

Research Paper:

Effect of Face-to-Face and Multimedia Methods of Education on Children's Constipation Severity



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ABSTRACT

Background: Constipation is a common problem among children. The aim of this study was to compare the effect of face-to-face and multimedia education on the severity of functional constipation in children.

Methods: It was a two-group pre-test post-test quasi-experimental study that was carried out at the Specialized Clinics of Pediatrics affiliated with the Arak University of Medical Sciences, Arak, Iran. The sample consisted of 96 eligible children in the age range of 6 to 12 years that were randomly assigned to face-to-face (n=48) and multimedia (n=48) groups. Functional constipation was detected by Rome III criteria. Data were collected by a demographic characteristics form and the Constipation Assessment Scale (CAS) before intervention and one month later in both groups. In the face-to-face group, education was provided using two 15-min training sessions in the form of a lecture in the presence of the mother. The multimedia training group received a 15-min training video. Both groups were given a pamphlet. The data were analyzed by Fisher's exact test, independent t-test, and paired t-test using SPSS 16.

Results: There was no significant difference between the groups' constipation severity before the intervention (P=0.12). There was a significant difference between the mean score of constipation severity between the face-to-face (P=0.01) and multimedia (P=0.001) groups before and after the intervention. However, the Mean±SD score of constipation severity after the intervention was 7.05±1.79 in the face-to-face group and 5.91±1.69 in the multimedia group (P=0.001).

Conclusion: The results of this study showed that both educational interventions reduced the severity of constipation in children. However, multimedia training was more effective than face-to-face education so that it reduced the severity of constipation to a greater extent.

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Highlights

- The face-to-face method of education, as an effective method, can decrease children's constipation severity.
- Education by multimedia technique is more effective than the face-to-face method in reducing the severity of functional constipation in children.
- The multimedia method of education about constipation provides the children with the opportunity to frequently review educational content, answer questions, and experience deep learning.

Plain Language Summary

Constipation is a common problem among children. Functional constipation usually occurs when a child intentionally refuses to defecate to prevent painful bowel movements. Constipation could occur because of children's lack of awareness about it. There are many techniques for teaching appropriate behaviors to children; e.g. multimedia and face-to-face methods. These methods have their own advantages and disadvantages. According to the results of this study, both multimedia and face-to-face educational techniques decreased constipation severity but the multimedia method was more effective.

1. Introduction

Constipation is a very common problem in children. It affects approximately 30% of the pediatrics population and accounts approximately for 3% to 5% of outpatient visits (Kyle & Carman 2017). Functional Constipation (FC) is a type of constipation with no organic etiology in children (Levy 2017). FC is commonly the result of the withholding of feces in a child who wants to avoid aching defecation. FC is a common symptom with the varying incidence among children. It is the most common gastrointestinal disorder in infants, children, and adolescents (Robin 2018). Although the pathophysiology of FC in children is unclear, it seems to be multifactorial in nature. The most common mechanism for developing FC is a lack of bowel movements, which often begins after painful and terrifying defecation. Stool remains in the rectum, the rectal mucosa absorbs water from the stool, making it more difficult to empty. This vicious cycle can lead to bowel disorders, sometimes bowel incontinence, loss of rectal sensation, and ultimately, loss of natural desire to defecate (Walter 2019).

FC in children has a negative effect on their physical, emotional, and social health (Joinson et al. 2019; Parashette et al. 2015). In addition, it imposes a heavy financial burden on the health care system, costing \$ 2,757 for diagnostic procedures and \$ 3,362 for treatment of each patient per year (Walter et al. 2019). The rate of improvement in constipation after one year from the start of treatment varies between 60 and 90%. This means

that about 10 to 30% of children still suffer from constipation after one year of starting treatment. The most important risk factors for constipation are inactivity, poor fluid intake, inappropriate diet, low level of education, depression, and physical problems (Bharucha, Pemberton & Locke 2013; Shen et al. 2018). Although constipation is not a life-threatening disease, it severely reduces the quality of life of the child and his/ her parents (Robin et al. 2018). Chronic constipation also causes complications, such as incontinence, hemorrhoids, intestinal obstruction, agitation, and urinary retention (Sajadi et al. 2020). The use of laxatives may also lead to various side effects (Werth et al. 2019).

School-age is an important stage of child development. This age begins when a child enters school (about 6 years old) and continues until 12 years old. During this time, the ability to think logically develops. Children at this age understand the cause and effects of an illness and gain the ability to take care of themselves (Hockenberry & Wilson 2018). Constipation requires constant management. Proper nutritional education can help treat children with FC. Therefore, it is essential that appropriate nutritional education be given to school-age children to enable them to control and manage their constipation (Hockenberry & Wilson 2018).

Using effective methods is necessary to prevent and manage constipation. Healthy lifestyle training can make a difference in health behaviors (Hockenberry & Wilson 2018). According to the research conducted on the comparison of health education methods, the use

of any kind of educational methods, such as individual and group education and using audio-visual equipment in health centers are useful (Sobhani Shahmirzadi et al. 2014). Face-to-face teaching is also one of the common teaching methods in health care education, in which the teacher presents the educational content individually and provides an opportunity for exchanging ideas and feelings verbally and non-verbally between the learner and the provider (Kyle 2017).

Some studies have shown that using new educational methods, such as multimedia education can be more attractive to children because it encourages them to learn better and deeper by creating more motivation (Knoopen van Campen, Segers & Verhoeven 2018). It has been shown in a study that playing and role-playing techniques lead to better and more effective learning in children than lecturing (Najafi 2020). However, the results of another study demonstrated that children learn more from the lecture method compared to the role-playing method (Mazloomi Mahmoudabad 2009). Face-to-face education is more effective in societies, where lack of knowledge is a barrier to choosing the appropriate behavior (Kaufman et al. 2018).

In order to control and manage FC, it seems that meeting particular needs of school-age children for proper nutrition, a balanced diet, adequate fluid intake, and a healthy lifestyle are necessary. (Hockenberry & Wilson 2018; Levy et al. 2017). Due to the disagreement between studies regarding the appropriate educational method for children, the question arises as to which educational method is better and more efficient for school-age children. Therefore, the aim of this study was to compare the effectiveness of face-to-face and multimedia education on children's constipation severity.

2. Materials and Methods

This research was a two-group pre-test post-test quasi-experimental study. The statistical population was 107 children with FC referring to Amirkabir Hospital, Arak (one of the central cities of Iran) from March 2019 to January 2020. The subjects were selected by convenience sampling method.

The inclusion criteria were the age between 9 and 12 years, FC for at least six months, ability to communicate verbally, absence of other chronic illnesses, access to smartphone or tablet, and child and mother consent to participate in the study. FC was determined and confirmed by a physician using Rome III at the beginning of the study. This diagnostic tool offers six criteria for

the diagnosis of FC. These symptoms should be present at least once a week for at least two months. The presence of two or more symptoms indicates the presence of FC. The exclusion criteria were the unwillingness of the child or parents to continue contributing to the study and developing other diseases during the study that result in a change in excretion pattern. Seven children did not meet the inclusion criteria; therefore, a total of 100 children were randomly assigned to two intervention groups including face-to-face and multimedia groups. In the face-to-face group, one child was excluded from the study due to lack of follow-up and another due to immigration. In the multimedia group, one child was transferred to another hospital and one child did not attend the second session. Ultimately, the study was performed on 96 children ($n=48/\text{group}$).

The objectives and process of the study were explained to the subjects (mother and child) in both groups before the intervention and informed consent was obtained from mothers. The first intervention group received face-to-face training and the second intervention group received multimedia training. The educational content provided to both groups included nutritional programs (diet containing fiber and fluids), proper and regular activity, drinking enough fluids, adjusting defecation habits, and programs to reduce the stress that was prepared using reliable sources (Hockenberry & Wilson 2018; Kyle 2017) and was approved by an expert panel (ten faculty members of the Arak University of Medical Sciences). The face-to-face group was trained with two 15-minute training sessions, individually (separate sessions for a mother and her child) in a classroom in the hospital. Face-to-face training was provided in simple language, at the level of comprehension and age of the child, without the use of medical terms. The classes were held in two sessions one week apart. In the second intervention group, the educational content, which was prepared for 15 minutes, was shown to the child and the mother once in the educational class individually using a video projector, and then, the educational content was sent to the children's tablets or mothers' smartphones. Also, they were asked to watch it again at home. An educational pamphlet was given to both groups.

The data were collected by a demographic data form and Constipation Assessment Scale (CAS). The demographic data of the children included age, sex, weight, height, educational level, Body Mass Index (BMI), duration of constipation, and the number of children in the family. Also, parents' occupations and level of education were recorded. Several questions were asked about eating habits, such as eating fast food, consumption of

vegetables, and drinking water or liquids as well as doing exercise. The CAS was used to assess the severity of constipation in both groups before the intervention and a month later.

CAS assesses eight symptoms, including abdominal distention, bowel movements, fecal discharge, a feeling of fullness in the bowel, abdominal pain, very low bowel movements, and inability to defecate. The instrument is scored based on a 3-point Likert type scale from 0 to 2. In this instrument, a score of 0 to 4 indicates mild constipation; 4 to 8 indicates moderate constipation; 8 to 12 indicates severe constipation, and 12 to 16 represents very severe constipation. This tool was first developed by McMillan & Williams to evaluate the presence and severity of constipation clinically (McMillan & Williams 1989). The validity of the instrument has been confirmed in previous studies (McMillan & Williams 1989; Woolery et al. 2006). The reliability of CAS was also confirmed by test-retest with a correlation coefficient of 0.98 and Cronbach's alpha of 0.70 (McMillan & Williams 1989). Woolery et al. (2006) examined this tool in children and reported that the tool had good construct validity and good correlation using the test-retest method ($r=0.93$). In this study, the reliability of the instrument was also calculated to be 0.80 by the test-retest method.

Demographic information was presented using descriptive statistics (frequency, percentage, mean, and standard deviation). Initially, the data distribution was measured using

the Kolmogorov–Smirnov test and the normality of the data was confirmed. Therefore, independent t-test, t-test, and Fisher's exact test were used to analyze the data. SPSS 25 was used for data analysis. The significance level was considered to be less than 0.05.

3. Results

In this study, 96 children with constipation were studied based on inclusion criteria. The mean age of children was 10.3 ± 1.29 years and the mean age of the mothers was 36.6 ± 3.56 years. Of the children evaluated, 38% reported eating fast food more than twice a week. Also, 45% of the subjects reported consuming fewer vegetables than needed. The majority of mothers were housewives and 28% were employed. There was no significant difference between the demographic characteristics of the groups. Also, there was no significant difference between the mean BMI of the groups at the beginning of the study ($P=0.85$). The groups were almost identical in terms of some variables, such as diet, fluid intake, and mobility. The third grade of elementary school showed the highest percentage than other educational levels (Table 1).

According to the results, the duration of constipation in these children was between 2 to 24 months. In most children (83.70%), the duration of constipation was between 6 and 12 months. At the beginning of the study, there was

Table 1. Comparison of demographic characteristics of the children in the intervention groups

Variables	Category	No. (%) / Mean \pm SD		P
		Face to Face Group	Multimedia Group	
Gender	Male	21(43.8)	17(35.4)	0.40 ^a
	Female	27(56.3)	31(64.6)	
Level of education	Third grade	13(13.5)	24(25)	0.11 ^a
	Fourth grade	14(14.6)	13(13.5)	
	Fifth grade	19(19.8)	8(8.3)	
	Sixth grade	2(2.1)	3(3.2)	
Body mass index (kg/m ²)	Up to 18.5	6(6.25)	4(4.17)	0.85 ^a
	18.5 to 25	18(18.75)	16(16.67)	
	25 to 30	16(16.67)	19(19.79)	
	More than 30	8(8.33)	9(9.37)	
Weight (Kg)		35.75 \pm 6.14	34.54 \pm 6.14	0.38 ^b

^a Fisher's exact test; ^b Student t-test.

Table 2. Comparison of some features of constipation in the intervention groups

Variables	Category	No. (%) / Mean±SD		P
		Face to Face Group	Multimedia Group	
Duration of constipation/month	2-6	6(12.5)	7(14.6)	0.23*
	6-12	28(58.3)	32(66.7)	
	12-18	10(20.9)	7(14.6)	
	18-24	4(8.3)	2(4.1)	
Stool frequency/week	Before intervention	2.88±0.63	2.27±1.01	0.805*
	After intervention	2.95±1.06	4.17±1.17	0.0001*

*Independent t-test.

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no significant difference between the groups in terms of stool frequency ($P=0.805$). However, after the education, a statistically significant difference was found between the groups in terms of stool frequency ($P=0.0001$) (Table 2). At the beginning of the study, there was no statistically significant difference between the groups in terms of constipation severity ($P=0.12$). However, after the intervention, the difference between the severity of constipation of the groups was significant ($P=0.001$). In other words, it can be concluded that after the intervention, the severity of constipation in the multimedia group significantly reduced compared to the face-to-face group (Table 3).

4. Discussion

The aim of this study was to compare the effect of face-to-face and multimedia education on the severity of FC in children. At the beginning of the study, the majority of children suffered from moderate to severe constipation. Constipation is a common problem in children, affecting 0.7% to 29.6% of children worldwide, and most of these cases have FC (Rajindrajith & Devanarayana 2011).

At the beginning of the current study, there was no significant difference between the groups in terms of con-

stipation severity. However, after training, the severity of constipation in the multimedia group was significantly lower than the face-to-face group. The main role of multimedia is to learn by doing. Students first see objects and then learn. Multimedia may have distinctive capabilities to assist learning because it is parallel to the natural way (visual information and images) children learn. Multimedia education provides a solution to worries, such as pressure to increase student enrollment in repetitious lessons, lack of interest or motivation in learning a subject, and poor student performance. It provides students with more options and degrees of control over the learning process, including screen, speed, and sequence control (Shipla & Sonita 2013).

It has been shown that fun educational methods are usually more effective in educating children than traditional methods. In this regard, a study showed that the role-playing method led to better and more actual learning than lectures (Najafi 2020). However, face-to-face training is more effective in children who do not have sufficient knowledge about appropriate behavior (Kaufman et al. 2018).

The results of our study showed that training using both face-to-face and multimedia methods could reduce the

Table 3. Comparison of mean constipation severity before and after the intervention in the groups

Variables	Times	Mean±SD		P
		Face to Face Group	Multimedia Group	
CAS ^a	Before	11.82±1.98	14.80±4.62	0.12 ^c
	After	7.05±1.79	5.91±1.69	0.001 ^c
	P-value	0.01 ^b	0.001 ^b	

^aConstipation Assessment Scale is a guide to assess constipation; ^bPaired t-test; ^cStudent t-test.

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severity of constipation in children. Yildirim et al. (2020) examined the effect of education given to children with functional constipation and fecal incontinence and their mothers on anxiety and constipation management. The results of their study showed that the training program had a significant influence on the prevention and management of constipation and anxiety. Nova (2019) found a significant improvement in parents' knowledge level after the multimedia-based education. His study showed Multimedia-based education caused an increased knowledge level for the parents of children with leukemia.

Singh examined the impact of health education by combining two educational methods on the knowledge and performance of elementary school students in India. The intervention group, in addition to practical demonstration and pamphlet, watched also a video; but the control group was trained only by practical demonstration and pamphlet. After three months, the level of knowledge and performance in the intervention group was significantly higher than that of the control group (Singh et al. 2016).

5. Conclusion

According to the findings of this study, it can be concluded that both face-to-face and multimedia methods of education are effective in reducing the severity of constipation in school-age children but the multimedia method is more effective. However, due to the availability of smartphones, their attractiveness to children as well as their affordability, the lack of need to set the time and place of training, the low number of nurses in medical centers, and also the need to maintain social distance to prevent COVID-19, indirect educational methods, such as multimedia education can be used more than before to teach healthy behaviors, such as prevention and treatment of constipation to primary school children. The long-term effects of the educational methods were not assessed in this study. Additional studies are recommended to assess the sustainability of these methods on FC in other hospital settings.

Ethical Considerations

Compliance with ethical guidelines

The Ethics Committee of Arak University of Medical Sciences, Arak, Iran, approved this study (Ethics Code: IR.ARAKMU.REC.1398.056). Permission for the study was also obtained from the Research and Technology Administration of Arak University of Medical Sciences, Arak, Iran. The mothers and children received clear information about the aim of this study, the confidentiality

of their data, and their freedom to voluntarily withdraw from the study. Informed consent was obtained from all the mothers and their children also agreed to in the study.

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Authors' contributions

Conceptualization and supervision, writing of article: Mahbobeh Sajadi; Data collection, data analysis: Sajjad Pirooz-arjmandi & Mahbobeh Sajadi; Mahbobeh; methodology, writing original draft: Akram Bayati and Mahbobeh Sajadi; Investigation, writing, original draft, and review & editing: All authors; Funding acquisition and resources: Mahbobeh Sajadi & Nooshin Sajadei.

Conflict of interest

The authors declared no conflict of interests.

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