Original Article

Evaluation of Bowel Management Program on Quality of Life in Children with Fecal Incontinence

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Abstract

Background: Fecal incontinence (FI) is a common disorder that affects the psychological, social, and mental aspects in children. It was showed that the quality of life (QoL) in children with FI was in low level. Bowel management program (BMP) is one of the most effective and low-cost therapies in selected children with FI, but it has also significant effects on mental functions. This study was conducted to evaluate the impact of BMP on the QoL of children with FI. **Materials and Methods:** In a case series study, we prospectively included all school-age children suffering from FI who had visited in colorectal follow-up center of Isfahan University of Medical Sciences. Patient eligibility included children with FI between 8 and 12 years who were candidate of BMP. The QoL was assessed by Persian version of pediatric QoL (PedsQL) 4.0. **Results:** In this study, 24 children with FI were studied. Our results showed that total QoL score is significantly different after BMP. The mean score of physical performance before and after BMP was significantly different ($P = 0.02$). In terms of emotional performance, the mean score of this dimension before and after starting of BMP was significantly different ($P = 0.06$). In terms of social performance, the mean score of this dimension before and after starting of BMP was significantly different ($P = 0.008$). **Conclusion:** BMP is a low-cost and affordable treatment that can have a significant impact on improving the QoL of the child by improving intestinal function.

Keywords: *Bowel management program, fecal incontinence, quality of life*

Introduction

Fecal incontinence (FI) is a common disorder that affects the psychological, social, and mental aspects in children.[1] Studies show that FI exists in 25% of children with anorectal disorders and in a large percentage of patients with spinal abnormalities[2] and can cause shame, fear, and a decreased self-confidence in the child.[3] It also affects their family negatively as conflicts, distress, and can make interacting with the therapy team.[4] A recent study showed that the quality of life (QoL) in children with FI was in low level.[5] Another study showed that the social and emotional performance of children were impaired with incontinence.[6]

Bowel management program (BMP) is one of the most effective and low-cost therapies in selected children with FI. It is used today in various centers around in the world. Although the main goal of BMP is keeping the child clean for 24 h a day,[7-9] Lombardi *et al*.[8] showed that it also significant effects on mental functions.

So far, the QoL in children with FI and the effects of BMP on it was not studied in Iran. Therefore, this study was conducted to evaluate the impact of BMP on the QoL of children with FI.

Materials and Methods

This is a case series study, carried out in the Department of Pediatric Surgery, Isfahan University of Medical Sciences (IUMS), from April 2017 to December 2018. After obtaining approval from hospital ethics committee, we prospectively included all school-age children suffering from FI who had visited in colorectal follow-up center of IUMS. Inform consent was obtained from the parents. The exclusion criteria were unwilling of children/parents to do enema or maintain participating the study and patients whose treatment was carried out by other centers. Patient eligibility included children with FI between 8 and 12 years who were candidate of BMP for at list six months. In the first visit, data such as age,

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sex, and cause of illness (neurogenic, Imperforate anus), were gathered.

The present questionnaire [Figure 1] was the Persian version of PedsQL designed to measure the QoL of children aged 8–12 years and has 23 questions with 5 options scored in the Likert scale ranged from 0 (always) to 100 (each time). The validity and reliability of the Persian version were established by Mohamadian *et al*. in 2014.[10] The reliability with Cronbach-alpha was 0.82 and for the subscales were 0.65–0.77.

In addition to total QoL, four subscales were evaluated including physical function, emotional performance, social performance, and academic performance [Table 1].

Regarding to this questionnaire, higher score shows a higher QoL. The score obtained for each subscale is between 0 and 100, if <25, the QoL is low, the score of 25–75 the QoL is average, and a score of 75 and more is high QoL.

Distribution of the data was evaluated by Kolmogorov–Smirnov test. The scores of overall QoL and the subscales before and after BMP were reported as mean ± standard. The scores of subscales were compared through paired *t*-test for normal and Wilcoxon for nonnormal distributed data. $P < 0.05$ was considered significant. The children's QOL was assessed before and 3 months after the beginning of BMP.

Results

In this study, 24 children with FI were studied. Ten (41.7%) were boys and 14 (58.3%) were girls. The mean age of girls was 8.33 ± 1 years (min = 6, max = 12) and the mean age of boys was 8 ± 1.19 years (min = 6, max = 10).

Table 2 shows changes in the QoL dimensions before and after BMP. Our results showed that total QoL score is significantly different after BMP.

The mean score of physical performance before and after BMP was 57.44 ± 28.52 and 70.65 ± 21.99, respectively, and it was significantly different ($P = 0.02$). The mean scores of this performance in girls before starting BMP was 32.58 ± 28.68 (Mi*n* = 0, Max = 71.55) and after that was 65.17 ± 21.07 (min = 43.75, max = 96.55). The mean score of this performance in boys before starting BMP was 58.85 ± 39.54 (min = 0, max = 100) and after starting from BMP was 65.10 ± 38.50 (min = 0, max = 1000).

In terms of emotional performance, the mean score of this dimension before and after starting of BMP was 55.00 ± 27.12 and 69.34 ± 23.61, respectively, and it was significantly different ($P = 0.06$). The mean scores of this performance in girls before starting BMP were 49.28 ± 31.51 (min = 0, max = 90) and after that were 65.17 ± 21.07 (min = 0, max = 90). The mean score of this performance in boys before starting BMP was 49.28 ± 31.51 (min = 0, max = 100) and after starting from BMP was 70.83 ± 36.79 (min = 0, max = 100).

Figure 1: PedsQL 4.0

Subscale	Questions	Scores				
		Always (0)	Often (1)	Sometimes (2)	Less often (3)	Never (4)
Physical functioning	Hard to walk more than a block					
	Hard to run					
	Hard to do sports or exercises					
	Hard to lift something heavy					
	Hard to take a bath or shower					
	Hard to do chores around house					
	Hurt or ache					
	Low energy					
Emotional functioning	Feel afraid or scared					
	Feel sad or blue					
	Feel angry					
	Trouble sleeping					
	Worry about what will happen					
Social functioning	Trouble getting along with peers					
	Other kids not wanting to be friends					
	Teased					
	Doing things other peers do					
	Hard to keep up when play with others					
School functioning	Hard to concentrate					
	Forget things					
	Trouble keeping up with schoolwork					
	Miss school - not well					
	Miss school - doctor appointment					

Table 1: Pediatric quality of life questionnaire

Subscales	Questions and scores
Physical function	Sum of scores 1 to 8 divided by 8
Emotional performance	Sum of scores 9 to 13 divided by 5
Social performance	Sum of scores 14 to 18 divided by 5
Educational performance	Sum of scores 19 to 23 divided by 5
Psychological health	Sum of questions 9 to 23 divided by 15

Table 2: The scores of quality of life and subscales before and after bowel management program

Dimensions	Pre-BMP scores	Post-BMP scores	*P*
Physical performance	57.44±28.52	70.65±21.99	0.02
Emotional performance	55.00±27.12	69.34±23.61	0.06
Social performance	59.28±28.34	77.14±20.	0.008
Educational performance	59.15±24.57	69.56±23.35	0.7
Total QoL	57.67±21.09	71.30±17.48	0.01

QoL: Quality of Life, BMP: Bowel management program

In terms of social performance, the mean score of this dimension before and after starting of BMP was 59.28 ± 28.34 and 77.14 ± 20.58, respectively, and it was significantly different (P = 0.008). The mean scores of this performance in girls before starting BMP were 41.42 ± 32.49 (min = 45, max = 100) and after that were 72.14 ± 26.90 (min = 45, max = 100). The mean score of this performance in boys before starting BMP was 46.66 ± 28.92 (min = 0, max = 80) and after starting from BMP was 70.00 ± 36.27 (min = 0, max = 100).

In terms of educational performance, the mean score of this dimension before and after starting of BMP was 59.15 ± 24.57 and 69.56 ± 23.35, respectively (P = NS). The mean scores of this performance in girls before starting BMP were 39.28 ± 24.73 (min = 0, max = 75) and after that were 48.57 ± 43.08 (min = 0, max = 100). The mean score of this performance in boys before starting BMP was 58.33 ± 32.35 (min = 0, max = 80) and after starting from BMP was 62.50 ± 33.72 (min = 0, max = 90).

Discussion

FI in children can create fear and embarrassment that reduces child self-esteem.[8] Bongers *et al*. showed that two-thirds of children with excretory system disorders were afraid of getting a dirty underwear and 70% of children with FI had a fear of getting dirty clothes, and 50% were embarrassed that they have FI. In these children, 37% were angry and <40% believed that they can manage this problem.[6] Previous studies also indicate that anxiety and depression have been observed in these children.[11-13] Not only the child but also parents are distressed and family conflicts occur, which affects the interaction with the treatment team as well as the treatment process and reduces the quality of care and treatment and ultimately, the QoL of the child.[9,10] The current study showed that in our society, children with FI have a QoL at an average level of 48.18 ± 26.16. Bai *et al*. also showed that in Quality of life for children with fecal incontinence after surgically corrected anorectal malformation is poor.[5] In another study, Bongers *et al*. concluded that FI is associated with low social and emotional dimensions.[6]

There are several approaches to managing FI, including sphincteroplasty, colostomy, biofeedback, and sacral nerve stimulation that is either invasive or requires the use of certain devices and tools.[6,11] Meanwhile, BMP is a noninvasive and low-cost method that does not require a dedicated tool.[2] Our study showed that after applying BMP, the QoL increased to come close to the top (73.8 ± 19.2). Smith *et al*. also concluded that BMP played a significant role in managing FI.[13] Laura *et al*. also indicated that BMP not only has significant effects on FI but also on mental functions.[8]

Grano *et al*. in the United States[14] conducted a study on the QoL of children with FI as well as similar QoL assessment tools (PedsQL) which has the QoL of these children before BMP at a close to the top level (73.8 ± 19.2) and after BMP at a high level (93.5 ± 6.2). It was reported that both studies show the successful effect of BMP on the QoL of children. Despite BMP being successful, there is a significant difference in the QoL scores, observed in the two studies, before and after BMP, in which factors such as the level of cultural facilities of society, lifestyle, and even the adaptability of the child and the family are to be considered effective. Wang *et al*.[2] in China also saw a significant difference in the QoL of before and after BMP.

The present study shows that the QoL of these children in the physical dimension is at the average level 57.44 ± 28.52, and after BMP, it almost upgraded to the high level (70.65 ± 21.99). Grano *et al*.[14] also reported that after BMP, an improvement to the physical dimension of the QoL, which matches the current results. Despite this upgrade in the physical dimension, the significant difference between these two studies is in the physical dimension score before BMP. Wang[2] also reported a physical dimension score before BMP at a high level in a study on the effects of BMP on children with FI. Perhaps these differences can be attributed to factors such as living facilities and lifestyle. In general, the physical performance of children and their inability to participate in group and sports activities can be due to abdominal pain and heavy weight because of fecal bulk, whereas BMP will eliminate all these obstacles and keep the child clean for 24 h and as a result, increase the child's ability to participate in group activities, sports games, daily activities, and social communication.

The results of the emotional dimension of this study showed that the performance of children in this dimension before

BMP was at an almost average level (55.00 ± 27.12), which has been upgraded to a higher level after BMP (69.34 ± 23.61). In Lombardi study,[8] this dimension before BMP was (67.1 ± 25.4) at a level close to high and after BMP, it was reported at a high level (90.3 ± 13.2). In Wang *et al*.'s study[2] in China, this dimension before BMP was 36.76 ± 16. 89 at a weak level and after BMP, this dimension was promoted to (63.65 ± 17.56) showing a significant difference.

Due to the psychological conditions of the child and the nightly process and psychological stress caused by the approach in children, favorable conditions regarding this dimension have not been reported in children.[15]

The study showed that children's performance in the social dimension before BMP was (59.28 ± 28.34) at an almost low level and after BMP (77.14 ± 20.58) was promoted to an almost excellent level that corresponds to the results of Wang[2] and Grano.[14] There was a huge difference between the QoL scores before and after BMP was performed. In both studies, the effect of BMP on children's social performance is evident, but the more dramatic difference is that in our country, children had a moderate social performance before BMP, which can be attributed to the inability of children to participate in group games, engaging in sports activities, resulting in fear and embarrassment from being rejected by friends and classmates because of the bad smell caused by FI, their physical weakness and physical inability compared to healthy children. Given our culture, distancing oneself from social activities, the lack of family participation in social affairs, parties and family relationships are very evident after BMP, due to the removal of the problem of FI and the increase in children's self-esteem, the lack of concern for rejection and increased physical capacity over time, we see a significant improvement in this dimension in children in the community.

In the educational dimension of this study, the performance of children before BMP (59.15 ± 24.57) was at moderate level and after BMP (69.56 ± 23.35), it was still moderate, which did not make much difference. In Grano study,[14] the educational dimension had significant improvement after BMP. Due to how children suffering from FI are affected psychologically, problems caused by consecutive absences from school, children before BMP had a moderate level of education that, despite BMP's performance, their educational dimension remained modest and did not change. Fear of dirty clothes at class hours, the need to change clothes, bad smell in class, and getting schoolmates becoming aware of the child's illness, resulting in class dropouts and consecutive absences, and reduced level of education of children with FI. Despite the success of BMP in other dimensions of QoL, the educational dimension is still the lowest of all other dimensions of QoL.

Conclusion

BMP is a low-cost and affordable treatment that can have a significant impact on improving the QoL of the child by improving intestinal function. Although after BMP, the QoL score was promoted in all four physical, social, emotional, and educational dimensions, the child's educational performance, which is directly related to the psychological and social aspects, did not make any significant progress. It is suggested that these children should be supervised by an educational consultant at school. The limitations of this study include lack of cooperation of children and sometimes, parents to carry out the process.

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Conflicts of interest

There are no conflicts of interest.

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