

Comparison of Two Validated Voiding Questionnaires and Clinical Impression in Children With Lower Urinary Tract Symptoms: ICIQ-CLUTS Versus Akbal Survey



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OBJECTIVE	To compare the correlation of 2 commonly used and validated voiding questionnaires (ICIQ-CLUTS and Akbal's) according to the physician's clinical impressions. Also, we investigated the reliability of these instruments in children with lower urinary tract symptoms (LUTS).
MATERIALS AND METHODS	Akbal's questionnaires and ICIQ-CLUTS forms were completed by children between 5 and 18 years old with and without LUTS and by their parents. The data were classified into 3 age groups (5-9, 10-13, 14-18). The reliability of Akbal and ICIQ-CLUTS was investigated by using Cronbach's α (≥ 0.7 is indicated acceptability). The total scores of the tools were compared with the physician's clinical impression (Kendall's tau b-test).
RESULTS	A total of 154 children (LUTS: $n = 88$, controls: $n = 66$) were prospectively enrolled into the study. The reliability of both instruments was excellent (Cronbach's alpha scores; Akbal = 0.811, ICIQ-CLUTS children version: 0.728 and ICIQ-CLUTS parental version: 0.746). When we compared by Kendal tau, Akbal was better correlated with physician's clinical impression. In addition, the children version of ICIQ-CLUTS was better correlated than parental version.
CONCLUSION	The results of our study provide that both tools are reliable and objective to grade the LUTS in pediatric population. Although both surveys were significantly correlated with clinical impression, the consistency of Akbal's questionnaire is found superior than that of ICIQ-CLUTS. UROLOGY 94: 214-217, 2016. © 2016 Elsevier Inc.

Lower urinary tract symptoms (LUTS) are common in pediatric population, and many physicians use voiding questionnaires during initial assessment and follow-up of those children.¹⁻⁵ The treatment is generally based on the clinical impression of the physician and the results of these instruments.⁶⁻⁸ The most frequently used voiding scoring systems were developed by Farhat, Akbal, Nelson and De Gennaro.^{2,4,9} Akbal's questionnaire was previously validated for children between 4 and 10 years old with parental help.² ICIQ-CLUTS (International Consultation on Incontinence Questionnaire Pediatric Lower Urinary Tract Symptoms) was validated in 2010, and it can

be used in children between 5 and 18 years old with both the children and parent versions.^{4,5}

In this study, we compared those 2 tools that have been demonstrated to predict severity of LUTS with the clinical impression determined by pediatric urologist or pediatric nephrologist. The secondary objective was to investigate the reliability of these instruments in children with LUTS.

MATERIALS AND METHODS

Institutional review board approval was obtained prior to the study. All patients and parents were informed and a consent was also obtained. Consecutively, children who were admitted to our pediatric nephrology or pediatric urology outpatient clinics with LUTS were requested to complete voiding questionnaires. LUTS were determined according to International Continence Society as storage (increased or decreased frequency, incontinence, urgency, nocturia), voiding (hesitancy, straining, weak stream, intermittency, dysuria), or other symptoms (holding maneuvers, feeling of incomplete emptying, urinary retention, post micturition dribble, spraying of the urinary stream).¹⁰ Children between 5 and 18 years old were prospectively included into the study. Akbal's

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questionnaire was completed by parents. However, both parents and children completed the ICIQ-CLUTS questionnaire in different rooms with their own versions. Parents give verbal consent for their children to participate. We have excluded children with urinary tract infection, neurogenic bladder, and psychiatric disorder.

ICIQ-CLUTS is a self-administered questionnaire developed by the International Consultation on Incontinence Questionnaire Committee in 2010.⁴ It consists of 12 questions about LUTS, 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-performed by children without parent's assistance. Akbal's questionnaire was designed in 2005 and completed by parents of patients 4–10 years old. Akbal survey has 13 questions and 1 quality of life question at the end of the study. The total score is between 0 and 35.²

The participants were recruited from January to June 2012. All children were investigated by a pediatric nephrologist or urologist by a visit lasted approximately 20 minutes with a detailed history, physical examination, 2-day bladder diary, urinalysis, and flowmetry and postvoid residual urine measurement. Children with LUTS were classified as having overactive bladder; mono-symptomatic enuresis, non-mono-symptomatic enuresis nocturna, and mixed; or dysfunctional voiding according to the International Children's Continence Society Guidelines.¹⁰ The physicians examining the children were unaware of the questionnaire responses until they had given their final diagnosis. To decrease physician bias, only 2 physicians, experienced in pediatric urology and nephrology (M.S.S. and N.G.), evaluated the children. Moreover, both physicians were unaware of the survey scores to decrease the observer bias. The data were separated into 3 subgroups according to patient age: 5-9, 10-13, and 14-18.

All the data were entered into an Excel sheet (Microsoft Corporation, Redmond, WA) by a research assistant from pediatric clinic. Then the data were transferred to SPSS and statistical analyses were performed with SPSS version 17.0 (IBM Corp., NY). Total symptom scores were calculated for both instruments. Total symptom scores from the 3 instruments (Akbal and 2 versions of ICIQ-CLUTS) were then compared with physician clinical impression of symptom at a clinical examination using a rank correlation technique (Kendall's tau test). The reliability of Akbal and ICIQ-CLUTS was evaluated using Cronbach's α and ≥ 0.7 was indicated as acceptability for reliability. The receiver operating characteristic curve was used to define the cutoff points, and the sensitivity and specificity were calculated. Categorical variables were compared between the groups using chi-square test. Comparisons among groups for normally distributed variables were performed using Student's *t*-test. Associations of LUTS and other variables were evaluated with logistic regression analysis. A *P*-value $< .05$ was considered statistically significant.

RESULTS

A total of 154 children who were admitted to our pediatric urology and pediatric nephrology outpatient clinics were enrolled into the study. The LUTS and control group were consisted of 88 and 66 children, respectively. Forty-four girls and 44 boys were included into the LUTS group and 36 girls and 30 boys were in the control group. No statistically significant differences was found about gender

between groups (*P* = .576). The mean age of control and study groups was 11.03 ± 2.4 and 10.16 ± 3 years, respectively (*P* = .055).

When we compared symptom scores of LUTS positive children with control group by the help of Akbal, and ICIQ-CLUTS parent and children versions, the difference was statistically significant (*P* $< .001$). Cronbach α value for Akbal, and ICIQ-CLUTS children and parent versions were found; 0.811, 0.728, and 0.746, respectively. Those results indicated the reliability of those 2 instruments. The sensitivity and specificity were 96.4 and 77.3 for Akbal's questionnaire, 85.9 and 71.2 for children version of ICIQ-CLUTS form, and 88.6 and 74.2 for parent version of ICIQ-CLUTS form.

When we compared ROC curves, areas under the curve for Akbal, ICIQ-CLUTS children version, and ICIQ-CLUTS parent version were 0.930, 0.879, and 0.868, respectively. The comparison of these validated scores is presented in [Figure 1](#). Kendal tau values were 0.700, 0.646, and 0.648 in Akbal, ICIQ-CLUTS children version, and ICIQ-CLUTS parent version, respectively. The highest Kendal tau value was for Akbal's score. When we compared Akbal with ICIQ-CLUTS children version and parent version by using ROC curves, the difference was statistically significant (*P* = .05 and *P* = .02). We also compared different age groups with ROC curves and the results are given in [Table 1](#). With the ROC curves, we demonstrated that both tools are valid and accurate to detect LUTS in different age groups. We divided study group as mild, moderate, and severe cases according to clinical symptoms by physician's clinical impression, and in [Table 2](#), we presented the mean symptom scores with both tools. Mean total symptom scores increased relative to physicians rating with ICIQ-CLUT children and parental versions and with Akbal's survey. With logistic regression analysis, we demonstrated that for the diagnosis of LUTS, Akbal's *P*-value was < 0.001 and odds ratio (OR) was 5.5, for ICIQ-CLUTS children version *P*-value was 0.006 and OR was 2.75, and for the ICIQ-CLUTS parental version *P*-value was 0.140 and OR was 2.17.

DISCUSSION

LUTS is a common clinical problem in pediatric age group, and it has negative social and health effects.¹¹ LUTS constitutes a significant portion of outpatient admissions to pediatricians, pediatric urologists, and pediatric nephrologists. Daytime lower urinary tract conditions encompasses a wide spectrum of clinical entities including urge syndrome, overactive bladder, dysfunctional voiding with dyssynergia between the detrusor and urinary sphincter, and enuresis.¹ Clinical symptoms may vary from mild incontinence to severe disorders with endpoints of irreversible bladder dysfunction with vesicoureteral reflux, urinary tract infection, and upper urinary tract damage.¹⁰ Diagnosis of LUTS relies on both noninvasive (careful history, detailed physical examination, 2-3 days voiding diary, voiding questionnaires, and uroflow plus residual urine) and invasive

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