

HOSTED BY



ELSEVIER

Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

Egyptian Pediatric Association Gazette

journal homepage: <http://www.elsevier.com/locate/epag>

Impact of functional constipation on psychosocial functioning and quality of life of children: A cross sectional study

H.A. Elkhayat^a, M.H. Shehata^b, A. Nada^b, S.M. Deifalla^{a,*}, M.S. Ammar^b^a Faculty of Medicine, Ain Shams University, Cairo, Egypt^b Postgraduate Institute of Childhood Studies, Ain Shams University, Cairo, Egypt

Received 7 March 2016; accepted 18 May 2016

Available online 11 June 2016

KEYWORDSBehavior problems;
CBCL scores;
Emotional problems;
Functional constipation;
Quality of life

Abstract *Aim:* Functional constipation (FC) is one of the common diseases among children. Many problems are common in children with FC. The aim of this study was to detect whether FC has a negative impact on the behavioral and emotional aspects, quality of life and intelligence of children.

Methods: In this cross-sectional, case-control study, one hundred children participated; 50 children (mean age, 7.52 ± 2.74 years, range 4–12 years) with FC and 50 healthy children (mean age, 7.00 ± 1.52 , range 4–12 years) recruited from the cases' sibs with age and sex matching to them. Behavior and emotional problems were assessed using the Arabic translation of the Child Behavior Checklist (CBCL) scores. In addition, the Arabic version of the Pediatric Quality of Life Inventory 4.0 (PedsQL™ 4.0) was used to evaluate the children's and parents' quality of life. Lastly, Stanford Binet Intelligence Scale was carried out.

Results: Although, healthy control children were recruited from the patients' sibs, patients had higher CBCL scores than control children in all items except for the attention and the aggressive items. Also, total PedsQL™ 4.0 scores were lower in children with FC and their parents ($p < 0.001$). Furthermore, All participating children had between average and above average Stanford Binet Intelligence Scale scores and there was no score difference between patients and control ($p = 0.26$).

Conclusion: Emotional and behavioral problems are common in children with FC so as quality of life which is compromised in those children and their parents suggesting incorporation of behavioral and quality of life screening into their diagnostic workup.

Production and hosting by Elsevier B.V. on behalf of The Egyptian Pediatric Association. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

* Corresponding author at: Faculty of Medicine, Ain Shams University, Abassey Square, Cairo 1111, Egypt.

E-mail address: Shaymaa_ziad@hotmail.com (S.M. Deifalla).

Peer review under responsibility of Egyptian Pediatric Association Gazette.

<http://dx.doi.org/10.1016/j.epag.2016.05.003>

1110-6638 Production and hosting by Elsevier B.V. on behalf of The Egyptian Pediatric Association.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Functional constipation in childhood is a common defecation disorder with 0.7–29.6% prevalence in the general population.¹

In a general pediatric practice, ~3% of the patients are referred for symptoms of constipation,² whereas in specific pediatric gastroenterology clinics, 25–45%^{3,4} of patients are referred for evaluation and treatment of functional constipation disorders.³

To date, it is unknown, whether behavior problems are the cause or consequences of constipation. Early literature suggested that fecal incontinence is a mental disorder that requires psychiatric treatment.^{5,6} In contrast, pediatricians emphasized the physiologic nature of childhood constipation with fecal incontinence as a result of severe fecal impaction. Several intervention studies showed an association between successful treatment and the reduction of behavior problems^{7–10} suggesting that behavior problems are secondary to the clinical symptoms of constipation, yet in a recent intervention study; the authors¹¹ concluded that regardless of treatment success, behavioral therapy relieves children with constipation from coexistent behavior problems.

In spite of the fact that constipation rarely causes life threatening complications, nevertheless it can cause emotional and physical distress and concern for children and their families, ultimately impairing health related quality of life (HRQoL).^{12,13}

Functional constipation, being a chronic problem with profound impact on the psychological and behavioral aspects of children might have an effect on the cognitive and school performance of children.

Aim of the study

Question the effect of FC on behavioral and emotional aspects, HRQoL and IQ of constipated children by comparing them to normal children recruited from the patients' siblings.

Patients and methods

Our cross sectional case control study was conducted in the period from June 2014 till January 2015. Children aged from 4 to 12 years seen in the Gastroenterology Clinic, Children's Hospital, Faculty of Medicine, Ain Shams University with FC according to ROME III criteria^{14,15} were eligible to participate in our study. In order to diagnose FC in a child who is at least 4 years old, two or more of the following criteria should be present for at least 2 months prior to diagnosis with insufficient criteria to diagnose irritable bowel syndrome: (1) two or fewer defecations 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 movements; (5) presence of a large fecal mass in the rectum; and (6) history of large diameter stools which may obstruct the toilet.

Children were excluded from the study when they had received a comprehensive behavioral treatment conducted by a psychologist or psychiatrist in the previous 12 months. In addition, children with organic causes for defecation disorders, such as Hirschsprung disease, spina bifida occulta, hypothyroidism, or other metabolic or renal abnormalities, were excluded. When the child was found to be eligible to participate, baseline data were obtained. For all participants, informed written consent was given by the parents or parents and children when applicable.

Sample size calculation

The power calculation was conducted based on a previous study showing that children with FC had lower HRQoL than healthy children without FC.¹⁶ To detect a difference between the children with FC and the healthy children with 95% power and with a significance level of $p < 0.001$, approximately 90 participants were needed based on Atman.¹⁷ Thus the current study included 100 participants. Fifty with functional constipation and age and sex matched 50 healthy controls. In order to keep the sociodemographic differences aside, the healthy controls were recruited from the patients' sibs.

Ethical considerations

The research protocol was approved by the medical ethics committee of Faculty of Medicine, Ain Shams University. The study was explained to the parents and children, an informed written consent was obtained from the parents and a written assent from children when applicable and results were expressed orally to them at the end of study.

Measures: all the participants were subjected to the following

The Child Behavior Checklist for 4–18 years old (CBCL/4-18)¹⁸ Arabic form¹⁹

The CBCL/4-18 parents' form was designed to measure competencies and problems in children aged 4–18 years as reported by parents. Achenback included these 2 components (competencies and problems) to assess both strengths and problem behaviors as a way to better understand a particular child's mental health status. Both sections have been developed as distinct standalone instruments. Although both sections seem complementary yet, users usually select only the behavior problems section because of its acknowledged psychometric strengths.²⁰ In our work, we included only the behavior problems section. It contains 118 specific problem behavior items and two items that allow parents to write in other problems. Scores of items were as follows, on the basis of the preceding 6 months: 0 = not true; 1 = somewhat or sometimes true, and 2 = very true or often true. The profile displays the child's standing on syndromes of problems. Each syndrome consists of problems that were found to occur concomitantly. Syndromes of the CBCL/4-18 are withdrawn, somatic complaints, anxious/depressed, social problems, thought problems, attention problems, delinquent behavior and aggressive behavior. The attention problems syndrome includes many of the types of problems that are ascribed to ADHD. The delinquent behavior syndrome comprises unaggressive conduct problems, such as lying, stealing, truancy and substance abuse. The profile provides scores for total problems, internalizing, externalizing and 8 syndrome scales (withdrawn, somatic complaints, anxious/depressed, social problems, thought problems, attention problems, delinquent behavior and aggressive behavior). The CBCL/4-18 was normed on a US nationally representative sample of 2368 children aged 4–18 years.²¹ In our work we were concerned with each syndrome score separately, and calculated the raw scores of each problem separately and compared it with the control children's raw scores.

The researcher used to sit close to the parent filling the questionnaire to clarify any question the parent might have

about the items or response scale. In case the caregivers were unable to complete the CBCL independently, the researcher read the items aloud and entered the parent's answers while the parent followed along on a second copy.

Filling the form usually took from 10 to 15 min. After filling the form, the researcher scored it by hand on the child's profile that usually took another 10–15 min.

The Arabic version²² of the Pediatric Quality of Life Inventory version 4.0

The 23-item PedsQL™ 4.0 Generic Core Scales²³ encompasses the essential core domains for pediatric health related quality of life measurements which are: (1) Physical Functioning (8 items), (2) Emotional Functioning (5 items), (3) Social Functioning (5 items) and (4) School Functioning (5 items). It consists of parallel Child Self-Report and Parent Proxy-Report format for ages 2–4, 5–7, 8–12 and 13–18 years. The items for each of the forms are essentially identical, differing in developmentally appropriate languages, or first or third person tense.

The Pediatric Quality of Life Inventory (PedsQL)™ is one of the most promising HRQoL measures for children. The advantages include brevity, availability of age-appropriate versions and parallel forms for child and parent.^{24,25} Reports confirm that PedsQL™ performs well in distinguishing healthy children from pediatric patients with either acute or chronic conditions if those conditions impact the child's general HRQoL significantly.^{26–28}

Items are reverse-scored and linearly transformed to a 0–100 scale (0 = 100, 1 = 75, 2 = 50, 3 = 25, 4 = 0), so that higher scores indicate better HRQoL. Scale scores are computed as the sum of items divided by the number of items answered (this accounts for missing data).

The questionnaire interviews were conducted between the researcher and each parent and child in a private room in the gastroenterology clinic. We included here the total parents' and children's scores as well as the children's separate domain scores.

Stanford Binet Intelligence test

Cognitive functioning was measured by Stanford Binet Intelligence test 5th edition with 90–109 scores signifying average intelligence.²⁹ A trained psychologist unaware of the child's condition performed the test.

Results

One hundred children attending main stream schools participated in our study. Their demographic and anthropometric data are shown in Table 1. No differences were found between cases and control regarding age, sex, weight, height and body mass index.

Moving to the Child Behavior Checklist scores (CBCL) (Table 2), starting with the internalizing behavior items, children with FC had significantly higher anxiety, sleep disturbances, social problems, somatic complaints and withdrawn scores than their healthy counterparts who were recruited from the patients' sibs, while attention problems score was comparable with no significant difference. Regarding the externalizing behavior items, patients had significantly higher delinquent

Table 1 Demographic and anthropometric data of the studied participants.

	Cases (n = 50)	Control (n = 50)	t, χ^2	p
* Gender–males ^a	25 ± 50	25 ± 50	0.00	1.00
** Age in years ^b	7.52 ± 2.74	7.00 ± 1.52	–0.671	0.504
** Height in cm ^b	121.56 ± 16.97	123.8 ± 16.4	–0.671	0.504
** Weight in kg ^b	22.48 ± 5.67	24.14 ± 6.03	–1.42	0.160
** BMI ^b	20.68 ± 2.38	20.98 ± 2.37	–0.63	0.53

^a Number (%).

^b Mean ± SD.

* Chi-Square test.

** Student's *t*-test.

Table 2 Comparison of CBCL/4-18 problems raw scores of cases and control using Mann–Whitney test; data are presented as mean + SD.

CBCL items	Cases (n = 50)	Controls (n = 50)	Z	p
Anxious/depressed	14.84 + 4.8	7.68 + 3.04	–6.48	0.000
Attention problems	10.48 + 6.97	10.26 + 7.08	–0.104	0.917
Thought problems	13.38 + 4.59	5.68 + 2.50	–7.11	0.000
Social problems	9.90 + 4.55	5.44 + 2.29	–5.134	0.000
Somatic complaints	10.20 + 4.93	5.18 + 2.15	–5.22	0.000
Withdrawn	12.46 + 5.01	5.50 + 2.44	–6.61	0.000
Aggressive behavior	11.40 + 7.87	10.48 + 6.97	–0.453	0.651
Delinquent behavior	7.36 + /2.45	5.06 ± 2.10	–4.31	0.000

behavior scores than control children while there was no difference concerning the aggressive behavior score.

Sailing to the PedsQL™ 4.0 questionnaire, both the parents' and the child's forms total scores revealed lower scores in children with functional constipation compared to their matching group (Table 3). Furthermore, children with FC had lower scores for all the PedsQL™ 4.0 domains which are the physical, emotional, social and school domains (Table 4).

Regarding the Stanford Binet intelligence scale, all the participating children had either average or above average score with no difference between the two participating groups (Table 5).

Discussion

Whether behavior problems precedes or results-from functional constipation, we may hypothesize that children with FC often experience distress or pain and as a consequence become agitated leading to oppositional behavior or interaction problems with the environment.

It is important to be aware of the fact that management of behavioral aspects of constipation are as important as the medical and dietary aspects.³⁰ So delineating them is of extreme value.

In our study, higher CBCL scores were encountered in children with FC compared to their normal counterparts with significant difference in all items except for the attention

Table 3 Comparison of the PedsQL™ 4.0 Generic Core total score of Child Self-Report and Parent Proxy-Report of children with FC and control group using *t*-test; data are presented as mean + SD.

	Cases (<i>n</i> = 50)	Control (<i>n</i> = 50)	<i>t</i>	<i>p</i>
Parent	47.22 + 5.10	79.76 + 21.89	10.24	0.000
Child	43.78 + 5.59	76.76 + 20.76	10.85	0.000

Table 4 Comparison between patients and control regarding PedsQL™ 4.0 domain scores using *t*-test; data are presented as mean ± SD.

	Cases (<i>n</i> = 50)	Control (<i>n</i> = 50)	<i>t</i>	<i>p</i>
Physical	69.1 ± 8.4	82.9 ± 8.6	6.9	0.03
Emotional	68.4 ± 12.2	78.5 ± 10.9	6.2	0.04
Social	69.5 ± 8.3	82.3 ± 9.8	5.9	0.02
School	65.4 ± 10.3	79.9 ± 9.4	3.9	0.00

Table 5 Comparison between patients and control regarding Stanford Binnet Intelligence Scale 5th edition scores using *t*-test.

	Cases (<i>n</i> = 50)	Control (<i>n</i> = 50)	<i>t</i>	<i>p</i>
IQ mean ± SD	103.54 ± 12.18	106.34 ± 12.61	-1.12	0.26

problems and aggressive behavior problems. Many studies have demonstrated higher behavioral and emotional problems scores either in the CBCL or other similar questionnaires in children with constipation.^{31,32}

In a study³³ which included 133 Dutch children with FC, van Dijk et al., 2007¹¹ found that 49 parents (36.8%) reported problems in the clinical range on the total behavior problem scale, 48 parents (36.1%) reported behavior problems on the internalizing scale, and 36 parents (27.1%) reported behavior problems on the externalizing scale compared to the Dutch population norms in which 9% of the children had a score within the clinical range.²⁰ The above indicates that internalizing behavior problems were 4 times higher and externalizing problems were 3 times higher among children with constipation.

Similar findings were reported by Kiliincaslan et al. in 2014.³⁴ They did a cross-sectional study investigating emotional and behavioral characteristics of 65 children with functional constipation by comparing CBCL parameters of those children versus 59 typically developing controls with normal intestinal habits, they found that approximately half of children with FC had exhibited internalizing problems and one-third had externalizing problems in the clinical range.

In the literature on childhood constipation, although externalizing problems are not uncommon among children with FC yet, they have always been under illuminated.³³ May be because, comprehensive behavioral treatments focus mainly on fear of defecation.³⁵⁻³⁹

Stubbornness is another negative behavior problem that is also of concern in children with FC. In a study investigating stubbornness in 102 children who had constipation and were

aged 2–7 years, the results unmasked that children with constipation were perceived by their parents to be significantly more stubborn both in general and specifically regarding toileting behaviors compared with 84 children without constipation.⁴⁰ Also in another research tackling the same problem, the researchers demonstrated that children who had constipation and were categorized by their parents as stubborn were less likely to respond to treatment.³³

Health related quality of life importance is being expanding to a degree that cannot be neglected. In our study PedsQL™ 4.0 scores for both parents and children forms revealed lower scores in parents of/and children with FC compared to the normal children and their parents. In a study discussing the impact of functional constipation in Chinese preschool children on the health related quality of life of children and their families, the authors found that HRQoL scores of physical, emotional, social, school functioning and a summary scale were significantly lower in children with FC than those of healthy children. Furthermore, scores of physical, emotional, social, cognitive function, communication, daily activity, relationship and summary score of Family Impact Module among families of children with FC were significantly lower than those of healthy children.¹⁶

Regarding the effect of functional constipation on cognition and intelligence quotient, all our cohort had average and above average range in the Stanford Binnet Intelligence Scale scores with no difference between cases' and controls' scores.

In 1996, Bellman⁴¹ reported that 75 boys with the diagnosis of fecal incontinence were more likely to demonstrate school disturbances. In 1984, Abrahamian and Lloyd-Still⁴² noted that 20% of children with chronic constipation had “significant psychological problems on the basis of behavior problems at home or at school”.

Conclusion

Emotional and behavior problems are common in children with FC so as the health related quality of life which is usually compromised in those children.

Recommendations

Behavioral screening should be incorporated into the diagnostic workup of children with functional constipation. We should have used the teachers' report form (TRF) of the CBCL/5-18 from one or more teachers in order to compare parents' reports and teachers' in order to assess the cross-informant consistency of problems on syndromes. This will enable users to identify specific problems and specific syndromes on which multiple informants agree versus those on which they disagree.

Incorporation of the CBCL in the routine assessment of children with FC, being standardized, cost and time effective and documented system.

Furthermore, the intelligence quotient of the parents as well as the children should be considered during examining the effect of chronic constipation on the children's IQ as parental intelligence quotient is one of the most important factors affecting children's IQ.

Limitations of the study

This study has several limitations. Given the cross-sectional nature of this study, causality cannot be addressed. Also, the use of parents as informants in filling the CBCL may be a confounding factor for this study. Although substantial agreement is reported between parent-rated CBCL scores and psychiatrists' clinical severity rating, parental reports may also be biased by the parents' own psychological or health status.⁴³

Conflict of interest

The authors declare no conflicts of interest.

Acknowledgment

We would like to express great appreciation to our patients.

References

- van den Berg MM, Benninga MA, Di Lorenzo C. Epidemiology of childhood constipation: a systematic review. *Am J Gastroenterol* 2006;**101**(10):2401–9.
- Loening-Baucke V. Chronic constipation in children. *Gastroenterology* 1993;**105**(5):1557–64.
- Benninga MA, Voskuil WP, Taminiu JA. Childhood constipation: is there new light in the tunnel? *J Pediatr Gastroenterol Nutr* 2004;**39**(5):448–64.
- Taitz LS, Wales JK, Urwin OM, Molnar D. Factors associated with outcome in management of defecation disorders. *Arch Dis Child* 1986;**61**(5):472–7.
- Bemporad JR, Kresch RA, Asnes R, Wilson A. Chronic neurotic encopresis as a paradigm of a multifactorial psychiatric disorder. *J Nerv Ment Dis* 1978;**166**(7):472–9.
- Bellman M. Studies on encopresis. *Acta Paediatr Scand* 1996;**170**:1–151.
- Nolan T, DeBelle G, Oberklaid F, Coffey C. Randomised trial of laxatives in treatment of childhood encopresis. *Lancet* 1991;**338**(8766):523–7.
- Young MH, Brennen LC, Baker RD, Baker SS. Functional encopresis: symptom reduction and behavioral improvement. *J Dev Behav Pediatr* 1995;**16**(4):226–32.
- van der Plas RN, Benninga MA, Redekop WK, Taminiu JA, Buller HA. Randomised trial of biofeedback training for encopresis. *Arch Dis Child* 1996;**75**(5):367–73.
- Levine MD, MAzonson P, Bakow H. Behavioral symptom substitution in children cured of encopresis. *Am J Dis Child* 1980;**134**(7):663–7.
- van Dijk M, Bongers ME, de Vries GJ, Grootenhuis MA, Last MA, Benninga MA. Behavioral therapy for childhood constipation: a randomized controlled trial. *Pediatrics* 2008;**121**(5). Available <www.pediatrics.org/cgi/content/full/121/5/e1334> .
- Youssef NN, Langseder AL, Verga BJ, Mones RL, Rosh JR. Chronic childhood constipation is associated with impaired quality of life: a case-control study. *J Pediatr Gastroenterol Nutr* 2005;**41**(1):56–60.
- Clarke MC, Chow CS, Chase JW, Gibb S, Hutson JM, Southwell BR. Quality of life in children with slow transit constipation. *J Pediatr Surg* 2008;**43**(2):320–4.
- Hyman PE, Milla PJ, Benninga MA, Davidson GP, Fleisher DF, Taminiu J. Childhood functional gastrointestinal disorders: neonate/toddler. *Gastroenterology* 2008;**130**(5):1519–26.
- Rasquin A, Di Lorenzo C, Forbes D, Guiraldes S, Hyams JS, Staiano A, Walker LS. Childhood functional gastrointestinal disorders: child/adolescent. *Gastroenterology* 2006;**130**(5):1527–37.
- Wang C, Shang L, Zhang Y, Tian J, Wang B, Yang X, Sun L, Du X, Jiang X, Xu Y. Impact of functional constipation on health-related quality of life in preschool children and their families in Xi'an, China. *PLoS ONE* 2013;**8**(10):e77273.
- Atlman DG. *Practical statistics for medical research London, UK*. Chapman & Hall; 1991.
- Achenbach TM. *Manual for the child behavior checklist, 4–18 and 1991 profiles' Burlington 1991*. VT: University of Vermont Department of Psychiatry; 1991.
- Yunis F, Eapen V, Zoubeidi T, Yousef S. Psychometric properties of the child behavior checklist/2-3 in an Arab population. *Psychol Rep* 2007;**100**(3 Pt 1):771–6.
- Hilsenroth MJ, Segal DL. *Comprehensive handbook of psychological assessment. Volume 2; personality assessment*, 2014 (Hersen M). 129–131.
- Saklofske DH, Janzen HL. *Handbook of psychoeducational assessment, ability, achievement, and behavior in children*. Academic Press; 2001 (Andews JW). 294–295.
- Arabiati D, Elliott B, Al Draper P, Jabery M. Cross-cultural pediatric quality of life inventory™ 4.0 (PedsQL™) generic core scale into Arabic language. *Scand J Caring Sci* 2011;**25**(4):828–33.
- Varni JW, Seid M, Kurti PS. The PedsQL: measurement model for the pediatric quality of life inventory version 4.0 generic core scales in healthy and patient populations. *Med Care* 2001;**39**:800–12.
- Eiser C, Morse R. Quality of life measures in chronic diseases in childhood. *Health Technol Assess* 2001;**5**:1–147.
- Varni JW, Seid M, Rode CA. The PedsQL: measurement model for the pediatric quality of life inventory. *Med Care* 1999;**37**:126–39.
- Varni JW, Seid M, Kurtin PS. Reliability and validity of the pediatric quality of life inventory version 4.0 generic core scales in healthy and patient populations. *Med Care* 2001;**39**:800–12, 10–12.
- Varni JW, Burwinkle TM, Seid M, et al. The PedsQL 4.0 as a pediatric population health measure: feasibility, reliability, and validity. *Ambul Pediatr* 2003;**3**:329–41.
- Varni JW, Burwinkle TM, Seid M. The PedsQL 4.0 as a school population health measure: feasibility, reliability, and validity. *Qual Life Res* 2006;**15**:203–15.
- Becker KA. History of the stanford-binet intelligence scales: content and psychometrics. *Stanford-binet intelligence scales, fifth edition assessment service bulletin No. 1*.
- Di Lorenzo C. Childhood constipation: finally some hard data about hard stools! *J Pediatr* 2000;**136**(1):4–7.
- Benninga MA, Voskuil WP, Akkerhuis GW, Taminiu JA, Buller HA. Colonic transit times and behavior profiles in children with defecation disorders. *Arch Dis Child* 2004;**89**(1):13–6.
- Becker A, Ruby M, El Khatib D, Becker N, von Gontard A. Central nervous system processing of emotions in children with faecal incontinence. *Acta Paediatr* 2011;**100**(12):e267–74.
- van Dijk M, Benninga MA, Grootenhuis MA, Last BF. Prevalence and associated clinical characteristic of behavior problems in constipated children. *Pediatrics* 2010;**125**:2008–3055.
- Kilincaslan H, Abali O, Demirkaya SK, Bilci M. Clinical, psychological and maternal characteristics in early functional constipation. *Pediatr Int* 2014;**56**(4):588–93.
- van Dijk M, Benninga MA, Grootenhuis MA, Onland-van Nieuwenhuizen AM, Last BF. A review of the literature and the introduction of a protocolized behavioral intervention program. *Patient Educ Couns* 2007;**67**(1–1):63–77.
- Borowitz SM, Cox DJ, Tam A. Precipitants of constipation during early childhood. *J Am Board Fam Pract* 2003;**16**(3):213–8.
- Blum NJ, Taubman B, Nemeth N. During toilet training, constipation occurs before stool toileting refusal. *Pediatrics* 2004;**113**(6). Available at: <www.pediatrics.org/cgi/content/full/113/6/e520> this may explain the relatively ineffectiveness of psychological treatments to cure constipation 41–43..
- Brazzelli M, Griffiths P. Behavioural and cognitive interventions with or without other treatments for the management of faecal

- incontinence in children. *Cochrane Database Syst Rev* 2006(2), CD002240.
39. Brooks RC, Copen RM, Cox DJ, Morris J, Borowitz S, Sutphen J. Review of the treatment literature for encopresis, functional constipation, and stool-toileting refusal. *Ann Behav Med* 2000;**22**(3):260–7.
 40. Burket RC, Cox DJ, Tam AP, et al. Does “stubbornness” have a role in pediatric constipation? *J Dev Behav Pediatr* 2006;**27**(2):106–11.
 41. Bellman M. Studies on encopresis. *Acta Paediatr Scand* 1996 (Suppl. 170);1.
 42. Abrahamian FP, Lloyd-Still JD. Chronic constipation in childhood: a longitudinal study of 186 patients. *J Pediatr Gastroenterol Nutr* 1984;**3**(3):460–7.
 43. Verhulst FC, van der Ende J. Assessment of child psychopathology: relationships between different methods, different informants and clinical judgement of severity. *Acta Psychiatr Scand* 1991;**84**(2):155–9.