Childhood Bladder and Bowel Dysfunction Questionnaire: Development, Feasibility, and Aspects of Validity and Reliability

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See "Functional Pelvic Floor Disorders: Concurrent Bowel and Bladder Symptoms" by Hyman and Santucci on page 847.

ABSTRACT

Objectives: The aim of the study was to develop a questionnaire evaluating the frequency of symptoms over time of concomitant childhood bladder and bowel dysfunctions (CBBDs) in 5- to 12-year-old children and to assess its feasibility and aspects of validity and reliability.

Methods: The Childhood Bladder and Bowel Dysfunction Questionnaire (CBBDQ) was developed in phases according to COnsensus-based Standards for the selection of health Measurement Instruments (COSMIN) in cooperation with epidemiologists, pediatricians, physiotherapists (phases 1 and 5), and professional translators (phase 5): selection of items (Delphi-method), content validity (pilot), feasibility (interviews), structural validity and internal consistency (field testing), and guideline-based translation (Dutch-English). Participants were parents of children, ages 5 to 12 years (phases 2–4).

Results: Parents of 1333 children (mean age 7.8 years [standard deviation 2.1]) were included. Most common were urinary incontinence (35.9%), enuresis (29.7%), and constipation/fecal incontinence (30.1%). Concomitant CBBD was seen in 74.2% of 1229 children. Originally, a 27-item CBBDQ was developed. After the pilot (48 parents) a 23-item version remained for evaluation of feasibility aspects by interviewing 56 parents. Based on 1229 completed questionnaires during field testing, the CBBDQ reduced to 18 items. Cronbach α values were 0.74 and 0.71 for bladder and bowel subscales, respectively. Feasibility and aspects of validity and reliability were satisfactory. A definitive and accepted English version of the CBBDQ is available.

Conclusions: When completed by parents, the 18-item evaluative CBBDQ appears feasible, content, and structurally valid with good internal consistency for the bladder and bowel subscales. The Dutch and English versions will be introduced clinically and subjected to further psychometric evaluation.

Key Words: constipation, COSMIN, enuresis, HR-PRO, incontinence

(*JPGN* 2017;64: 911–917)

What Is Known

- A diversity of (un)published bladder and bowel questionnaires for use in children exist.
- These questionnaires mostly address only bladder or bowel dysfunctions and do not satisfy current developmental and scaling standards.

What Is New

- The evaluative 18-item Childhood Bladder and Bowel Dysfunction Questionnaire is feasible, content, and structurally valid, showing good internal consistency (bladder and bowel subscales) and is available in English.
- The Childhood Bladder and Bowel Dysfunction Questionnaire is easy to fill out and suitable to be completed by parents.
- The Childhood Bladder and Bowel Dysfunction Questionnaire offers professionals and researchers an easy way to evaluate the symptoms of childhood bladder and bowel dysfunctions.

Childhood bladder and/or bowel dysfunctions (CBBD) form a heterogeneous group and are a common problem in children of all ages worldwide (1–5). Bladder dysfunctions, according to the International Children's Continence Society (ICCS), include symptoms such as, urinary incontinence (UI; any involuntary loss of urine), enuresis (UI; while asleep), nocturia (to wake at night to void), and increased or decreased voiding frequency (respectively daytime voiding frequency of at least 8 times and <3). These definitions are relevant from the age of 5 years onwards (6,7). Worldwide, prevalence rates vary from 6.3% to 9.0% for daytime UI at the age of 7 years, decreasing to 1.2% to 3.0% in adolescence (8). Approximately 10%

Received July 20, 2016; accepted October 29, 2016.

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Supplemental digital content is available for this article. Direct URL citations appear in the printed text, and links to the digital files are provided in the HTML text of this article on the journal's Web site (*www.jpgn.org*).

The authors report no conflicts of interest.

DOI: 10.1097/MPG.0000000000001461

to 20% of all 7-year-olds regularly wet their beds, decreasing by approximately 15% a year toward adolescence (8,9). Bowel dysfunctions, constipation, and fecal incontinence (FI) are listed among the Rome-IV criteria (10,11). Estimates of constipation in the general pediatric population range from 0.3% to 8% (10). FI is estimated to affect 0.8% to 7.8% children in Western societies (4,12–14). CBBD is often accompanied by comorbidities, such as urinary tract infections and abdominal pain (15,16).

Previous work from our research group demonstrated in a cohort of 1748 children affected with bladder and/or bowel problems' major discrepancies between physicians' diagnoses and parent-reported daily symptoms. In particular, physicians reported substantially less concomitant bladder and bowel dysfunctions (18.4%) compared to parents (72.4%). From an international perspective, healthcare professionals use a diverse range of bladder and bowel questionnaires, which are often unpublished and tailored to their specific setting. Moreover, the few published questionnaires are primarily intended to be diagnostic to, mostly address only bladder or bowel dysfunctions and do not satisfy current developmental and scaling standards (17–25). So, given the rates of bladder and bowel comorbidity, the field is in need of a CBBD questionnaire, that is easy to administer, evaluates both bladder and bowel symptoms over time and enables standardized evaluation of CBBD symptoms in an international context, which may facilitate clinical practice and comparisons among study outcomes.

Therefore, a new measurement tool was developed for use in clinical and research practice, which enables symptom frequency evaluation, of concomitant bladder and bowel dysfunctions in children ages 5 to 12 years (26,27). The aim of the present study was to develop the parent-reported Childhood Bladder and Bowel Dysfunction Questionnaire (CBBDQ), to assess its feasibility and aspects of validity and reliability, and to translate it into English.

METHODS

Study Design

Table 1 describes the development, validation, and translation process of the parent-reported CBBDQ according to the COnsensus-based Standards for the selection of health Measurement Instruments (COSMIN), which are international consensus based standards as a guideline for quality assessment (27–29). The study was conducted in 5 phases: selection of items and response formats, pilot testing, feasibility study, field testing, and guideline-driven translation into English (28).

Participants

Throughout all phases, participating parents (except 13 controls in phase 3) were parents of new children (5–12 years)

TABLE 1. Flowchart of the development of the Childhood Bladder and Bowel Dysfunction Questionnaire

Phase		n	Items*	Psychometric property	COSMIN definitions
1	Delphi panel	31†		Face and content validity	The degree to which the content of an HR-PRO instrument is an adequate reflection of the construct to be measured.
2	Pilot testing	48‡	27	Feasibility and content validity	Feasibility-related aspects (comprehensibility, regionally acceptable wording, time to complete and acceptability).
3	Three-step test interviews	56‡	23	Feasibility	
4	Field testing	1229‡	23	Content and structural validity	Structural validity. The degree to which the scores of a measurement instrument are consistent with hypotheses with regard to internal relations and consistency of the items.
				Reliability (aspect)	Internal consistency: the degree of inter-relatedness among the items.
5	Crosscultural translation Dutch-English§	11§	18	Adapted version	
					COSMIN definitions (not assessed)
				Reliability	The extent to which scores for patients who have not changed are the same for repeated measurement under several conditions: eg, using different sets of items from the same HR-PRO's (internal consistency); over time (test-retest); by different persons on the same occasion (inter-rater); or by the same persons (ie, raters or responders) on different occasions (intrarater).
				Responsiveness	The ability of an HR-PRO instrument to detect change over time in the construct to be measured.
				Interpretability	Interpretability is the degree to which one can assign qualitative meaning—that is, clinical or commonly understood connotations—to an instrument's quantitative scores or change in scores. Interpretability is not considered a measurement property, but an important characteristic of a measurement instrument.

CBBDQ = Childhood Bladder and Bowel Dysfunction Questionnaire; COSMIN = COnsensus-based Standards for the selection of health Measurement Instruments; HR-PRO = health-related patient-reported outcome.

*Number of items.

†Delphi panel: 6 pediatricians, 25 specialized pelvic and pediatric physiotherapists in different combinations.

‡Number of participants (parents).

§Expert committee: 4 professional translators (all naive to the topic), 2 epidemiologists, and 5 healthcare professionals.

visiting physiotherapy, affected with at least 1 bladder or bowel dysfunction and with no association between increased behavioral problems and CBBD. Children were recruited during their initial visit at the pelvic physiotherapists (phases 2–4) or pediatric physiotherapists (phases 2 and 3). These physiotherapists completed an additional professional master's degree on specialized pelvic and/or pediatric physiotherapy. The children came from primary (general practitioner or self-initiated visit), secondary (district hospitals) or tertiary (university hospital) healthcare settings from across the Netherlands. It was decided to limit the use of the CBBDQ to children ages 5 to 12 years, because bladder and bowel control is considered normal and relevant from the age of 5 years onwards (10,30) and children up to 12 years were supposed to better self-report their problems. Exclusion criteria included age other than 5 to 12 years and insufficient understanding of the Dutch language. Informed consent was obtained from all participating parents. The Medical Ethics Committee of the Maastricht University Medical Centre approved the study (MEC 15-4-117).

Phases of the Development of the Childhood Bladder and Bowel Dysfunction Questionnaire

Selection of Items and Response Formats

Items covering bladder and bowel symptoms were derived from existing questionnaires (Dutch and English), identified by approaching Dutch clinicians and by means of an extensive literature review in the following databases: PubMed, the Cochrane Library, and PEDro (1995–2006). Questions were rephrased in accordance with ICCS-recommendations or Rome-III criteria (same as recently published Rome-IV criteria) (10,11,30–32). First, a Delphi panel (6 pediatricians and 25 physiotherapists) was asked to comment by E-mail on the completeness and relevance of selected items and accompanying response formats and to indicate missing or redundant items (content validity). Next, the wording of the items and corresponding answers was scrutinized in 2 meetings with the Delphi panel, to ascertain that all facets of CBBD were covered. An item was included if at least 80% of the panel agreed and the draft-version was prepared for further evaluation in pilot testing (phase 2).

Pilot Testing

Before the first visit at the physiotherapist, parents were asked to complete the draft questionnaire at home. During intake the parents underwent semistructured interviews inventorying feasibility-related aspects, such as wording of the items and response formats (5-point Likert scales) while completing the questionnaire. All participating physiotherapists were members of the Delphi panel.

At the end of the pilot phase, the Delphi panel discussed in a third meeting the problems raised by parents and professionals. Feasibility and validity aspects of the draft version of the CBBDQ were evaluated.

Feasibility Study

Parents (children with CBBD symptoms) and control parents (children without CBBD symptoms), originating from all regions of the Netherlands, were invited to participate. Controls (as potential users) were recruited through acquaintances of the researchers. The ''Three-Step Test Interview'' strategy was used to assess the feasibility-related aspects of the CBBDQ (27–29). Control parents were asked to keep one of their fully toilet-trained 5- to 12-year-old children, in mind when completing the CBBDQ. Comprehensibility, regionally accepted wording, time to complete, and acceptability were taken into consideration. To address potential regional differences in CBBD-terminology (such as the Dutch equivalents of urination, peeing, weeing, wetting, defecation, pooing, and stools), parents from all regions in the Netherlands were invited to participate. In addition, a semistructured questionnaire identified additional information on the time needed to complete the CBBDQ and any problems experienced, such as the use of unacceptable or puzzling words or incomprehensible response formats (27–29).

Field Testing

During field testing, the CBBDQ was incorporated into routine clinical practice of pelvic physiotherapy. Before the first visit, parents (other than those participating in previous phases) were asked to complete an online version of the CBBDQ at home. Data were collected to determine the relatedness of items and to consider item reduction (content and structural validity) and to explore the internal consistency of the possible subscales (reliability).

Guideline-driven Translation

To produce an English version of the Dutch CBBDQ, forward translations into English were performed by 2 independent professional translators. After results had been combined, 2 other translators, blinded for the original, translated the English version back into Dutch. Translators were all naive to the topic. Discrepancies among translations were discussed and resolved with an expert committee (including the 4 translators, [2 native English speakers], 2 epidemiologists, and 5 healthcare professionals) (28).

Statistical Analyses and Sample Sizes

Phase 2: Comments by parents and professionals with respect to relevance, wording and question, and response formats were noted. A sample size of 15 to 30 persons was considered sufficient for the qualitative approach during pilot testing (28).

Phase 3: A minimum sample size of 50 was considered sufficient (28). We assumed each item and the CBBDQ as a whole to be acceptable when $\geq$85% of the parents had ''no problems'' with understanding or wording of the individual items or the questionnaire and experienced the ''time to complete the CBBDQ'' as reasonable. Characteristics between parents and control parents were compared using analysis of variance for continuous variables and the χ^2 test for categorical variables.

Phase 4: To ensure sufficient power for the analyses, a general subject-item ratio of 20:1 (ie, 460 questionnaires) was considered a minimum requirement (28). The answering options, the 5-point Likert scale in all items, ranged from 0 (never) to 4 (almost daily or daily). An item had to be removed in case of floor or ceiling effect >75%, proportion of missing data (>10%), and intercorrelations <0.20 with all remaining items. Items with intercorrelations >0.80 (showing redundancy of measurements) were considered for removal (28). Missing values were imputed with the median item value for the total sample. The relatedness of items was determined using exploratory factor analysis (EFA). Oblimin rotations were applied to facilitate the interpretation of the factor structures. Items with weak multiple loading (cut-off at <0.40) were either removed, if the interpretation was difficult, or linked to the factor that was conceptually most closely related to it. Cronbach α was used to explore the internal consistency. Cronbach α of 0.70 to 0.89 was regarded as good, 0.60 to 0.69 as acceptable, and $\leq$0.59 as poor (28).

Phase 5: Items were accepted when >85% of the members of the expert committee had ''no problems'' with wording and response formats of each item (28).

A P value <0.05 was considered to indicate statistical significance. Statistical analyses were performed with SPSS software, version 23 (SPSS Inc, Chicago, IL).

TABLE 2. Characteristics of the 23-item Childhood Bladder and Bowel Dysfunction Questionnaire (n = 1229) in Field Testing

Item	My child	Missing %	Floor %	Ceiling %	Component matrix Comp1	Component matrix Comp2	Structure matrix* Comp1	Structure matrix* Comp2
CBBDQ 1	Passes urine >8 times during the day.	0.0	50.6	20.6	0.380	−0.143	**0.319**	−0.227
CBBDQ 2	Wets underwear and/or outer clothing during the day (a few drops is considered wet).	1.4	37.1	29.5	**0.830**	0.120	**0.830**	−0.073
CBBDQ 3	Loses some drops of urine immediately after voiding has finished.	2.0	43.2	4.6	**0.546**	0.069	**0.543**	−0.058
CBBDQ 4	Loses urine within the hour after voiding has finished.	1.5	58.9	1.1	**0.759**	0.123	**0.762**	−0.054
CBBDQ 5	Seems to ignore the urge to urinate.	2.4	35.8	23.4	**0.670**	0.349	**0.747**	0.187
CBBDQ 6	Uses tricks to stay dry, like wriggling or forcefully crossing the legs.	2.2	31.0	27.0	**0.620**	0.206	**0.656**	0.059
CBBDQ 7	Experiences a sudden uncontrollable urge to urinate.	2.6	59.6	13.0	**0.669**	0.149	**0.685**	−0.009
CBBDQ 8	Postpones first urination in the morning.	2.8	60.4	12.0	0.309	0.232	**0.366**	0.156
CBBDQ 9	Wets the bed or diaper during sleeping periods.	2.2	45.2	29.8	**0.468**	−0.138	**0.405**	−0.242
CBBDQ 10	Wakes up at night to urinate.	3.1	59.0	5.8	−0.067	0.047	−0.050	0.061
CBBDQ 11	Has 2 or fewer bowel movements per week.	2.6	72.0	9.4	−0.242	**0.454**	−0.093	**0.498**
CBBDQ 12	Stains or soils the underwear with stools.	2.4	37.2	15.5	−0.035	**0.593**	0.148	**0.587**
CBBDQ 13	Has hard stools or painful bowel movements.	3.5	50.8	3.5	−0.265	**0.503**	−0.100	**0.551**
CBBDQ 14	Has large amounts of stools (that may obstruct the toilet).	4.3	65.2	1.3	−0.152	**0.545**	0.021	**0.567**
CBBDQ 15	Postpones bowel movements.	4.5	52.4	16.5	−0.078	**0.708**	0.141	**0.709**
CBBDQ 16	Experiences a sudden uncontrollable urge to defecate.	4.8	39.2	11.9	0.147	**0.523**	0.300	**0.477**
CBBDQ 17	Has abdominal pain.	7.1	27.4	1.6	−0.282	**0.410**	−0.144	**0.465**
CBBDQ 18	Has a bloated belly.	0.0	66.9	5.7	−0.193	**0.570**	−0.011	**0.601**
CBBDQ 19	Passes urine <4 times during the day.	2.1	67.6	7.8	−0.131	0.247	−0.050	0.271
CBBDQ 20	Has pain during passing urine.	1.9	**77.3**	1.3	0.071	0.125	0.106	0.106
CBBDQ 21	Is lifted during the night to urinate.	5.3	73.6	15.3	0.306	−0.161	0.244	−0.227
CBBDQ 22	Has >2 bowel movements during the day.	2.8	41.9	1.6	0.013	0.134	0.053	0.128
CBBDQ 23	Has blood during bowel movements.	5.7	**94.4**	0.2	−0.144	0.147	−0.093	0.176

Relevant outcomes are shown in boldface.
CBBDQ = Childhood Bladder and Bowel Dysfunction Questionnaire; Comp = component.
*Oblimin rotation of the factor solution.

RESULTS

Participants

A total of 1333 parents participated. The children in all phases were comparable in terms of clinical characteristics. The mean age of the 677 girls was 7.9 years (standard deviation [SD] 2.2), the mean age of the 656 boys was 7.9 (SD 2.0). The most frequently reported complaints were daytime UI (35.9%), enuresis (29.3%), constipation, and/or FI (30.5%). In addition, increased voiding frequency (14.5%) and defecation frequency (2.4%) were noted in phase 4. More than 85% of the children had BBD symptoms over 6 months (Patient characteristics are presented in Supplemental Digital Content 1, Table, *http://links.lww.com/MPG/A841*).

The most common comorbidities were urinary tract infection (13.2%) and abdominal pain (26.3%). Of the 1277 children visiting physiotherapy in phases 2 and 4, 145 (11.4%) came at own initiative, 375 (29.4%) were referred by their family doctor, 688 (53.9%) by pediatricians of district hospitals, and 69 (5.4%) by tertiary healthcare medical specialists.

Phases of the Development of the Childhood Bladder and Bowel Dysfunction Questionnaire

Phase 1: A total of 31 questionnaires were retrieved, differing with regard to number of items (ranging from 10 to >100 items), response formats, purpose of measure (diagnostic, predictive, parent- or child-reported), covered symptoms (bladder and/or bowel symptoms), and target group (age). Following 2 meetings with the Delphi panel, 27 items were included in the draft version with each item indicating a single bladder or bowel symptom or withholding behavior, in accordance with ICCS or Rome-III standards (10,30). Each item is scored on a 5-point Likert scale, ranging from never, hardly ever, sometimes, often to always.

Phase 2: Forty-eight parents completed the (27-item) draft version of the CBBDQ. Pilot testing resulted in removal of 4 items (''hesitancy,'' ''urinary flow,'' ''child sent to toilet by the parents,'' and ''passing mucus during defecation''). In addition, some parents experienced problems with the wording of the Likert scales; therefore, the wording was changed into ''never, once a month, several times a month, once or several times a week, almost daily or daily'' in accordance with the ICCS and Rome-III standards. As a consequence of using standards the response formats of 3 items differ slightly.

Phase 3: Fifty-six parents completed the CBBDQ of whom 43 (76.8%) had a child with CBBD and 13 controls (23.2%) a nonsymptomatic child. The children of both groups were comparable in terms of age (mean symptomatic group 8.6 years [SD 2.2] vs 9.3 [SD 2.2] for the controls; $P = 0.99$); however, girls were overrepresented in the control group (41.8% vs 84.6%). Of the parents, 87.3% did not have any problems regarding understanding or the response formats and none indicated to have major problems. One parent (1.8%) experienced a problem with the time to complete the CBBDQ. The wording of the adapted 5-point Likert scales was accepted. The mean time taken to complete the CBBDQ was 5.7 minutes (1.5–25 minutes). Only 3 of the parents (5.4%) skipped 1 question (33).

TABLE 3. Childhood Bladder and Bowel Dysfunction Questionnaire

Questionnaire on ''urinary and defecation problems in children ages 5 to 12 years''
For each question, please select the answer that best applies to your child *in the past month.*
If you do not know the answer, please ask your child (or complete the questionnaire together with your child).
Note that not all questions have the same answer options.
MY CHILD....

1	Passes urine >8 times during the day.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
2	Wets underwear and/or outer clothing during the day (a few drops are considered wet).	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
3	Loses some drops of urine immediately after urinating has finished.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
4	Loses urine within the hour after urinating has finished.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
5	Seems to ignore the urge to urinate.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
6	Uses tricks to stay dry, like wriggling or forcefully crossing the legs.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
7	Experiences a sudden uncontrollable urge to urinate.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
8	Postpones first urination in the morning.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
9	Wets the bed or diaper during sleeping periods.	☐	Never	☐	Less than once a week	☐	1 to 2 times a week	☐	3 to 5 times a week	☐	Almost daily or daily
10	Wakes up at night to urinate.	☐	Never	☐	Less than once a week	☐	1 to 2 times a week	☐	3 to 5 times a week	☐	Almost daily or daily
11	Has 2 or fewer bowel movements per week.	☐	Never	☐	Once a month or less	☐	1 to 2 times a month, at the most	☐	Several times a month	☐	Very often
12	Stains or soils the underwear with stools.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
13	Has hard stools or painful bowel movements.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
14	Has large amount of stool (*that may obstruct the toilet).*	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
15	Postpones bowel movements.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
16	Experiences a sudden uncontrollable urge to defecate.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
17	Has abdominal pain.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily
18	Has a bloated belly.	☐	Never	☐	Once a month or less	☐	Several times a month	☐	Once or several times a week	☐	Almost daily or daily

Phase 4: Table 2 shows the characteristics of the 23-item CBBDQ based on questionnaires of 1229 children, visiting 6 pelvic physiotherapy-practices from May 2010 to March 2015. Before EFA, the appropriateness of data was assessed. Floor effects and intercorrelations <0.2 were found for the items ''pain during voiding'' and ''blood during defecation,'' so these items (20 and 23) were discarded from further analysis. EFA was used for the remaining 21 items. The items ''micturition <4 times a day,'' ''nocturia,'' ''night lifting,'' and ''defecation >2 times a day'' failed to load appropriately. The item on decreased voiding frequency was covered by other items (5 and 8) and the items 21 and 22 (''night lifting'' and ''frequent defecation'') were not supported by ICCS or Rome-III and were therefore removed. The item on nocturia was maintained. Consequently, 18 items remained (Table 3) and were subjected to EFA, resulting in a 2-factor structure, which was a priori hypothesized: a 10-item bladder subscale (Cronbach α 0.74) and an 8-item bowel subscale (Cronbach α 0.71). Both Cronbach α values exceeded the recommended value of 0.70, indicating good internal consistency. The answering options of the 5-point Likert scale of each item ranged from 0 (never) to 4 ([almost] daily). Therefore, the bladder subscale ranged from 0 to 40 and the bowel subscale from 0 to 32. The scores of the 2 subscales can be combined in 1 overall score for concomitant bladder and bowel symptoms (range 0–72).

Phase 5: During the translation process (28), discrepancies between translations were resolved by consultation. The 4 non-medical professional translators independently indicated to have problems with the word ''voiding.'' Other debated words were ''clothing'' (trousers, pants, outer clothing), ''the degree of incontinence'' (the size of a [small] coin, a [few/some] drops), and withholding maneuvers (wriggling, keeping knees together and crossing legs [forcefully]). Consensus among the expert committee resulted in the phrases ''urination,'' ''outer clothing,'' ''some drops,'' and ''like wriggling and forcefully crossing the legs.'' The final version was accepted by all members of the committee (Table 3) (28).

DISCUSSION

The purpose of the present study was to develop an evaluative parent-reported questionnaire for use in clinical and research practice, which is able to quantify the symptom frequency of (concomitant) bladder and bowel symptoms in children, ages 5 to 12 years, and to assess its feasibility and aspects of validity and reliability. The results indicate that the Dutch 18-item CBBDQ is feasible and content and structurally valid and it shows good internal consistency for the bladder and bowel subscales. More psychometric analyses are needed to fully demonstrate the instrument's measurement properties; test-retest reliability, responsiveness, and interpretability.

Children originated from different settings and were included regardless of underlying origin or concomitant comorbidities. The development and testing of the CBBDQ in this broad patient population supports the applicability of CBBDQ. In addition, it turned out to be suitable to be filled out at home or in the waiting room, before visiting a care provider. As such, it offers healthcare professionals such as doctors, physiotherapists, and nurses an easy way to quantify and evaluate CBBD in school-age children (27,34).

To our knowledge, the CBBDQ is the first questionnaire that aims to evaluate the presence of symptoms related to bladder and bowel problems. Most closely related to the CBBDQ, with regard to measured construct, is the ''Vancouver-NULTD/DES-questionnaire'' (14-items, with 10 on bladder, 3 on bowel, and 1 on understanding). Factor analysis of the Vancouver-NULTD/DES showed loading on 4 factors, corresponding to UI, urgency (of urine), obstruction (of urine), and constipation/FI. Only for the total scale a Cronbach α of 0.45 was presented, which is considered a poor outcome (35). This questionnaire differs from the CBBDQ as it has primarily a diagnostic purpose. This is also the case for other questionnaires that have been described in the literature next to the fact that those questionnaires only address either bladder or bowel dysfunctions (17–25). The CBBDQ has been translated into English, with the intention to provide an internationally available questionnaire and therewith to standardize the evaluation of CBBD symptoms over time, which may facilitate clinical reasoning and comparisons among study outcomes. Furthermore, it is hypothesized that using the CBBDQ may reduce the risk of undertreating CBBD.

The strengths of the present study are that the 18-item CBBDQ is based on the use of structured methods advocated by COSMIN to construct the instrument; in accordance with ICCS-recommendations and Rome-III; participation of the target group in evaluating feasibility aspects; participation of various healthcare professionals, epidemiologists, and translators to address validity aspects; the samples used over the 5 phases of development were large and diverse in terms of age, place of origin within the Netherlands, and types of CBBD symptoms; and minimal missing values, underlining the feasibility of the CBBDQ.

Given the increasing ubiquity of electronic health records, various platforms for collecting patient data and internet administration of the questionnaire in field testing phase the potential generalizability of the CBBDQ for clinical and research purposes is apparent beyond its development.

A limitation includes that the use of the CBBDQ is restricted to parents of children ages 5 to 12 years and that controls (as potential users) were recruited through acquaintances of the researchers, possibly introducing recruitment bias on the feasibility judge.

CONCLUSIONS

The 18-item CBBDQ with an evaluative purpose, constructed according to the internationally accepted COSMIN standards, met the psychometric criteria for feasibility, content, and structural validity and have good internal consistency for the bladder and bowel subscales, when completed by Dutch parents of children, ages 5 to 12 years. The CBBDQ, as a self-administered instrument, is easy to fill out within a short time and suitable to be completed before visiting a healthcare professional. It offers professionals, but also researchers, an easy way to evaluate the frequency of symptoms of CBBD. Further psychometric analyses are needed to fully demonstrate the instrument's measurement properties, especially aspects needed to investigate test-retest reliability, responsiveness, and interpretability. Therefore, the English and Dutch versions of the CBBDQ will now be introduced clinically and subjected to further psychometric evaluation.

ACKNOWLEDGMENTS

The authors would like to thank all 1333 parents (phases 2, 3, and 4) for participating in this study, and Ineke de Gee-de Ridder, who was closely involved in the first draft of the questionnaire and in the pilot study, Maartje Verhoeven for performing the feasibility study using The Three-Step Test Interviews and the professional translators, Matt Commers, Tracey Drost-Plegt, Inge van Engelenburg, and Jan Klerkx for their critical advice during the cross-cultural adaptation. In addition, we want to thank all pediatricians and pelvic and pediatric physiotherapists involved in the different phases of the study for their cooperation and support through the years.

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