determined their group assignment.

Blinding

Blinding was not considered in this study.

Statistical Methods

The data were analyzed using SPSS software (version 20.0). The classified data were analyzed using the Chi-square test, and their information was written as frequencies and related percentages.

The dependent variables in each group were compared before and after the intervention. In addition, in the two groups, the clinical outcome variables before and after the intervention were compared with each other independently. Quantitative data were compared using the independent t-test, paired t-test, or, if necessary, non-parametric Mann-Whitney test to compare the mean in the two groups when the default assumptions, including normal distribution, were not established. The $P < 0.05$ was considered statistically significant.

Ethical Considerations

The necessary permits for this randomized clinical trial study were obtained from the Vice-Chancellor of Research and Biomedical Ethics Committee of Shahrekord University of Medical Sciences (IR.SKUMS.MED.REC.1401.019). Moreover, the study protocol was registered in the Iranian Registry of Clinical Trials (ID: IRCT20220830055828N1). Informed consent was obtained from the children's parents.

Results

Of the 70 children assessed, 36 (51.4%) were boys, and 34 (48.6%) were girls. Furthermore, 97.1% of mothers were not covered by protective coverage. The mean age in the control and intervention groups was 5.19 ± 1.88 and 6.20 ± 2.07 years, respectively. Statistical analysis showed that the two groups did not significantly differ in terms of occupation, education level, and support coverage status (Table 1).

Based on the results (Table 2), the training of mothers had a significant effect on reducing the symptoms of constipation, including the history of bowel movements ≤ 2 times a week, excessive stool retention, painful bowel movements, bowel movements with a large diameter, and abdominal pain ($P < 0.001$). However, undesired defecation ($P = 0.156$) and excretion of blood with stool ($P = 0.321$) demonstrated no significant change after the intervention.

Discussion

The results of this study emphasize the positive impact of educating mothers on managing childhood constipation. The intervention significantly improved key symptoms of constipation, such as reducing bowel movements to less than twice a week, excessive stool retention, and painful defecation, passing large-diameter stools, and alleviating abdominal pain ($P < 0.001$). These findings support the idea that involving mothers and providing proper education on constipation management can significantly reduce the severity and frequency of constipation-related symptoms in children. The findings of a study indicated that training and empowering parents about symptoms and risk factors and suitable treatment options and their participation in

Table 1. Frequency Distribution of Demographic Variables in the Two Studied Groups

Item	Control Group	Intervention Group	*P* value
Education level (%)			
Primary	1 (2.9)	4 (11.4)	0.333
Diploma/associate	25 (71.4)	21 (60.0)	
Higher	9 (25.7)	10 (28.6)	
Job status (%)			
Housewife	28 (80.0)	26 (74.3)	0.785
Employed	6 (17.1)	7 (20.0)	
Worker	1 (2.9)	2 (5.7)	
Protective cover status (%)			
Absent	35 (100)	34 (97.1)	0.999
Present	0 (0.0)	1 (2.9)	
Children's gender (%)			
Male	20 (57.1)	19 (54.3)	0.672
Female	15 (42.9)	16 (45.7)	
The mean age of children (year)	5.19 ± 1.88	6.20 ± 2.07	0.879
The mean duration of disease (month)	18.00 ± 10.70	18.00 ± 10.70	

Table 2. Clinical Status of Defecation in the Two Studied Groups

Item	Control	Intervention	*P* value
Defecation ≤ 2 times a week			
Before the intervention	0.89 ± 0.32	0.71 ± 0.45	0.075
After the intervention	0.63 ± 0.49	0.26 ± 0.44	0.001*
Intragroup comparison *P* value	0.002	< 0.001	
Excessive fecal retention			
Before the intervention	1.00 ± 0.00	0.91 ± 0.28	0.079
After the intervention	0.83 ± 0.38	0.03 ± 0.16	< 0.001*
Intragroup comparison *P* value	0.012	0.001	
Painful defecation			
Before the intervention	1.00 ± 0.00	0.91 ± 0.28	0.079
After the intervention	0.83 ± 0.38	0.03 ± 0.16	< 0.001*
Intragroup comparison *P* value	0.012	0.001	
Passing stools with a large diameter			
Before the intervention	1.00 ± 0.00	0.97 ± 0.16	0.321
After the intervention	0.77 ± 0.35	0.03 ± 0.16	< 0.001*
Intragroup comparison *P* value	0.003	0.001	
Undesired defecation			
Before the intervention	0.17 ± 0.38	0.06 ± 0.23	0.137
After the intervention	0.06 ± 0.23	0.00 ± 0.00	0.156*
Intragroup comparison *P* value	0.103	0.160	
Excretion of blood with stool			
Before the intervention	0.20 ± 0.40	0.20 ± 0.40	1.000
After the intervention	0.03 ± 0.16	0.00 ± 0.00	0.321*
Intragroup comparison *P* value	0.032	0.006	
Abdominal pain			
Before the intervention	0.91 ± 0.28	0.74 ± 0.44	0.058
After the intervention	0.80 ± 0.40	0.23 ± 0.42	< 0.001*
Intragroup comparison *P* value	0.044	0.001	

Note. *Intergroup comparison *P*-value.

the treatment process can lead to a faster response and improve the treatment process of children (10). According to the research comparing health education methods, using any education method (e.g., individual and group education or audio-visual equipment in health centers) is beneficial (11). A study has shown that new educational methods (e.g., multimedia resources, words, animations, sounds, and images) have advantages, such as lower cost, flexibility, ease of access, and lack of time and place restrictions, and can create more motivation, leading to better and deeper learning (12).

The intervention did not significantly improve undesired defecation ($P = 0.156$) and blood in the stool ($P = 0.321$), indicating that these symptoms have complex or multifactorial causes that cannot be quickly addressed through maternal training alone. Underlying physical and mental medical conditions, lifestyle factors, such as immobility, or dietary factors might influence these specific symptoms, necessitating further investigation and potentially more specialized interventions (13-15).

Yıldırım et al observed that providing an educational program in the field of nutrition and behavioral modification, communication skills, problem-solving skills, stress-coping strategies, self-confidence improvement, and anger control to children with constipation and their mothers have a significant effect on preventing and managing constipation and improving children's anxiety (16). Khalil et al found similar findings, reporting that providing face-to-face educational programs related to physical activity and behavioral changes to children with constipation reduced the time needed to treat constipation, reduced the number of recurrences, and increased the duration of everyday bowel habits (17). In the study by Faramarzian et al, children with constipation and their parents participated in three educational sessions. Each session had a discussion and exchange of opinions on a specific topic. Finally, educational pamphlets containing the necessary educational tips (introduction to constipation, nutrition, and behavioral tips) were provided to parents. The findings revealed that nurse-oriented educational programs favor reducing some symptoms of chronic functional constipation based on the Rome III criteria in children aged 3–14 years (18).

Conclusion

Our findings confirmed that parent education through blended educational content, compared to routine education, significantly reduced constipation symptoms. Therefore, it is recommended that programs focusing on blended educational content be considered for parents.

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Authors' Contributions

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Competing Interests

The authors declare that there is no conflict of interests.

Ethical Approval

The necessary permits for this randomized clinical trial study were obtained from the Vice-Chancellor of Research and Biomedical Ethics Committee of Shahrekord University of Medical Sciences (IR.SKUMS.MED.REC.1401.019). Moreover, the study protocol

was registered in the Iranian Registry of Clinical Trials (ID: IRCT20220830055828N1). Informed consent was obtained from the children's parents.

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