The treatment of functional constipation significantly increased quality of life in children aged 4-17 years

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ABSTRACT

Background/Aims: *In this study, it was aimed to investigate the effect of 6-week treatment on quality of life in 4-17-year-old children with functional constipation.*

Materials and Methods: *The children 4-17 years old diagnosed as functional constipation according to Rome IV criteria, between June and December 2018 were included in the study. KINDL scales were applied to patients and their parents before starting treatment for 6 weeks and after the end of the treatment.*

Results: *The study was completed with 42 patients. The majority of the patients (54,8%) were female cases and the general part of them (45,2%) were between 4-6 years old. The age at onset of constipation was found to be 5,19±3,658 years. Total KINDL scores of both children and parents were lower before the treatment. Significant improvement was observed in the symptoms of constipation after 6 weeks of treatment. There was a statistically significant (p<0,05) increase in children's subgroup and total KINDL scores after treatment. Parental subgroup and total KINDL scores also showed a statistically significant (p<0,05) increase after treatment. The treatment of functional constipation was found to be highly effective with the eyes of both children and parents in improving the quality of life. (Eta value, η2.>0,25)*

Conclusion: *A significant increase was observed in all areas of life quality and total score in children with functional constipation after a regular treatment. We think that the treatment of children with functional constipation will significantly improve their quality of life*

Keywords: *Childhood, functional constipation, quality of life, KINDL scale*

INTRODUCTION

Functional constipation (FC) is a common condition today and constitutes 3% of general pediatrics and 25% of pediatric gastroenterology outpatient admissions (1). Two individual studies performed in the last 15 years showed us that FC occurs in 5%-18% of pediatric population (2, 3). FC is more common in children between the ages of 2 years and 4-5 years (4, 5).

Growing up with a complaint of constipation may adversely affect the psychosocial development of the children by influencing the independence of the areas of gaining skills and by affecting the relationship of the child with parents and siblings, friendship, academic success, self-care, and personal hygiene (6-8). Over the past 10 years, studies on how FC affects the quality of life of children and adolescents have been conducted. These studies have shown that children with constipation were negatively affected physically, socially, and emotionally compared with the healthy children (9, 10). It has been reported that children with FC have a lower quality of life than that of children with inflammatory bowel disease according to their own and parental statements (9).

Health-related quality of life tools are increasingly used to assess the impact of physical, social, and emotional health on the overall quality of life. Although there are some studies about the remittance of behavioral problems in children with constipation treatment (11, 12), there is still limited evidence that the quality of life has increased.

In this study, we aimed to evaluate the quality of life before and after 6 weeks of treatment in children aged 4–17 years with FC and to investigate the effect of treatment on their quality of life.

MATERIALS AND METHODS

For this study, approval was obtained from the local clinical research ethics committee on 07.06.2018, number 2018/10-02.

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Children aged 4-17 years who were diagnosed with FC according to Rome IV criteria between June and December 2018 were included in the study (13). Those who were not under regular follow-up and had an underlying chronic disease were excluded from the study in consideration of affecting the quality of life.

Informed consent was obtained from all the patients diagnosed with FC and their families after giving them information about the study. Drug therapy, nutrition, and behavioral treatments were administered to the patients for the removal of stiff stools accumulated in the rectum and/or colon and for maintenance treatment. An information form about constipation was given to the patients and their families. During medical treatment, if there was a clinical need, enema treatments were used. Lactulose was started at a dosage of 1 mL/kg/day as a standard laxative treatment. If the patient was intolerant to lactulose, polyethylene glycol was used. Patients and their families were informed about regularly undergoing the treatment for 6 weeks. Patients who did not meet the Rome IV criteria for FC after treatment were considered as treatment responsive.

Demographic characteristics (age and sex) of the patients included in the study, socioeconomic status of the parents, educational status of the mother, family history of constipation, constipation onset age, and clinical symptoms were recorded. The socioeconomic status of the families was determined according to the socioeconomic index score used by Eser et al. (14) from Turkey our country. Before starting the treatment lasting 6 weeks, appropriate "Health Related Quality of Life in Children and Adolescents" KINDL scales were applied. The KINDL scales were repeated 6 weeks after the end of the treatment, and the results were compared. Similarly, KINDL scales applied to the parents at weeks 0 and 6 and the changes in results were evaluated.

KINDL scale is a generic measure of health-related quality of life, which contains 24 categorical items that assess six dimensions (physical well-being, emotional well-being, self-esteem, family, friends, and school). Item scores are summed up to give dimension scores, and dimension scores are summed up to give an overall score. The raw score is transformed to a scale of 0-100 to facilitate interpretation. Higher scores represent better quality of life. In children, the KINDL scale is available in three age versions: Kiddy KINDL (4-6 years), Kid KINDL (7-13 years), Kiddo KINDL (14-17 years) with both parents' and self reports. Every version has appropriate questions for the age and developmental stage of the child. On account of the particular difficulties associated with assessing young children, the structure of the Kiddy KINDL is different from that of the others. It includes only 12 items, 2 for each dimension, and less response categories.

Statistical Analysis

For statistical analysis, the Statistical Package for Social Sciences (SPSS) version 22 (IBM Corp.; Armonk, NY, USA) Windows program was used. For the descriptive findings and KINDL scores, mean, standard deviation, and percentage distribution data were used. Mean and standard deviation for parametric methods and median and minimum-maximum values for non-parametric methods were preferred. For comparison of KINDL scores and for parametrical evaluation of independent groups affecting the KINDL scores, the t test was used. For non-parametric measurements, the Wilcoxon signed-rank test was applied. Effect level (partial eta squared) values were obtained to express the relative magnitude of the difference after treatment. Eta value, $\eta^2>0.25$, was considered as highly effective. p values <0.05 were considered statistically significant.

RESULTS

The study was completed with 42 patients. Evaluation of sociodemographic and clinical data of patients is given in Table 1. The majority of the patients were female, and the majority of them were between 4-6 years old. The average age of their mothers was 37.04±5.1 years. Except one, all the children were tolerant to lactulose treatment. For the patient who was intolerant to lactulose, polyethylene glycol was used.

The course of constipation symptoms before and after treatment is given in Table 2. It was observed that patients' symptoms showed significant improvement with the help of treatment, and fecal incontinence disappeared in eight patients.

The pediatric-adolescent KINDL average scores before and after treatment are given in Table 3.

According to the results, a statistically significant difference between physical goodness, emotional goodness, family relationships, friend relationships, school, and total score was found before and after treatment. Effect levels (partial eta squared) were used to express the relative magnitude of difference before and after treatment. In this study, the eta values of all parameters before and after treatment were found to be highly effective. Fur-

Table 1. Evaluation of sociodemographic and clinical data of patients.

Parameter	Number of patients (n=42) (%)
Sex	
Male	19 (45.2)
Female	23 (54.8)
Age (years)	
4-6	19 (45.3)
7-13	15 (35.7)
14-17	8 (19.0)
Age of onset of constipation (year)	5.19±3.658
Number of applications	
First application	17 (40.4)
Repetitive application	25 (59.6)
Is there constipation in the family?	
Yes	19 (45.2)
No	23 (54.8)
Mother's education status	
Primary school graduates	14 (33.3)
Secondary school graduates	3 (7.2)
High school graduates	17 (40.5)
University/college graduates	8 (19)
Family socioeconomic level	
Lower	3 (7.1)
Middle	33 (78.6)
Upper	6 (14.3)

Table 2. Course of constipation symptoms before and after treatment.

	Pre-treatment (week 0) n (%)	After treatment (week 6) n (%)
Defecation two times a week or less frequently	36 (85.7)	2 (4.7)
Fecal soiling at least once in a week	8 (19)	0 (0)
Fecal mass clogs the toilet	9 (21.4)	0 (0)
Presence of fecal mass in the abdomen or rectum	7 (16.6)	1 (2.3)
Painful and stiff defecation	26 (61.9)	5 (11.9)
Retention of feces	34 (80.9)	8 (19)
FC diagnosis	42 (100)	2 (4.7)

FC: functional constipation.

Table 3. Comparison of pediatric-adolescent KINDL average scores before and after treatment.

	Section score average		
KINDL subgroups	Pre-treatment (week 0) Mean±SD	After treatment (week 6) Mean±SD	p
Physical goodness	45.65±20.94	67.91±13.91	0.000
Self-esteem	60.60±16.26	72.83±14.84	0.001
Family relationship	72.28±17.15	82.43±13.92	0.000
Friendship	64.30±19.89	76.43±11.92	0.001
School	64.48±19.89	74.5±15.86	0.003
Total score	68.24±15.54	79.26±10.33	0.000

SD: standard deviation; KINDL: "Health Related Quality of Life in Children and Adolescents".

thermore, the eta values obtained were statistically significant. Eta values of the parameters before and after treatment are given in Table 4.

Comparison of the parental KINDL averages before and after treatment is given in Table 5. According to the results, an important statistical difference before and after treatment in physical goodness, self-esteem, family relationships, friend relationships, school areas, and total score was found. Effect levels (partial eta squared) were used to express the relative magnitude of difference before and after treatment. In this study, the eta values of all the parameters before and after treatment were found to be highly effective. In addition, the eta values obtained were statistically significant (Table 6).

DISCUSSION

Constipation is one of the most common complaints of the digestive system in childhood. Although not life-threatening, if not well treated, FC could lead to recurrent hospital admissions and unnecessary laboratory examinations. It is also known that complaints such as long-term abdominal distention sense, abdominal pain, and fecal soiling can cause emotional, behavioral, and social problems in children and their families and adversely affect their quality of life (15).

Table 4. Eta values of patients' parameters pre- and post-treatment.

	Eta values before and after treatment	p
Physical goodness	0.628	0.017
Emotional goodness	0.663	0.009
Family relationship	0.617	0.021
Friend relationships	0.761	0.001
School	0.807	0.004
Total score	0.846	0.000

Table 5. Comparison of parental KINDL averages before and after treatment.

	Section score average		
KINDLsubgroups	Pre-treatment (week 0) Mean±SD	After treatment (week 6th) Mean±SD	p
Physical goodness	57.44±20.81	73.36±13.10	0.000
Self-esteem	63.99±21.42	70.54±15.45	0.001
Family relationship	74.40±15.85	79.61±14.81	0.002
Friendship	69.35±15.30	77.08±12.85	0.000
School	58.80±30.25	74.31±15.94	0.044
Total score	67.68±13.27	75.73±9.51	0.000

SD: standard deviation; KINDL: "Health Related Quality of Life in Children and Adolescents".

Table 6. Eta values of parental parameters before and after treatment.

	Eta values before and after treatment	p
Physical goodness	0.550	0.000
Emotional goodness	0.759	0.000
Family relationship	0.731	0.000
Friendship	0.648	0.000
School	0.566	0.008
Total score	0.862	0.278

Previous literature had similar findings to our study as seen when demographic data were evaluated. Similar to our study, previous studies have also reported that the incidence of constipation did not differ between males and females in childhood (16, 17). In the literature, the age of onset of constipation was found to be more frequent at younger ages, which was consistent with our results (4, 5).

When the family history of our patients was evaluated, nearly half of our patients had a family history of constipation. There is no clear numerical data in the literature on the incidence of constipation in first-degree relatives in children diagnosed with FC, but this is an important risk factor for the development of FC in children (18). More frequent appearance of constipation in first-degree relatives may be related to common environmental factors such as nutrition and toilet habits and similar genetic causes in the etiology. Majority of the families of children participating in the study were at the middle socioeconomic level. In a study by Cağan Y et al. (19), it was demonstrated that low socioeconomic level and low education level of the families were the risk factors for the development of FC in children. This situation was explained by the poor attitudes and behaviors of these families toward their children, higher number of psychological problems in families, faults in toilet education, lifestyle, and dietary habits.

The symptoms of constipation were examined before and after treatment and showed a significant improvement with treatment. The main goal of the treatment of FC is resolving the symptoms, especially abdominal pain and encopresis, which can lead to behaviors such as avoiding social activities and can lead to a decrease in self-confidence. Solving this problem plays an important role in increasing the quality of life (20).

The main aim of this study was to compare the quality of life before and after treatment in children with FC. The quality of life in children with FC is known to decrease (9, 21). In the past 10 years, studies evaluating the effects of FC on the quality of life of children and adolescents have shown that they are negatively influenced emotionally, socially, and physically (9, 22). There are several studies about the effect of treatment on the quality of life in FC. Wald A et al. (23) reported that chronic constipation reduced the quality of life in both children and adults. In a study published in 2017, it was found that pelvic physiotherapy increased the quality of life in children compared with the quality of life seen in case of standard medical therapy (24). In another study, transanal irrigation has been shown to improve the quality of life in resistant constipation and encopresis (25). There are also studies in the literature that suggest that transcutaneous electri-

cal stimulation in slow-pass constipation in children and Malone antegrade continence enema protocol, which is a method of bowel washout using an antegrade enema, improve the quality of life in highly resistant patients who do not respond to standard therapies (26). However, these methods are not routinely applied as standard, and their use in children is often limited. In our study, we found a significant increase in all areas of quality of life in both children and parents with the standard medical treatment. We found that treatment was highly effective in improving the quality of life. Our study was also important because it included children with a wide age range.

The relatively low number of patients was the limitation of our study.

In conclusion, treatment of FC is highly effective in improving the quality of life in both children and parents.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Behcet Uz Children's Hospital, date:07.06.2018, number:2018/10-02.

Informed Consent: Informed consent was obtained from patients' parents who participated in this study.

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REFERENCES

1. Van Dijk M, Benninga MA, Grootenhuis MA, Last BF. Prevalence and associated clinical characteristics of behavior problems in constipated children. Pediatrics 2010; 125: 309-17. [Crossref]
2. Saps M, Sztainberg C, Di Lorenzo C. A prospective community-based study of gastroenterological symptoms in school-age children. J Pediatr Gastroenterol Nutr 2006; 43: 477-82. [Crossref]
3. Wald E, Di Lorenzo C, Cipriani L, Colborn DK, Burgers R, Wald A. Bowel habits and toilet training in a diverse population of children. J Pediatr Gastroenterol Nutr 2009; 48: 294-98. [Crossref]
4. Miele E, Simeone D, Marino A, et al. Functional gastrointestinal disorders in children: An Italian prospective survey. Pediatrics 2004; 114 :73-8. [Crossref]
5. Van den Berg MM, Benninga MA, DiLorenzo C. Epidemiology of childhood constipation: A systematic review. Am J Gastroenterol 2006; 101: 2401-09. [Crossref]
6. Bongers ME, Benninga MA. Long-term follow-up and course of life in children with constipation. J Pediatr Gastroenterol Nutr 2011; 53: 55-6.
7. Lisboa VC, Felizola MC, Martins LA, Tahan S, Neto UF, de Morais MB. Aggressiveness and hostility in the family environment and chronic constipation in children. Dig Dis Sci 2008; 53: 2458-63. [Crossref]
8. Kaugars AS, Silverman A, Kinservik M, et al. Families' perspectives on the effect of constipation and fecal incontinence on quality of life. J Pediatr Gastroenterol Nutr 2010; 51: 747-52. [Crossref]
9. Youssef NN, Langseder AL, Verga BJ, Mones RL, Rosh JR. Chronic childhood constipation is associated with impaired quality of life: a case-controlled study. J Pediatr Gastroenterol Nutr 2005; 41: 56-60. [Crossref]
10. Rajindrajith S, Devanarayana NM, Weerasooriya L, Hathagoda W, Benninga MA. Quality of life and somatic symptoms in children with constipation: a school-based study. J Pediatr 2013; 163: 1069-72. [Crossref]
11. Nolan T, Debelle G, Oberklaid F, Coffey C. Randomised trial of laxatives in treatment of childhood encopresis. Lancet 1991; 338: 5237. [Crossref]
12. Levine MD, Mazonson P, Bakow H. Behavioral symptom substitution in children cured of encopresis. Am J Dis Child 1980; 134: 663-7. [Crossref]
13. Hyams JS, Di Lorenzo C, Saps M, Shulman RJ, Staiano A, van Tilburg M. Childhood functional gastrointestinal disorders: Child/Adolescent. Gastroenterology 2016; 1501: 1456-68. [Crossref]
14. Nesanir N, Eser E. Development of a Socioeconomic Index to be used in health researches in Turkey. TAF Prev Med Bull 2010; 9: 277-88.
15. Benninga MA, Voskuijl WP, Taminiau JA. Childhood constipation: Is there new light in tunnel. J Pediatr Gastroenterol Nutr 2004; 39: 448-64. [Crossref]
16. İnan M, Aydıner CY, Tokuç B, et al. Factors associated with childhood constipation. J Paediatr Child Health 2007; 43: 700-6. [Crossref]
17. Suares NC, Ford AC. Prevalence of, and risk factors for, chronic idiopathic constipation in the community: systematic review and meta-analysis. Am J Gastroenterol 2011; 106: 1582-91. [Crossref]
18. Rajindrajith S, Devanarayana NM. Constipation in children: diagnosis and management. Sri Lanka J Child Health 2009; 38: 127-35. [Crossref]
19. Appak Y, Yalin S, Dogan G, Herdem A, Ozyurt BC, Kasirga E. Clinical findings, child and mother psychosocial status in functional constipation. Turk J Gastroenterol 2017; 28: 465-70. [Crossref]
20. Beaudry-Bellefeuille I, Booth D, Lane SJ. Defecation-Specific Behavior in Children with Functional Defecation Issues: A Systematic Review. Perm J 2017; 21: 17-047. [Crossref]
21. Dolgun E, Yavuz M, Celik A, Ergun MO. The effects of constipation on the quality of life of children and mothers. Turk J Pediatr 2013; 55: 180-5.
22. Kovacic K, Sood MR, Mugie S, et al. A multicenter study on childhood constipation and fecal incontinence: effects on quality of life. J Pediatr 2015; 166: 1482-7. [Crossref]
23. Wald A, Sigurdsson L. Quality of life in children and adults with constipation. Best Pract Res Clin Gastroenterol 2011; 25: 19-27. [Crossref]
24. van Engelenburg-van Lonkhuyzen ML, Bols EM, Benninga MA, Verwijs WA, de Bie RA. Effectiveness of Pelvic Physiotherapy in Children with Functional Constipation Compared With Standard Medical Care. Gastroenterology 2017; 152: 82-91. [Crossref]
25. Ng J, Ford K, Dalton S, McDowell S, Charlesworth P, Cleeve S. Transanal irrigation for intractable faecal incontinence and constipation: outcomes, quality of life and predicting non-adopters. Pediatr Surg Int 2015; 31: 729-34. [Crossref]
26. Leong LC, Yik YI, Catto-Smith AG, Robertson VJ, Hutson JM, Southwell BR. Long-term effects of transabdominal electrical stimulation in treating children with slow-transit constipation. J Pediatr Surg 2011; 46: 2309-12. [Crossref]