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EFFECT OF BOWEL TRAINIG PROGRAM ON BOWEL CONTINENCE, AMONG CHILDREN WITH FECAL INCONTINENCE

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ABSTRACT

Fecal incontinence (FI) is defined as, inability to control bowel movements, causing feces to leak unexpectedly from the rectum. Bowel training program (BTP), is an ongoing process that is responsive to children and their family needs. The aim of the current study was, to investigate the effect of bowel training program on bowel continence, among children with fecal incontinence. One group pre-post quasi-experimental research design was utilized, to fit the aim of the study. The study was conducted in pediatric colorectal clinics, at Cairo University's Specialized Pediatric Hospital. A purposive sample of 35 children with FI was included in the study. Data were collected using the following tools: structured interview questionnaire, and the Wexner Continence Score, was developed by Jorge and Wexner (1993), this scale used to assess and evaluate the child's bowel movement habits and bowel control. The study results revealed that, the majority of children in the study group had lower Wexner continence mean scores, after implementation of BTP and there were statistically significant differences between children, as regards to the total mean score of Wexner continence, before and after the implementation of BTP. The study results concluded that, the BTP was effective in improving the continence abilities of children with fecal incontinence, as well as assist in regulation of the time of bowel elimination, among those children.

KEYWORDS: Children with Fecal Incontinence, Bowel Training Program, Bowel Continence

INTRODUCTION

Bowel continence is an important milestone in a child's development. This is the first manifestation of a child's independence. Three components are necessary to achieve bowel continence, sensation within the rectum to feel that stool or gas is present, good motility of the colon; peristaltic waves that move the stool through the rectum and good voluntary muscle or sphincter control, which allow for control and retention of stool [1]. Gut motility is irregular, pattern of peristaltic activity different from adults, resulting in longer transit times before 6 months of age ranged from 8 to 96 hours [2].

The term of FI is defined as, inability to control bowel movements, causing feces to leak unexpectedly from the rectum. FI ranges from an occasional leakage of feces, when gas is passed to complete absence of bowel control. [3]. FI has been associated with constipation in up to 90%. Soiling is involuntary, often small as stains in underwear to larger amount, which can be mistaken for diarrhea [4]. The BTP is an ongoing process that is responsive to children and their

family needs. Its succeed depends on the dedication and consistency of everyone, involved in this program, children who remain clean for 24 hours, experience a new sense of confidence and improved quality of life [5]. The pediatric surgical nurse, plays a role to establish a normal and regular pattern of bowel evacuations, is central to eventual success for children with soiling from any cause. The nurse has important role to achieve the objective of bowel training program, it is important that, both parent and the child have a basic understanding of the pathophysiology of FI, for effective bowel management, using simple language and illustrated book. This process decreases anxiety level, eliminates false belief and helps to build a good therapeutic alliance between nurse, child and their family [6].

METHODS

Operational Definition

Bowel Continence

In the current study, the bowel continence is defined as, the ability of the child to control passage of stool without soiling his /her clothes. The researchers measured that, bowel continence through assessment of the type of passage of stool and observe its consistency, using Bristol chart and evaluate the bowel movement habits and bowel control, by Wexner continence score and evaluate the established regular toilet time for children.

Aim of the Study

The aim of the current study was, to investigate the effect of bowel training program on bowel continence, among children with fecal incontinence.

Research Hypotheses

The results of the current study, tested the following research hypotheses:

- Children with fecal incontinence, who will receive the bowel training program, will have lower Wexner continence score than before.
- Children with fecal incontinence, who will receive the bowel training program, will have regular time of elimination than before.

Research Design, Participants & Setting

One group pre-post quasi-experimental research design was used to fit the aim of the current study. A quasi experimental design is one type of experimental design, the group was treated as study group and itself as control group at the same time. The current study was conducted at pediatric colorectal outpatient clinic in the second floor at CUSPH. The pediatric colorectal clinic receives cases of children affected with various surgical disorders either congenital or acquired at a great rate due to the scarcity of this specialty in the other hospitals. A purposive sample of 35 children with FI was exposed to the bowel training program.

Ethical Considerations

A primary approval was obtained from the research ethical committee in the Faculty of Nursing, Cairo University. A written informed consent was obtained from children' mothers, by the researcher after complete description of the purpose and nature of the study in order to obtain their acceptance as well as to gain their cooperation. The researcher

explained the aim of the study, its benefits, data collection tools, duration of the study to children and their caregivers. Children and their caregivers were informed that participation in the study is voluntary, that they have the right to withdraw from the study at any time without giving any reason and that their responses would be held confidentially will be assured to children and their caregivers. After completion of data collection, the final approval was obtained from the research ethical committee in the Faculty of Nursing, Cairo University.

Data Collection tool

The required data was collected through the following tools:

- Structured Interview Questionnaire:-It was developed by the researcher after extensive review of the related literature. It include 39 items classified into three parts:

Part I:-It contained 8 questions related to characteristics of the child such as: child's age, rank within the family, educational level…etc. and 4 items related to personal data about the family of the child such as mother's age, occupation, level of education, occupation etc.

Part II:-History of the Child Illness. It contained 7 items related to illness of the child; it involved data about the child's medical history, signs and symptoms…etc. It includes also questions about frequency of bowel movements, questions to assess the child´s routines and bowel habits as (routine for child' defecation…etc.). It contained items to assess consistency of stool using Bristol Stool Chart, which developed by Lewis and Heaton (1997) who classify the form of human feces into seven categories or types. The chart enables parents and children to identify the predominant type of stool easily and without lengthy descriptions. The seven types of stool are: type (1): separate hard lumps, like nuts (hard to pass); type (2): sausage-shaped, but lumpy; type (3): the stool looks like a sausage but with cracks on its surface; type (4): like a sausage or snake, smooth and soft. Type (5): the stool becomes soft blobs with clear cut edges (passed easily); type (6): fluffy pieces with ragged edges, a mushy stool, type (7): the stool looks watery, no solid pieces, entirely liquid. Types 1 and 2 indicate constipation, with 3 and 4 being the ideal stools (especially the latter), as they are easy to defecate while not containing excess liquid, and 5, 6 and 7 tending towards diarrhea.

Part III: Child history of toilet training and fecal incontinence. It contained 9 questions such as (information about time of start toilet training, problem faced mother during training ….etc. It also consisted of 11 items about FI such as soiling, management of constipation, use of laxatives…..etc.

The Wexner Continence Score: Wexner continence score was developed by Jorge and Wexner (1993), to assess and evaluate the bowel movement habits and bowel control. This scoring system was used to assess type and frequency of incontinence, it evaluate 5 items (solid, liquid, gas, wear pad and life style alteration). The scoring system was a 5 point likert scale, ranged from 0-4, where never (0); rarely (1); sometimes (2); usually (3) and always (4).

The total score was ranged from 0–20 (where 0 = perfect continence and 20 = complete incontinence). Each of the incontinence presentations is graded equally in this scoring system. This scoring system was used to assess and evaluate the bowel movement habits and bowel control of children before and after the bowel training program.

Data Collection Procedure

The study was carried out on three phases: preparatory, implementation and evaluation phases.

Preparatory Phase

Before conducting the current study an official permission was obtained from the director of CUSPH and the chairperson of pediatric surgery department. The researcher was filling the structured interview questionnaire from children who are fulfilling the study inclusion criteria on individual bases. The time spent to fill in the sheet ranged between 15 to 30 minutes for each child and his/ her mother. Complete past history about bowel habit of each child was obtained (e.g. first passing of meconium, frequency of stool …etc.). Toileting habits of each child were assessed by the researcher using the structured interview questionnaire. The character of stool was assessed before the implementation of the bowel training program using Bristol Stool Chart. Wexner Continence Score was used, to assess and evaluate the bowel movement habits and bowel control, before the implementation of bowel training program.

Implementation phase

The researcher provides simplified Arabic instructions after filling in the questionnaire sheet from each child. The instructions were given through an illustrated booklet designed by the researcher to children at pediatric colorectal outpatient clinic about bowel training program. The instructions were provided through two followed consecutive sessions, each one took about 30-45minutes in colorectal clinic, used simple langue and illustrated picture. In first session the researcher started with regimen of food It contained items about diet that stimulate colon motility that help colon to return to normal size (all green vegetable that rich with fiber, fruit such as oranges, watermelon and drink daily cup of milk, bread rich with fiber …etc.) toileting bowel habits (timing to go to bathroom after each meal, suitable position on bathroom, using stool diary designed by researcher at assess how child carried out the instruction about frequency of toilet sit after 3 meals The researcher teach the child and their mother how to fill schedule of sitting on toilet developed by researcher and in second session the researcher teach the mothers about daily enema for 3days followed by daily laxative as prescribe by doctor and teaching how to use home enema for the child properly, the teaching was done through demonstration and remonstration using doll ready enema and illustrated pictures and present in illustrate booklet.. Follow up the child with telephone and answer any question.

Evaluation Phase

The researcher evaluated the bowel continence of children after implementation of bowel training program. The continence score was assessed and evaluated at 2weeks after first session of the program and at 4 weeks after the implementation of the BTP using Wexner Continence Score, to assess and evaluate bowel continence, after implementing the bowel training program. Data collection procedure took six months to be completed and, started from beginning of January 2016 to end of June 2016.

Tools Validity and Reliability

Data collection tools were developed after extensive reviewing of literature. The tools were reviewed by 5 experts in pediatric surgery nursing, and pediatric surgery to test the content of the tools. Internal consistency and reliability were determined using Cronbach's alpha for protocol of care was 0.75.

Statistical Design

The collected data were, coded, categorized, tabulated, and analyzed using (SPSS 21.0). Descriptive data were

expressed as mean and standard deviation. Qualitative data were expressed as frequency and percentage. Chi-square was used to detect the relation between mothers' knowledge based on their selected personal variables. Comparison of means was performed using paired-sample t-test. Correlation among variables was done using Pearson correlation coefficient. The significance level of all statistical analysis was at < 0.05 (P-value).

RESULTS AND DATA ANALYSIS

Part I: Personal data about Children with Fecal Incontinence and Their Mothers

Table 1: Percentage Distribution of Personal Data about Children with FI (n=35)

Children' personal data	N	%
Child's age/year:		
6 <8	19	54.3
8 < 10	12	34.3
10 to 12	4	11.4
Mean ±SD	7.5 ±1.42	
Child's rank in the family:		
First	18	51.4
Second	10	28.6
Third	5	14.3
More than third	2	5.7
Number of siblings:		
One	16	45.8
Two	13	37.1
Three and more	6	17.1
Primary school grade:		
1st - 3rd	26	74.2
4th – 6th	9	25.8

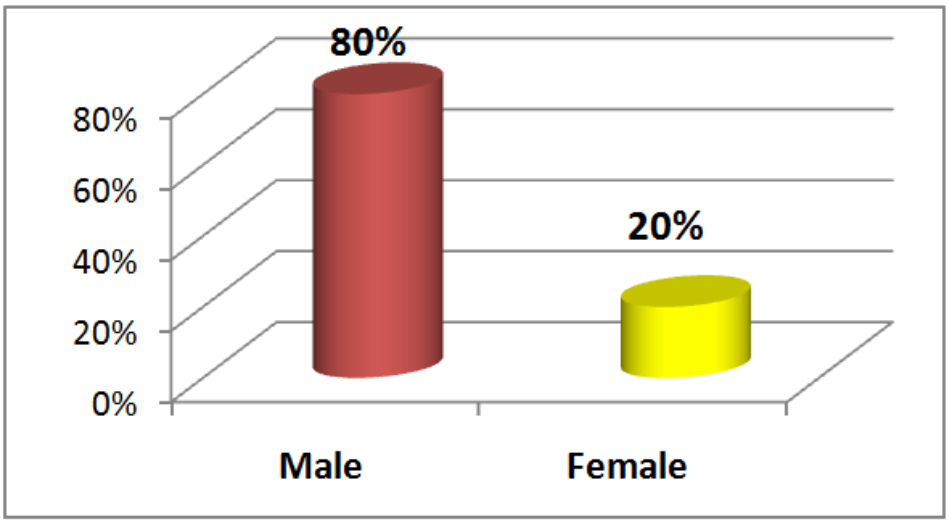

Figure 1: Children' Gender (n=35)

Part II: Past History of Children with FI

Table 2: Percentage Distribution of Past History of Children with FI (n=35)

History of the Children Illness	N	%
Time of passing meconium after delivery:		
Immediate	35	100
After 24 hours	0	0
After 48 hours	0	0
Frequency of defecation /day:		
Once	0	0
Twice	0	0
Three	0	0
More than three	35	100
Defecation problems during first year of life?		
Yes	9	25.7
No	26	74.3
Other associated symptoms with defecation?		
Yes	9	25.7
No	26	74.3
The other associated symptoms with defecation (n=9):		
Nausea	0	0
Vomiting	0	0
Abdominal pain	9	100

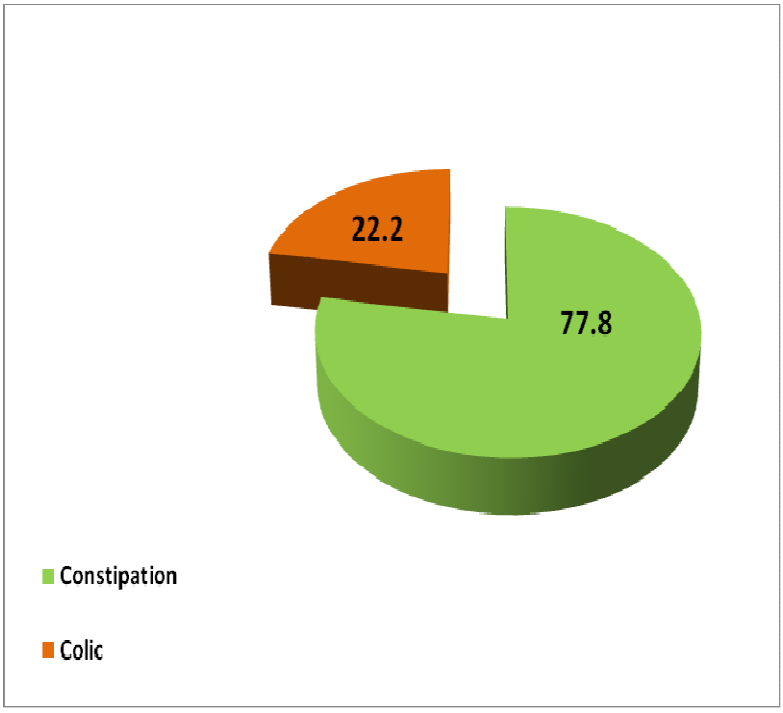

Figure 2: Percentage Distribution of Defecation Problems during First Year of Life among Children with FI (n=9)

Part III: History of Toilet Training Habits among Children with FI

Table 3: Percentage Distribution of Toilet Training Habits of Children with FI (n=35)

Toilet training habit	N	%
First time of using potty by the child:		
4 -11months	20	57.1
At the end of the first year	12	34.3
After the first year	3	8.6
The child went to bathroom:		
Yes	28	80
No	7	20
The mother rewarded the child when defecate in the bathroom:		
Yes	33	94.3
No	2	5.7
The child refuse to sit on the defecate:		
Yes	22	62.9
No	13	37.1
The child holds the desire to defecate:		
Yes	23	65.7
No	12	34.3

Table 4: Percentage Distribution of Toilet Training Habits of Children with FI, cont., (n=35)

Toilet training habit	N	%
The child seems to feels pain when defecating:		
Yes	17	48.6
No	18	51.4
The child realizes that his clothes are dirty (soiled with feces):		
Yes	21	60
No	14	40
The child was hiding when he defecates:		
Yes	23	65.7
No	12	34.3
The child refuses to sit on the bathroom outside the home:		
Yes	32	91.4
No	3	8.6

Part IV: Data about FI among Children Participated in the Current Study

Table 5: Percentage Distribution of Starting time of FI and causes among Children (n=35)

Items	N	%
Starting time of FI/year:		
One	30	85.7
Two	3	8.6
Three	2	5.7
Causes of FI:		
Chronic constipation	35	100
Anorectal malformation	0	0
Weakness of anal sphincter	0	0

Table 6: Percentage Distribution of Children' Stool Type According to Bristol Stool Chart (n=35)

Bristol Stool Chart Items	N	%
Type 1: (separate hard lumps, like nuts)	6	17.1
Type 2: (sausage-shaped, but lumpy)	20	57.1
Type 3: (stool looks like a sausage but with cracks on its surface)	8	22.9
Type 4: (stool like a sausage or snake, smooth and soft)	1	2.9
Type 5: (stool becomes soft blobs with clear cut edges)	0	0
Type 6: (fluffy pieces with ragged edges, a mushy stool)	0	0
Type7:(stool looks watery, no solid pieces, entirely liquid)	0	0

Table 7: Percentage Distribution of Shape and Frequency of Stool and Common Complains among Children with FI (n=35)

Items	N	%
Stool Shape:		
Mark	9	25.7
Mark and pieces of stool	17	48.6
Only pieces of stool	9	25.7
Stool Frequency /day:		
Once	3	8.6
Twice	5	14.3
Three	16	45.7
More than three	11	31.4
Abdominal pain Associated with Defecation:-		
Yes	32	91.4
No	3	8.6
Constipation:		
Yes	19	54.3
No	16	45.7

V: Bowel Continence among Children Using (Wexner Continence Score) before and after Implementation of BTP

Table 8: Comparison between Total Mean of Wexner Continence Score before and after Implementation of BTP (n=35)

	Mean ± SD	t-test	P
-Before BTP -Two weeks after BTP	11.46±1.31 6.60±2.51	11.95	0.000
-Two weeks after BTP -Four weeks after BTP	6.60±2.51 2.54±2.61	14.00	0.000
-Before BTP -Four weeks after BTP	11.46±1.31 2.54±2.61	19.49	0.000

Significant at $p < 0.01$

Table 9: Percentage Distribution of Total Frequency of Toilet Sit Two and Four Weeks after Implementation of BTP (n=35)

The frequency of toilet sit after 3meals	N	%
Two weeks after BTP:		
30-45 times	29	82.9
15- 29 times	5	14.3
>15times	1	2.9
Four weeks after BTP:		
80-90 times	33	94.2
30-45times	1	2.9
>8 times	1	2.9

Table 10: Correlations between Total Mean Scores of Wexner Continence after Implementation of BTP and Selected Personal Data of Children

Personal Data of Children	Total Mean of Wexner Continence Score after Implementation of BTP	
	r	p
Child's age	-0.88	0.619
Child's gender	-0.249	0.86
Child's rank	0.167	0.338
Child's place of residence	-0-351	0.039
Child's duration of FI	-0.40	0.820
Child's potty training	- 0.493	0.003**

Significant at $p < 0.01$

DISCUSSIONS

The current study results showed that the highest percentage of children' age ranged from 6 to less than 8 years and the majority of them were males. In general most of congenital anomalies especially gastrointestinal tract are linked with male gender. In the same context [7] who found that 68.7% of children were males and their age ranged from 7-8 years. Moreover, more than half of children came from urban areas. This explanation congruent with the findings presented in [8] which revealed that, higher prevalence of children was living in urban areas. The current study result revealed that, more than half of mothers had a secondary education. These results congruent with [9] found that 34 % of the mothers had completed secondary education. Also, the majority of mothers in current study were housewives. These results supported with [10] who found most of the mothers were unemployed.

The findings of the current study revealed that, all of children passed meconium, immediately after delivery. This explanation was in same line with the findings, presented in the study of [11], which summarized that, children passed meconium immediately after delivery and more than 3 times of defecation per day. Furthermore, the results of the current study revealed that, more than three quarters of children complained from constipation during first year of life, and nearly one quarter of them complained from abdominal colic. In this respect, [12] it is emphasized that; the constipation was one of the most common pediatric problems faced by parents. On the same line, most of children had abdominal pain associated with defecation. These results are congruent with [13] most frequently observed symptoms i.e., functional constipations and abdominal pain.

As regarding the history of toilet training habits among children with FI, the results of the current result showed that, more than half of children and their mothers started potty trained very early, from 4-11months of age. These results correspond with [14] that 60% of the early trainers' children, who had daytime soiling. In addition, the study [15]

concluded that, too early and vigorous toilet training may be detrimental for the child. There are a relationship between early toilet training and the development of constipation and/ or FI. Having a look at this result, on potty training, this result might be interpreted as the highest percentage of children in the current study whose mothers started potty training from 4 to11months, for their kids, that reflect Egyptian culture, while most of mothers practicing early potty training and ignoring the child's developmental abilities.

The current study results revealed that, nearly two thirds of children refuse to sit on the potty to defecate and two thirds of them hold desire to defecate. These results correspond with [16] and found that, 60% of the children refused to sit on potty. The current study results revealed that, the highest percentage of children was hiding when had to defecate, which reflects the knowledge of mothers, about toilet training process and the impact of early toilet training. Regarding the causes of FI; the current study result demonstrated that, all children had chronic constipation. This result was supported by [17] who explained that, FI has been associated with constipation in up to 90% of children. In relation to children' stool type, according to Bristol Stool chart, the current study revealed that, more than half of the children's stool was described as type 2 stool (sausage-shaped, but lumpy). Twenty two point nine percent of them had type 3 (stool looks like a sausage but with cracks on its surface). These results are concurrent with [18], which concluded that, 23% of children had type 2 and 9% of them had type 3. In relation to shape of stool among children, who participated in the current study, it was found that, less than half of them had stool shaped as mark and pieces in their underwear. The same explanation was mentioned by [19] about FI and described that, the shape of stool often small as stains or pieces in underwear.

It was evident from the results of the current study that, the mean of the total score of Wexner Continence decreased, after two and four weeks of implementation of BTP, compared to the total mean score, before the implementation of BTP. There was highly statistically significant difference, between the total mean score of Wexner Continence score, before BTP and two, four weeks of implementation of BTP. The above mentioned results were ascertaining the first hypothesis of the current study. Moreover, these results might be due to children and their mother's adherence to BTP (including dietary habit, regulate the time of defecation by sitting on toilet after 3 meals, and using stool softener and enema), and to their attendance at all scheduled follow up, at the pediatric colorectal clinic. This result correspond with a study by [20], who found that, there was a highly statistically significant difference between mean score of Wexner Continence, at first and third month of their intervention. As shown from the above mentioned results, children in the current study with FI, who will receive the BTP had lower Wexner continence score than before. These results support the first hypothesis of the current study.

Furthermore, the results of the current study revealed that, the majority of children reported 30-45 times of total toilet sit, post implementation of BTP. This result could be interpreted as children with FI, who received the BTP had regular time of elimination than before. This result significantly supports the current study on second hypothesis. The study results were supported by [21] who found that, an increase in sitting on the toilet and the frequency of toilet sits increased from a mean of 4 times per week, during baseline to a mean of 15 times per week during the intervention. Similarly, the results of the current study found that, the vast majority of children were had 80-90 times of total toilet sits, after 4weeks of implementation of BTP.From the researchers point of view these results might be due to successful implementation of a daily bowel diary with good rewarding system for children from their mothers and researchers. Small gifts can further increase children motivation.

The current study proved that a statistically significant correlation was detected between the total mean of Wexner continence score after implementation of BTP and child's potty training. This result correspond [22] who conclude that there was statistically correlation of the total mean of Wexner continence score after implementation of BTP and child's characteristics.

CONCLUSIONS AND RECOMMENDATIONS

The study results of the current study concluded that, the BTP was effective in improving bowel continence among children with FI. The children who received BTP had lower Wexner continence score and had regular time of defecation than before implemented BTP. The study results also concluded that, there was statistically significant positive correlation between the total mean score of Wexner continence score and child's potty training.

Recommendations: Integration of the bowel training program among children with fecal incontinence in pediatric colorectal clinic and pediatric surgery units is mandatory. Raising the awareness of pediatric surgical nurses through in-service training about the benefits of bowel training program and teaching to the parents of children with fecal incontinence to improve bowel continence. A multidisciplinary team consisting of pediatric surgeon, pediatric nurses and social workers should be involved in a program to provide holistic care for children with fecal incontinence and their families. Longitudinal and long follow-up study is necessary to monitor the effect of bowel training program on later life of children.

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