

Therapy of Chronic Functional Constipation in Children before and after Dietary Education

M Salehi¹, M Dehghani², MH Imanieh^{2*}

¹Department of Nutrition, School of Public Health, ²Gastroenterohepatology Research Center, Nemazee Hospital, Shiraz University of Medical Sciences, Shiraz, Iran

Abstract

Background: The prevalence of chronic constipation in children has been reported between 0.3 and 28%. This study was conducted in southern Iran to compare the effect of a balanced and high fiber diet in children with chronic functional constipation.

Methods: During summer 2007, all children (60) who referred to the Pediatric Department of Mottahari Clinic affiliated to Shiraz University of Medical Sciences and were diagnosed with chronic functional constipation entered this study. A questionnaire on the child's routine dietary regime was filled in for each child through face to face interviews with the parents. The questionnaire included demographic information, food habits, physical exam, and the para-clinical results of each participant. 30 parents were trained to supply a high fiber diet for their children, and its effect on chronic functional constipation was followed after two months. The children of these parents were considered as the case group and the other 30 children were considered as the control group.

Results: Before the parents were educated, the amount of fiber intake from fruits and vegetables by the children was 7.6 ± 2.1 gr. in the case group which increased to 24.25 ± 2.3 gr. after 2 months of training. The amount of water intake was 280 ml before training which increased to 600 ml afterwards and that of milk and yoghurt intake was 280 and 240 ml which decreased to 60 and 200 ml after training, respectively. The amount of beverage and fruit juice intake was 280 and 220 ml while after training it decreased to 100 and 60 ml, respectively. In the case group, 10% of the children had 3 to 6 times defecation per week before the intervention while this increased significantly to 56.7% of the children after the training. The stool consistency significantly changed from very firm to normal and soft consistency after training and the times of stool defecation increased significantly, too. The children's nutrition status changed from a poor state to a good status after training.

Conclusion: Drug treatment was more effective in children that consumed high-fiber diet. It was shown that some of these changes were significant. The difference between the two groups was not, of course, significant which might be due to the small sample size.

Keywords: Constipation; Children; High fiber diet; Southern Iran

Introduction

It has been estimated that the prevalence of chronic constipation in children varies between 0.3-28% worldwide. About 16% of the mothers with children of 22 months old reported constipation in their children. In England, 34% of the children between 4-11 years reported constipation while 5% of the reports

were about chronic constipation in ages after 6 months old.¹ In western countries, 10% of the children were reported to suffer from chronic constipation but only 3% of their parents had followed a treatment protocol for their children.² Different factors such as genes, early toilet training of children and/or difficulty in learning it,³ changing diet from breast feed to formula and/or liquid to solid food, having painful and difficult defecation, early commencement of school,⁴ infrequent defecation as necessity, poor fiber dietary regime, inadequate liquid intake, immobilization, psychological problems, and anxiety can cause constipation during childhood.⁵

*Correspondence: Mohammad Hadi Imanieh, MD, Professor of Pediatric Gastroenterohepatology, Nemazee Hospital, Shiraz University of Medical Sciences, Shiraz, Iran. Tel: +98-711-6474263, Fax: +98-711-6474263, e-mail: imaniehm@sums.ac.ir
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Constipation is defined as bowel movements less than 3 times per week accompanied by pain or tenesmus during defecation. It is not an age related process but it is usually associated with chronic diseases, insufficient fiber and liquid intake, immobilization, and side effects of drugs as well. Although constipation has few symptoms, it hampers functioning and life quality in the elderly.⁶ Constipation is common in childhood, its recovery is a difficult process, and it is not easily acceded. It is more common in very low weight and formula fed children. 40% of children with chronic constipation have symptoms during the first year of their life and an increase in fiber intake is a treatment modality for these children; it has no adverse effect on nutrition.⁷ However, a successful treatment for chronic constipation could not be achieved with a high caloric intake in these children.⁸ Dietary fibers are indeed of plant sources that are resistant to digestion including cellulose, hemicelluloses and lignin while soluble fibers contain pectin and propectin.⁹ Fibers have a mechanical stimulation on the colon movements, affect defecation, and result in soft stool that is appropriated for children with firm stool.¹⁰ Moreover, fibers cause an increase in the liquid content of the stool in the colon, microbial mass, stool weight and its frequency of passage in the colon.⁴ They are mostly in full wheat, fruits, vegetables, grain, seeds, and beans, and contain nutrients and sufficient useful photochemical conserving microbial flora of the colon as probiotics,¹¹ which are not only high in fiber but also in organic supplies of vitamins, minerals, and antioxidants.²

This study was carried out in southern Iran to determine the effect of a balanced and high fiber diet on children with chronic functional constipation.

Materials and Methods

During summer 2007, all children (60) referring to Pediatric Department of Mottahari Clinic affiliated to

Shiraz University of Medical Sciences and diagnosed as chronic functional constipation entered this study. A questionnaire was filled in for each child by face-to-face interview with their parents on their child's routine dietary regime. The questionnaire comprised demographic information, food habits and the result of physical exam of each participant. 30 parents were randomly chosen and trained by a dietitian to supply a balanced high fiber diet for their child (case group). Then, its effect on chronic functional constipation was followed for two months. 30 children were considered as the control group; they received medication for their problem (Polyethylene glycol, 0.6 g/kg, twice per day). The training was repeated every 2 weeks during the 2 month period of the study. A written consent was taken from the child's parents and the study was approved in the Ethics Committee of the university.

Paired T-test and Wilcoxon Signed Rank Test were performed for statistical analysis, using SPSS software (Version 11.5, Chicago, IL, USA). A *p* value less than 0.05 was considered significant.

Results

Among the participants, 19 (31.6%), 30 (50%), 5 (8.3%) and 6 (10%) children were in the age groups of 1-5, 6-10, 11-15 and 16-20, respectively. 28 (46.6%) of them were male and 32 (53.3%) were female. Before training the parents, the amount of their fiber intake from fruits and vegetables was 7.6 ± 2.1 gr. in the case group which increased to 24.25 ± 2.3 gr. after 2 months of training. The amount of water intake was 280 ml before training, increasing to 600 ml afterwards. The amount of milk and yoghurt intake was 280 and 240 ml which decreased to 60 and 200 ml, respectively after training. The amount of beverage and fruit juice intake was 280 and 220 ml while after training it decreased to 60 and 100 ml, respectively (Table 1). Tenesmus decreased to 7 patients in the case group (out of 25 children with the problem) and to no

Table 1: Intake of different foods in the case group

Time	Variables	Milk	Yoghurt	Water	Fruit juice	Beverage
Before	Mean±SD	1.4±0.2	1.2±0.2	1.4±0.4	1.1±0.9	1.4±0.2
	CC	280	240	280	220	280
After	Mean±SD	0.3±0.2	1±0.2	3±0.2	0.5±0.1	0.3±0.1
	CC	60	200	600	100	60
PV*		0.013	0.041	0.000	0.057	0.006

*Paired t Test

child in the control group (out of 9 children) ($p=0.018$).

The number of stool defecations increased significantly as well ($p=0.001$). In the case group, 10% of the children had 3 to 6 times of defecation per week before the training on consumption of a high fiber diet while it increased to 56.7% of the children after the training ($p=0.027$) (Table 2). The consistency of the stool changed from very firm to normal and soft after training ($p=0.001$). 83.3% of the case group had very firm stool, which decreased to 13.3% after training (0.001) (Table 3); it decreased from 36.7% to 3.3% in the control group (0.047, Table 4). Nutrition status also changed from moderate or poor to a good quality after training. The severity of pain and tenesmus during defecation significantly decreased after training on a balanced and high fiber diet in addition to adequate liquid intake and increased physical activity ($p=0.012$). Similar results were achieved with drug administration; decreasing the severity of pain and dif-

ficulty in defecation in the control group ($p=0.039$).

Discussion

In a study conducted by Stephen et al., the parents of children with constipation reported severe pain and difficulty in defecation as the most important factor causing constipation.⁶ Our findings showed that decreased intake of beverage and fruit juice not only increased the child's appetite and did not prevent the child from receiving appropriate food, but also it increased the child's desire for eating fruit that is a factor in high fiber intake and decreased complications of constipation. Increased water intake also revealed a significant effect on relieving constipation due to increased stool mass and its lubrication. In a similar study done by Gomes et al., the amount of fiber intake was evaluated in children and it was noticed that

Table 2: Defecation times in the case group

Variable		Number of defecation times		
		2 times or less per week	3 to 6 times per week	One time per day
Before	Number	26	3	1
	Percent	86.7%	10%	3.3%
After	Number	6	17	7
	Percent	20%	56.7%	23.3%
PV*		0.018	0.027	0.087

*Wilcoxon Signed Rank Test

Table 3: Stool consistency in the case group

Variable		Stool consistency			
		Very firm	Firm	Normal	Soft
Before	Number	25	3	1	1
	Percent	83.3%	10%	3.3%	3.3%
After	Number	4	2	22	2
	Percent	13.3%	6.7%	73.3%	6.7%
PV*		0.000	0.213	0.000	0.241

*Wilcoxon Signed Rank Test

Table 4: Stool consistency in the control group

Variable		Stool consistency			
		Very firm	Firm	Normal	Soft
Before	Number	11	15	4	0
	Percent	36.7%	50%	13.3%	0
After	Number	1	4	18	7
	Percent	3.3%	13.3%	60%	23.4%
PV*		0.047	0.053	0.001	0.115

*Wilcoxon Signed Rank Test

fiber intake less than the suggested amount (age +5 gr.) was a risk factor for chronic functional constipation in children.¹² In a study done by Wisten et al. in Sweden on determining the role of fruit and fiber intake in preventing constipation, it was revealed that high fiber diet and also fruit intake had significant effects on decreasing laxative prescription and also decreased complications of constipation in these patients ($p<0.05$).¹³ In another study done by Carvalho et al. in Brazil, dietary fiber intake and constipation were evaluated in adolescents, showing that fiber intake less than the suggested amount (age +5 gr.) was 61.8% and 41.4% in private and governmental school girls ($p=0.00$) and 44.1% and 25.5% ($p=0.001$) in boys, respectively.¹⁰ They showed that grain intake (containing high amounts of fiber) more than four times per week supplied the sufficient amount of dietary fiber and had a significant effect on relief from constipation in adolescents.¹⁴ In our study, it was indicated that drug intake prescribed by physicians had also a significant effect on improving the stool consistency ($p=0.047$) (table 4), increasing the defecation times ($p=0.039$), and decreasing pain during defecation ($p=0.015$). These were often comparable with the effect of a balanced and high fiber diet on constipation.

Our results showed that a decrease in the intake of beverage and fruit juice not only increased the child's

appetite, but also increased the consumption of the fruits as a high fiber diet resulting in a decrease in complications of constipation.

Conclusion

Parents that used the diet as trained by the dietitian for their children with chronic functional constipation could affect the drug therapy more. As seen in Tables 1 and 2, in some of the results these changes were significant. The results of the patients that used the diet as trained were better than those of the patients not using the so-called diet. The non-significant difference obtained in this study might be attributed to the inadequate sample size.

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