



Investigating the Effect of Nurse-Centered Strategies on Functional Chronic Constipation of Children aged 3-14 years Referring to Imam Reza Clinic of Shiraz University of Medical Sciences in 2014

Zohre Faramarzian,¹ Marzieh Kargar,^{2,*} Mohsen Dehghani,³ and Najaf Zare⁴

¹Master of Science in Pediatric Nursing, Student Research Committee, Shiraz University of Medical Sciences, Department of Nursing, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran

²Professor Assistance, Department of Nursing, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran

³Associate Professor of Pediatric Gastroenterology, Department of Gastroenterology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

⁴Associate Professor, Department of Biostatistics, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

*Corresponding author: Marzieh Kargar, MD, PhD, Professor Assistance, Department of Nursing, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran. Tel: +98-7136474258, Fax: +98-36474252, E-mail: kargarm@sums.ac.ir

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Abstract

Background: Functional constipation is among the most common problems of childhood. Children's life quality is affected by constipation. In addition, constipation can bring about undesirable physical and psychic consequences. However, follow-up programs can solve the problem and assure the patient about continuing treatment.

Objectives: This study aimed to investigate the impact of nurse-based approaches on functional chronic constipation in children.

Methods: This is a clinical trial study conducted from August to December 2013 in Imam Reza clinic. The sample size was 95 children who were randomly assigned to two groups of experimental (47 persons) and control (48 persons). The mean age in the experimental and control groups was 6.25 ± 2.71 and 6.21 ± 2.68 years, respectively. The experimental group received a combination of nurse-centered and education program as well as conventional medical treatment while the control group received only the usual medical treatment. The data were collected using a data collecting form and bowel diary. The recovery percentage was assessed based on Rome 3 criteria in three periods of 1, 2, and 3 months after the intervention compared to before the intervention. The collected data were analyzed by SPSS version 16 software using chi square and Mc Nemar tests.

Results: Before the intervention, the similarity of people in the study groups that is necessary for clinical trials was observed. In all variables such as constipation status, sex, weight, duration of constipation, previous therapy, and family history of constipation, there was no statistically significant difference between the two groups (P value > 0.05). The results showed improvements in both the groups. The percentage of improvement assessed by chi square test in the intervention group was 70.2%. This percentage increased to 83% about 2 and 3 months after the intervention; in comparison with the control group, the improvement was higher by 14 and 10%, respectively (P value > 0.05).

Conclusions: Nurse-based clinics should be established at gastroenterology clinics to minimize the frustration of parents and children in remission and treatment discontinuation through routine follow-up of long-term treatment (either by phone or in person) that may lead a greater number of patients to achieve remission after treatment.

Keywords: Children, Functional Chronic Constipation, Nurse-Centered Strategies

1. Background

Health is one of the essential concerns of societies (1, 2). In this context, constipation is among the important concerns of childhood in families (3-6) that refers to the frequency of solid defecation occurring with too much pressure and ache (7). In addition, gastroenterology and nutrition council of North America has defined constipation as delay or problem in defecation for more than two weeks if worries the patient or his/her parents (8, 9). Of course, it must be considered that all definitions of constipation are

relative and depend on consistency, frequency, and hardness in the passage of faeces. If it takes more than two months, this situation will be treated as chronic constipation (10). Major causes of constipation are divided into two functional and organic categories. Functional constipation is the most common cause of constipation in children and includes more than 95% of constipation cases among children over 1 year of age (11). In this kind of constipation, no limbic, descriptive, or medicinal cause can be found for the disease (12). Constipation constitutes 3% - 5% of visits

to pediatric clinics and about 25% of visits to pediatric gastroenterologist (13, 14). Moreover, it is often proposed as a main problem for the patient and his family, imposing much cost on the society (8). According to a recent report by American Health Center, the cost of treatment of children's constipation has been estimated 3.9 billion dollars in a year (14). Based on a study done by Youseff et al. (2005), children's life quality is affected by constipation and fecal incontinence is lower in them as compared to normal children and even to those children who have more severe digestive diseases as inflammatory bowel disease and stomach to gullet reflex (15). In addition, constipation can bring about undesirable physical and psychic consequences like depression, anorexia, anxiety, fissure, anal bleeding, and most importantly fecal incontinence with average prevalence of 84% (16). According to several studies, fecal incontinence is proposed as a negative predictive factor in obtaining successful treatment results for constipation (17).

Treatment options of functional constipation are chosen based on experimental observations, clinical experiences, and patient's preferences. Common treatment of constipation consists of 4 main steps including training, disimpaction, maintenance therapies, and therapeutic behavior. Although scientific evidence on the application of common methods in treating constipation and fecal incontinence is strong and developing, application of these methods alone does not remove the symptoms completely and it accompanies side effects in some children. Thus, this situation limits the application of these methods so that according to a study conducted by Youseff et al. (2002), there is little success in spite of effectiveness of common treatments of constipation in some children and adolescents including those who have slow intestinal movement or those whose defecation roots in social, psychological, and nervous factors (like those children who avoid using school toilets because of fear, feeling of insecurity or because these toilets are dirty or smell badly) (18). This shows that common treatments may be insufficient for these people (11).

Many references explain that diet, lifestyle, and cognitive, affective, and socio-psychic factors can play a role in etiology and effectiveness of treatment for functional constipation. This problem may take some months or years due to the multi-factorial nature of constipation (11); and its treatment needs a comprehensive and properly planned program and cooperation of a team consisting of the child, parents, and therapists (11). The study of Burnnet et al. (2004) showed that children with constipation need a follow-up program to obtain effective therapeutic results (3) and follow-up programs can solve the problem and assure the patient about continuing treatment. Therefore, having planned visits for follow-up is recommended since

nurses can play an important role in curing children's constipation (19) and it is considered as an important educational reference (11).

2. Objectives

This study aimed to determine the impact of nurse-centered strategies on children's chronic functional constipation; meanwhile, the strategies had two basic elements of follow-up and training.

3. Methods

This research is a pseudo-experimental study aiming at determining the impact of nurse-centered strategies on chronic functional constipation of children aged 3 - 14 years referring to Imam Reza Clinic of Shiraz University of Medical Sciences in 2013. Research population consisted of children aged 3 - 14 years.

The sample size was set at 52 for each group according to previous studies (8) and this figure increased to 60 people to reduce errors. By the end of the research, 25 people were excluded from the study (13 individuals from the experimental group and 12 individuals from the control group) because the program and its follow-up lasted long (3 months). Therefore, at the end, 48 persons in the control group and 47 in the experimental group participated in the study.

$$N = \frac{2\sigma_2 \left(z_{1-\frac{\alpha}{2}} + z_{1-\beta} \right)^2}{(1 - \mu_1\mu_2)^2} \quad (1)$$

$$\sigma = 5.5, \alpha = 0.05, \beta - 1 = 0.8, \mu_1 - \mu_2 = 3$$

The instrument used included a data gathering form and a notebook to record daily functioning of the intestine. To choose sample, 3-14 year old children referring to Imam Reza Clinic of Shiraz who were diagnosed with chronic functional constipation based on the data gathering form (including Rome 3 criteria items Box 1) and confirmed by a pediatric gastroenterologist were selected. Therefore, children with inclusion criteria entered the study willingly. The first person was placed in the control or experimental group by chance and the rest were alternately designated to the control or experimental group. At the end, 48 subjects were placed in the control group and 47 in the experimental group using the convenience sampling method.

All legal guardians of the study participants provided an informed written consent prior to study enrollment. The signed consent forms were available in Persian. Each person entering the study was offered a notebook for recording daily functioning of his/her intestine to note

Box 1. Rome 3 Criteria**Two or More of the Following Six Characteristics During the Last Week:**

1. Two or fewer defecation in the toilet per week
2. At least one episode of fecal incontinence per week
3. History of retentive posturing or excessive volitional stool retention
4. History of painful or hard bowel movement
5. Presence of a large fecal mass in the rectum
6. History of large diameter stools that may obstruct the toilet

the symptoms related to constipation. The experimental group participated in a comprehensive nurse-centered program in addition to usual treatment that was prescribed by the doctor for them. For the intervention, each person participated in three training sessions with his/her parents that were held in Imam Reza Clinic. In each of these sessions, certain subjects were discussed and three training pamphlets containing the required training notes (points on introducing constipation and points related to nutrition and behavior) were given to the parents. In addition, the researcher nurse was available one day a week in a room at Imam Reza Clinic, investigating the improvement trend of children using daily notebooks; she offered the child's parents necessary recommendations and advice if required.

The follow-up period continued for 3 months. Of course, during this period, the nurse contacted the children and their parents by telephone, assessing their status and offering the required advice. In addition, at the end of the study, daily notebooks completed by the experimental group subjects were surveyed completely; the person's constipation condition after 1, 2, and 3 months from the beginning of the nurse-centered program was compared with that before the program beginning.

Children in the control group received only the usual treatment prescribed by the doctor. The usual treatment in the research means treatment that the doctor usually prescribes for patients referring to the Clinic for dissipation, if required, polyethylene glycol prescribing, and recommendations about diet and necessary trainings briefly. The medicine prescribed usually by the doctor in case of diagnosis of functional constipation was 40% polyethylene glycol solution produced by Pharmacy Faculty of Shiraz University of Medical Sciences with certain and fixed formula and taste that is distributed in pharmacies of Imam Reza and Shahid Motahhari Clinics. The dose of the medicine was 1 cc per kg of the child's weight 2 times a day.

At the end of each month, the children's constipation status was completely surveyed based on the daily note-

books filled out by these people. The patients' constipation condition after 1, 2, and 3 months from the beginning of the program was compared with that before the program beginning using statistical tests. At the end, a training pamphlet including some required points about constipation was given to subjects in the control group. Then, the scores on constipation before starting the study, 1, 2, and 3 months after the study were compared in both control and experimental groups.

It is worth mentioning that daily notebooks were filled out by the child (if he/she could do so) or his/her parents every day; the completed notebooks were gathered monthly by the nurse and replaced by a new notebook. Therefore, 3 notebooks were used by each child for 3 months, i.e. the period of the study. Data were analyzed by SPSS 16 using independent statistical t test and chi square test. The significance level was considered 0.05 in the study.

4. Results

In this study, the average values of quantitative variables like age, weight, and duration of constipation were compared using t. Overall, 95 constipated children participated in this study and their mean age in the experimental and control groups were 6.25 ± 2.71 and 6.21 ± 2.68 , respectively. The mean weight in the experimental and control groups was 23.30 ± 12.03 and 21.37 ± 9.35 , respectively. In addition, the mean duration of constipation in the experimental and control groups was respectively 35.80 ± 28.55 and 44.33 ± 34.68 . Qualitative variables such as gender ratio (male/female), family history, and previous treatments history were compared using chi square test. Male-female ratio in the experimental and control groups was 29 to 18 and 27 to 21, respectively. Frequency of positive family history was 59.6% in the experimental group and 47.9% in the control group. Frequency of positive previous treatments history was 66% in the experimental group and 72.9% in the control group (Table 1). In all of the variables, there was no statistically significant difference between the two groups (P value > 0.05). Therefore, there was a similarity in the subjects of the study groups, which is necessary in clinical trial studies. The improvement percentage that was measured by chi square after 1 month from the beginning of the program was 70.2% in the experimental group and 70.8% in the control subjects (P value = 0.947). After two months, the rates were 83% and 68.8%, respectively. Therefore, the improvement percentage was 14.2% higher in the experimental group compared to the control group (P value = 0.106). Moreover, there were 83 and 72.9% improvements in each group. Then, the improvement value in the experimental group was 10.9% higher than that in the control group (P value = 0.237) (Table 2).

Table 1. Individual Characteristics of Patients in the Intervention and Control Groups^a

Variables	Control Group	Intervention Group	P Value
Gender			0.260
Male	27	29	
Female	21	18	
positive history of previous therapy	53	47	0.461
Positive family history of constipation	45.1	54.9	0.255
Age, y	6.21 (± 2.68)	6.52 (± 2.71)	0.580
weight	21.37 (± 9.35)	23.30 (± 12.03)	0.394
Duration of constipation	35.80 (± 28.55)	44.33 (± 34.68)	0.195

Abbreviation: SD, Standard Deviation.

^aValues are expressed as mean (± SD).**Table 2.** Comparison of Improvement Percentage in the two Groups one Month, Two Months, and Three Months After the Intervention

Improvement Status	Experimental	Control	P Value
Improvement status in 4th week			0.947
improvement	33 (70.2)	34 (70.8)	
constipation	14 (29.8)	14 (29.2)	
Improvement status in 8th week			0.106
improvement	39 (83)	33 (68.8)	
constipation	8 (17)	15 (31.2)	
Improvement status in 12th week			0.237
improvement	39 (83)	35 (72.9)	
constipation	8 (17)	13 (27.1)	

The influence of group and time variables during 12 time points (12 weeks) was evaluated based on a GEE model on the recovery process. As can be seen, only the effect of time was significant among the independent variables (P value < 0.001). Thus, it can be said that from one time to the next, the chance of recovery increased by 1.105%. In addition, the study showed that the two groups did not have a statistically significant difference in terms of recovery (Table 3).

Table 3. The Process of Changing the Percentage of Recovery Variable (s) by Considering the Independent Variables of Group and Time

Parameter	S	P Value	EXP(β)	Lower	Upper
Group	experimental	0.225	1.520	-0.258	1.095
	control		1		
Time		< 0.001	1.105	0.050	0.149

5. Discussion

In this study, response to treatment was measured based on Rome 3 criteria to confirm improvement if the patient did not suffer from constipation according to the criteria. It is worth mentioning that in the present study, the percentage of response to treatment (improvement) was measured in three different times, i.e. 1, 2, and 3 months after the beginning of the study. Results of the present study showed that improvement was observed in 70.2% of the patients in the experimental group one month after the intervention and this value was significant. It shows that nurse-centered strategies have been very effective in improving constipation in children. On the contrary, improvement percentage reached 70.8% for the one-month period in the control group. Therefore, we can say that during a month, the impact rate of the combined strategy of nurse-centered and usual treatment prescribed by the doctor is the same as that of the doctor's usual treatment alone (P value = 0.947). Accordingly, it can be mentioned

that the impact rate of the combination of nurse-centered and doctor's usual treatment was significant as much as the impact rate of the doctor's usual treatment alone for a month. Two months after the study, improvement percentage increased to 83% in the experimental group while it decreased in the control group, showing that the impact of nurse-centered strategies on the improvement of children's constipation was more significant with an increasing trend compared to the doctor's usual treatment. The improvement value reached 83% in the experimental group and 72.9% in the control group after three months. Since the improvement value in the experimental group had 40.9% rise compared to the control subjects, we can claim that nurse-centered strategies have had more impact on children's constipation improvement (P value = 0.237). Consequently, since the improvement value was permanently increasing in the experimental group during the 3 months after the beginning of the study, we can claim that the impact of nurse-centered strategies will increase as time passes and in longer time its impact will reach a level in which a statistically significant difference will be observed compared to the physician's usual treatment. Results of the study done by Bongers et al. (2009) that planned a follow-up period for a long time constipation in children showed that constipation would improve in many children during time (20). Ismail et al. (2011) showed that referral to a nurse-centered constipation clinic will cause a significant improvement in all therapeutic aspects of constipation (21) and the results of this study is compatible with those of the present study. In addition to this study, Burnett et al.'s study (2004), which was done with aim of evaluating the effectiveness of nurse-centered treatments compared to doctor-centered treatments, indicated that 65.4% of people participating in nurse-centered clinics and 50% of those from doctor-centered clinics showed improvements. Therefore, the improvement of children referring to the nurse-centered clinic was more than the improvement of those referring to the doctor-centered clinics (19). These results are compatible with those of the present study. Results of a study done by Marikeh van Dijek et al. (2008) showed that the success percentage after treatment was 62.3% in the group undergoing traditional treatment and 51.5% in the behavior therapy group. Although the success percentage was 10.8% higher in traditional therapy than in behavior therapy, no statistically significant difference was found between the two groups (P value = 0.249). Moreover, after 6 months of follow-up, the success percentage fell to 57.3% in traditional therapy and to 42.3% in behavior therapy, showing again no significant difference (P value = 0.095). The results of the study were not compatible with the present study findings because the impact of traditional therapy was relatively

higher than the impact of behavior therapy in spite of insignificant relationship between the two groups. This incompatibility can be due to the different definition that Marikeh van Dijek et al offered for therapy success. The success in therapy was defined as defecation for more than 3 times a week and fecal incontinence for lower than 1 time in two weeks. In this study, behavior therapy was offered by pediatric psychologists while in the present study nurse-centered strategies were offered by pediatric nurses (22). In addition, the results of the study carried out by Browitz et al. showed that there was no statistical difference between medication, a combination of medication and toilet training, and a combination of medication and toilet training and feedback training (23). The results of the study were compatible with those of the present study.

5.1. Conclusion

The results of the study showed that the difference between the nurse-centered strategy and doctor's usual strategy was not significant; however, because the effect of nurse-centered strategy was increasing, the difference could be expected to be significant gradually.

Therefore, according to the above findings, it is suggested:

- Nurse-centered strategies should be considered as a part of therapy plans offered in pediatric gastroenterology clinics.
- Nurses should train children and parents in pediatric gastroenterology clinics.
- Nurse-centered strategies should be planned to train the parents because many problems of children can be solved in this way.
- The study showed the necessity of promoting constipation clinics by hygienic team.

Supplementary Material

Supplementary material(s) is available [here](#) [To read supplementary materials, please refer to the journal website and open PDF/HTML].

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Footnote

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