Who Should We Trust in Screening for Lower Urinary Tract Dysfunction in Children: The Parents or the Child?

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OBJECTIVE To investigate whether the child's and the parents' reports about lower urinary tract symptoms (LUTS) are reliable and correlate with each other.

MATERIALS AND METHODS A validated questionnaire, the International Consultation on Incontinence Questionnaire Pediatric Lower Urinary Tract Symptoms, including both children and parent versions, was completed by children (age 5-18 years) with and without LUTS (control) and their parents without assistance. All children were investigated with detailed history, bladder diary, urinalysis, and flowmetry with postvoid residual urine volume measurement. The data were stratified into 3 age groups (5-9, 10-13, and 14-18 years). The reliability of both versions was evaluated using Cronbach's α and ≥ 0.7 indicated acceptability. The correlation between the children's and parents' reports for each question was evaluated using Spearman correlation coefficients. The receiver operating characteristic curve was used to define the cutoff points, and the sensitivity and specificity were calculated. The principal component analysis method was used to explain the construct validity.

RESULTS A total of 272 children (147 with and 125 without LUTS) and their parents completed the questionnaire. The children and parent versions of the questionnaire were both reliable (Cronbach's α 0.709 and 0.710, respectively). The sensitivity and specificity was 82.4% and 80.0% for the children version and 87.8% and 78.4% for the parent version, respectively. The reliability and acceptability of the children's reports were insufficient for the 5-9 year age group, and the parents' answers were unreliable for the 10-13 year age group. The correlation between the parent and children reports was the lowest for the 10-13 year age group.

CONCLUSION The alteration in the reliability in the different age groups suggests that the combination of the parent and children versions is most appropriate for screening children with LUTS. UROLOGY 82: 437–441, 2013. © 2013 Elsevier Inc.

Lower urinary tract symptoms (LUTS) are common in the pediatric population and can lead to significant worsening in the quality of life. It has been reported that 22% of school children have LUTS.[1] Also, almost 40% of pediatric urology outpatient visits are for complaints of LUTS.[2] A wide range of non-neurogenic voiding disorders, between giggle incontinence and the Hinman syndrome, can present with such symptoms.[3] Although such symptoms might be considered more of a social problem, it has been demonstrated that LUTS can predispose to urinary tract infections (UTIs) and a poor response to treatment of vesicoureteral reflux.[4] Therefore, it is of utmost important for physicians to identify which of these children need treatment.

Several symptom scoring questionnaires have been developed to facilitate the diagnosis of LUTS, verify the disease severity, and monitor the children to evaluate their response to treatment.[5-10] Many of these questionnaires were designed only for the parents or the children, with some designed for both. However, no consensus has been reached regarding who should complete the questionnaires for more reliable answers.

We distributed a previously published questionnaire to both parents and children using the appropriate version. Our main purpose was to investigate whether the children's and parents' reports about LUTS are reliable and correlate with each other. This is the first study to highlight the identity of the primary respondent as the main topic for screening LUTS in children.

Financial Disclosure: *The authors declare that they have no relevant financial interests.*

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Submitted: February 15, 2013, accepted (with revisions): March 12, 2013

0090-4295/13/$36.00

http://dx.doi.org/10.1016/j.urology.2013.03.021

MATERIAL AND METHODS

Children who were admitted to our pediatric urology or pediatric nephrology outpatient clinics with a complaint of LUTS and those without LUTS (control group) were requested to complete the Turkish version of the International Consultation on Incontinence Questionnaire Pediatric Lower Urinary Tract Symptoms (ICIQ-CLUTS).[10] The ICIQ-CLUTS is a self-administered questionnaire developed by the International Consultation on Incontinence Questionnaire Committee in 2010. It consists of 12 questions; 1 question each on age and gender, 9 specific questions about LUTS and 1 for weekly defecation frequency. Two versions of the survey were developed: 1 for the parents and 1 for the children.

The questionnaire was self-completed by children aged 5-18 years old and their parents, without any assistance. The patients with anatomic and/or neurologic lower urinary tract abnormalities, diabetes mellitus, and psychiatric disorders were excluded from the present study. The cultural adaptation of ICIQ-CLUTS was performed in 3 main steps.

1. Two bilingual, native Turkish-speaking physicians who were aware of the study's objectives (M.S.S., N.G.) translated the original ICIQ-CLUTS into Turkish. The 2 translations were discussed, and a consensus was reached for the initial version.
2. A backward translation of the initial version was performed by a bilingual, native English-speaking physician. The minor differences were discussed with all translators, and the preliminary version was developed after mutual consent.
3. Twenty children who had self-reported complaints of LUTS and their parents were requested to complete the preliminary version independently. An interview with these families elucidated the possible misunderstandings in the questionnaire. The marginal differences were corrected, and another interview performed with 10 additional families. The final version was created after ensuring that the translation was completely understood (Appendix 1).

The psychometric analyses of the ICIQ-CLUTS were performed in the following order:

1. Internal consistency reliability of each question was evaluated with Cronbach's α and ≥ 0.7 indicated acceptability.
2. Receiver operating characteristic curves were used to define the cutoff points, and the sensitivity and specificity were calculated.
3. The correlation between the children's and parents' answers was evaluated using Spearman correlation coefficients.

The participants were recruited from January to June 2012. All children were investigated with a detailed history, physical examination, 2-day bladder diary, urinalysis, and flowmetry or postvoid residual urine volume measurement. After the final clinician diagnosis, the children were divided into 2 main groups: group 1, those with LUTS and group 2, those without LUTS. Group 1 consisted of consecutive patients diagnosed with LUTS at their first pediatric urology or nephrology visit. Group 2 was selected from patients admitted to our pediatric urology or nephrology department with non-LUTS complaints. Children with LUTS were classified as having overactive bladder, monosymptomatic enuresis nocturna (MEN), non-MEN, and mixed and/or dysfunctional voiding according to the International Children's Continence Society Guidelines.[11] The physicians examining the children were unaware of the questionnaire responses until they have had given their final diagnosis.

Application of factor analyses using the principal component analysis method with the quartimax rotation was used to explain the construct validity and the success of the demonstrated percentage of variability. Categorical variables were compared between the groups using the chi-square test. Psychometric analyses were performed for the children and parent versions and for all groups. The data were separated into 3 subgroups according to patient age: 5-9, 10-13, and 14-18 years. Because the main purposes of our study were to evaluate the reliability of the answers, measure the correlation between the children and parent versions, and calculate the appropriate cutoff points, the data were determined for each study subgroup. The percentages above the cutoff threshold were also investigated for each type of voiding dysfunction and for the control group. The institutional review board approved the present study, which complied with the Declaration of Helsinki.

RESULTS

A total of 272 children who were admitted to our pediatric urology or pediatric nephrology outpatient clinics were eligible for the present study. The final clinician diagnosis separated the children into those with LUTS positive (group 1, n = 147) and those without LUTS (group 2, n = 125). The mean age of the study groups was 10.2 ± 2.7 and 11.1 ± 2.3 years, respectively. The number of females and males was 62 and 38 and 61 and 39 for groups 1 and 2, respectively. No statistically significant difference was found between the 2 groups ($P = .943$). Of the participants, 88 were aged 59, 137 were 10-13, and 47 were 14-18 years.

Of the 88 children aged 5-9 years, 14 could not complete the forms. Of these children, 13 were <7 years old, indicating the low acceptability in this age group. The other questionnaires, both the children and the parent versions, were all completed in the other age groups. The percentage of missing answers was 1.2% and 0.9% in the children and parent versions, respectively. Also, 0.6% and 0.8% of the children and parents had written phrases or paragraphs on the questionnaire forms instead of circling the numeric choices, respectively.

The internal consistency reliability scores for each age group using Cronbach's α are listed in Table 1. The children and parent versions of the questionnaire were both reliable (Cronbach's α 0.709 and 0.710, respectively). However, the reliability was lowest for the parents of the children aged 10-13 years (α 0.659). The remaining questionnaires completed by the different age groups were greater than the threshold α of 0.7, except for the children aged 5-9 years (α 0.696).

Figure 1 demonstrates the receiver operating characteristic curves for the children and parent scores. The cutoff threshold score was 15 and 14 for the children and parent versions, respectively. The scores less than these thresholds were accepted as LUTS negative. The sensitivity and specificity was 82.4% and 80.0% in the child version and 87.8% and 78.4% in the parent version, respectively.

Table 1. ICIQ-CLUTS reliability using Cronbach's α

	Cronbach's α	
Age Group	Children	Parent
Overall	0.709	0.710
5-9	0.696	0.720
10-13	0.706	0.659
14-18	0.759	0.794

ICIQ-CLUTS, International Consultation on Incontinence Questionnaire Pediatric Lower Urinary Tract Symptoms.

The correlation between the child and parent answers for each question is listed in Table 2. The correlation was highest for question 4 (incontinence) and lowest for question 3 (UTIs) ($r \leq 0.6$ for questions 4, 6, and 2 in the 5-9, 10-13, and 14-18 year age groups, respectively). Therefore, the correlation between the parent and children answers was lowest for the 10-13 year age group.

Using the International Children's Continence Society guidelines, the final clinician judgment identified 147 children with LUTS. These patients were classified into different diagnostic groups: overactive bladder (n = 24), dysfunctional voiding (n = 32), mixed type voiding dysfunction (n = 32), MEN (n = 33), and non-MEN (n = 26). The percentages greater than the cutoff threshold are provided for each diagnostic group and the control group in Figure 2.

To assess the possible differences in internal conceptual structure, the principal component analysis was applied to both versions. The total variance explained was 55.983% and 54.533% for the children and parent versions, respectively, indicating the validity of the questionnaire in the Turkish language.

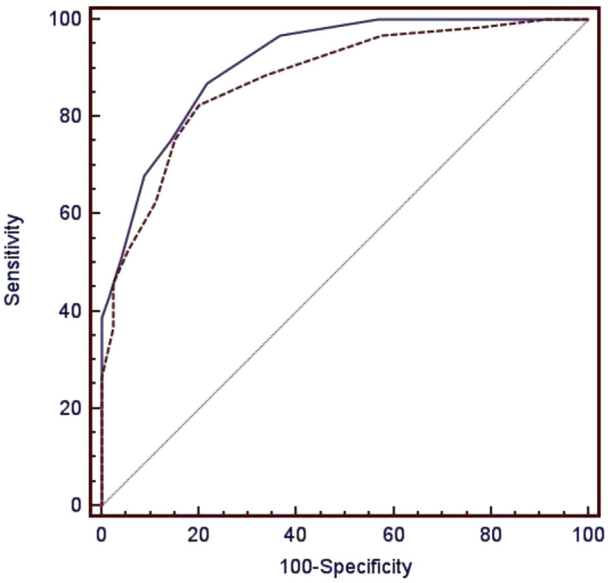

Figure 1. Receiver operating characteristic curves of child and parent scores. Dashed curve represents children version; diagonal line, represents reference standard. Children version, criterion >15; sensitivity 82.4%, and specificity 80.0%. Parent version, criterion >14; sensitivity 87.8%, and specificity 78.4%. (color version available online.)

COMMENT

Symptom scoring systems designed for urologic conditions in the adult population have gained worldwide acceptance for diagnostic and monitoring purposes.[12,13] Subsequently, several screening tools were developed to investigate LUTS in children.[5-10] Some were designed to only be answered by the parents.[6,4] Most were designed only for completion by children, although the caregivers were asked to complete the questionnaire in some circumstances, such as for younger children.[5,9,15] Some included questions directed to both the children and the parents on the same reply sheet.[7] Therefore, no consensus has been reached regarding who will provide more reliable answers, increasing concern regarding the reliability of the questionnaires. This topic was previously highlighted.[9,16]

In our study, the primary goal was to investigate whether the children and parent reports about LUTS are reliable and correlate with each other in the different age groups. We found that the reliability and acceptability of the children's answers were insufficient for those aged 5-9 years, and the parents' answers were unreliable for the children aged 10-13 years. The correlation between the parents and children was lowest for those aged 10-13 years. The secondary objective was to perform validate the ICIQ-CLUTS in the Turkish language. We demonstrated that ICIQ-CLUTS is a valid and reliable questionnaire to screen for LUTS among the Turkish pediatric population. Both objectives were achieved.

The main reason we chose the ICIQ-CLUTS was that it includes 2 versions, 1 for children and 1 for parents.[10] The questionnaire was properly designed to evaluate LUTS in the pediatric population and eliminate other diseases that can overlap. It is also a valid and reliable diagnostic tool in 3 different languages: English, Italian, and German. Therefore, we believed the ICIQ-CLUTS would be the most suitable scoring system for our study.

The investigation of reliability using Cronbach's α demonstrated satisfactory internal consistency for the children and adult reports both (0.709 and 0.710, respectively). However, stratifying the reliability by age group, the reliability of the children's answers was slightly insufficient for the 5-9 year age group (Cronbach's α 0.696). Also, the reliability was not adequate for the parent answers for the children aged 10-13 years (Cronbach's α 0.659). These results have demonstrated that the reliability varies among the different age groups. Moreover, the high numbers of uncompleted forms for those aged 5-9 years indicated the low acceptability.

The variable correlation scores between the child and parent answers were also important results in our study (Table 2). We found that the correlation was greatest for question 4 (incontinence) and lowest for question 3 (UTIs) (Cronbach's α 0.934 and 0.481, respectively). For the 10-13 year age group, the correlation between the children and parent answers was the lowest. Although the

Table 2. Spearman correlation coefficients for children and parent answers stratified by group

Question	SRCC			
	5-9 y	10-13 y	14-18 y	Total
3	0.553	0.363	0.716	0.481
4	0.966	0.898	0.996	0.934
5	0.976	0.582	0.763	0.739
6	0.704	0.674	0.770	0.703
7	0.645	0.438	0.380	0.494
8	0.666	0.573	0.624	0.600
9	0.389	0.562	0.476	0.496
10	0.743	0.646	0.723	0.694
11	0.496	0.520	0.631	0.518
12	0.393	0.605	0.765	0.594

SRCC, Spearman correlation coefficient.

Correlation was greatest for question 4 (incontinence) and lowest for question 3 (urinary tract infection).

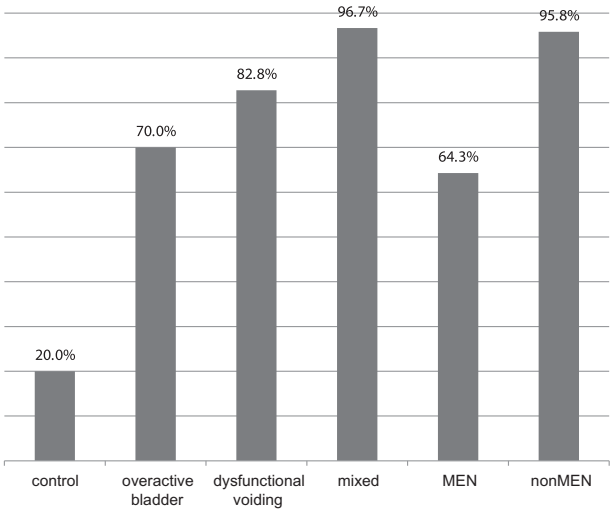

Figure 2. Percentages greater than cutoff threshold (children version) provided for each type of voiding dysfunction and control group.

reliability of the children in that age group was acceptable (Cronbach's α 0.706), the parent answers were not reliable (Cronbach's α 0.659). We hypothesized that this difference can be explained by the occurrence of puberty. The development of puberty has usually started by 10-13 years old, especially in girls. Hence, communication between children and parents is decreasing during this period. This finding has demonstrated that for children aged 10-13 years, it is important to use a screening tool developed, not only for parents, but also for children. Screening only the parents or the children could result in inappropriate findings for this specific age group. However, cultural differences should be remembered because these could affect the emotional behavior and responses. In the study by De Gennaro et al,[10] they been demonstrated that the reliability of the parents was low for children aged 5-9 years. The correlation between the parent and children versions was highest for the children aged 14-18 years.[10] The differences in the results between our study and the initial validation study have demonstrated that the responses of the screening tools are usually culturally based and can differ from 1 country to another.

It has been reported that the incidence of dysfunctional voiding is higher in females.[2] Our study results were in accordance with those from previous studies and the female to male ratio was about 2:1 in the children with LUTS. Moreover, this ratio was similar in the control group of our study, which is statistically of importance.

Although some concerns about the reliability of the screening tools in children have been previously discussed, ours is the first study to highlight the identity of the primary respondent as the main topic for screening LUTS in children. The caregivers of children with LUTS can sometimes exaggerate or underestimate the symptoms of their child. This can also be said of the children's reports. Such reactions are usually culturally based, and different results from the scoring systems can be obtained from different populations. Sureshkumar et al[14] reported that parents were over-reporting their children's UTIs by twofold but were reliable in answering the questions about voiding frequency and daytime incontinence. In another study, the children and parent reports about health-related quality of life were compared. The children reported significantly lower quality of life scores than their parents for physical complaints, motor and cognitive functioning, and positive emotion scales.[17] Therefore, the parental impression about LUTS could differ significantly from the child's impression. Thus, it would be wiser to use a screening tool that includes both the parent's and the children's aspects.

Similar to the other symptom scoring questionnaires, a cutoff value has been set for the ICIQ-CLUTS to define the presence of LUTS. However, one should not use the cutoff threshold as the only diagnostic criterion without the findings from the clinical evaluation. Therefore, ICIQ-CLUTS should be used cautiously for the following purposes: to facilitate the diagnosis in addition to the clinical evaluation findings, verify the disease severity, and monitor children during treatment.

One superiority of our study compared with other validation studies was the assessment of the type of LUTS by the clinicians and the investigation of which diseases were more likely to be diagnosed using the ICIQ-CLUTS. Although screening tools are used to help the evaluation of the symptoms in a structured manner, they can also help physicians to determine the type of LUTS. Therefore, it is crucial to know which diseases are best associated with the questionnaire results. We found in the Turkish population that the ICIQ-CLUTS is most helpful in screening children with mixed type voiding dysfunction and those with non-MEN (Fig. 2). However, the percentage above the cutoff threshold was only 64% for the patients with MEN. Thus, the identification of children with MEN using the ICIQ-CLUTS is questionable. To provide powerful statistical results, we intended to include a relatively higher number of participants compared with the other

available validation studies.[9,14] We believe this information is another point that makes our study not only a translation of a survey, but also adds additional useful information to previously published data.

Another objective of our study was to perform a cross-cultural adaptation of the ICIQ-CLUTS. The findings of our study have indicated that this questionnaire is valid and reliable in the Turkish population. We detected a satisfactory level of sensitivity and specificity for both the parent and the children versions. The receiver operating characteristic curve demonstrated the ability to discriminate between children with and without LUTS (Fig. 1). Furthermore, the principal component analysis results clearly showed the construct validity of the questionnaire.

One limitation of our study was the population bias. Because our hospital is a university hospital and a referral center, the patients and their families might not reflect the general situation in Turkey. Thus, the generalizability of our results could be limited. However, our hospital is located in a cosmopolitan city, enabling us to treat patients from different parts of the country. Therefore, we believe the population bias was minimized.

Another drawback of our study was the reliability of the final clinician diagnosis. To decrease physician bias, only 2 physicians, experienced in pediatric urology and nephrology (M.S.S., N.G.), evaluated the children. The diagnosis was in accordance with the International Children's Continence Society guidelines.[11] Moreover, both physicians were unaware of the survey scores to decrease the observer bias.

CONCLUSION

This is the first study to highlight the identity of the primary respondent as the main topic for screening LUTS in children. We have demonstrated that children aged 5-9 years are unreliable respondents and that the parents are unreliable respondents for their children aged 10-13 years. Because of this alteration in the reliability in the different age groups, the combination of both versions would be the most helpful in understanding the nature of LUTS. Therefore, we suggest that a validated questionnaire including both parent and children versions is appropriate for screening pediatric LUTS.

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APPENDIX

Supplementary Data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.urology.2013.03.021.