Original Article

Adaptation and validation of Turkish version of tonsil adenoid health status instrument

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ABSTRACT

Objectives: This study aims to present the validation and cross-cultural adaptation of the Tonsil Adenoid Health Status Instrument (TAHSI) in Turkish language.

Patients and Methods: This prospective single-center validation study was conducted between May 15th, 2019 and December 31st, 2019 in a tertiary care facility. The study group consisted of 41 patients (20 males, 21 females; mean age 6.8±3.2 years; range, 3 to 15 years) who were diagnosed with tonsil and/or adenoid disease who were scheduled for adeno/tonsillectomy, while the control group consisted of 42 healthy children (20 males, 22 females; mean age 9.5±3.8 years; range, 3 to 16 years). The original survey was translated to Turkish and cross-cultural adaptation process was carried out as stated in guidelines. Both groups were assessed twice in two to six weeks before surgery. Study group was assessed again six months following surgery. Internal consistency, test-retest reliability, validity, and responsiveness to change were analyzed.

Results: Cronbach's alpha was 0.949 for the total scale. All subscales showed adequate internal consistency. Test-retest reliability was over 0.8 for all subscales. Subscale scores were statistically significantly lower in control group compared with study group ($p<0.001$). The scale showed high responsiveness to change for all subscales ($p<0.001$).

Conclusion: Turkish version of TAHSI showed good psychometric properties and can be used for both research and clinical purposes in children with tonsil and adenoid disease.

Keywords: Instrument validation, pediatric tonsillectomy, quality of life, recurrent tonsillitis.

Tonsillectomy is one of the most common procedures in otolaryngology practice. In children under 15 years of age, 289,000 procedures are performed annually in the United States.[1] The most common indications for tonsillectomy include recurrent throat infections and obstructive sleep disorders, both of which can have significant impact on health status of the child and result in decreased quality of life (QoL).[2] Although there is controversy regarding the indications for tonsillectomy, it has been shown that frequency and severity of infections reduce in the two years following tonsillectomy.[3] However, currently, only a few disease specific, validated outcome assessment tools are available to assess the efficacy of tonsillectomy. Tonsil Adenoid Health Status Instrument (TAHSI) is a widely used, validated, disease specific assessment tool which was developed by Stewart et al. in 2001.[4] This comprehensive instrument

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includes 15 items which consist of six different subscales (airway and breathing, infection, healthcare utilization, eating and swallowing, cost of care, and behavior). Each subscale includes three different questions which are scored using a 5-point Likert scale. Instrument is completed by the proxy of the child and it takes only a few minutes to complete, which makes it a practical tool to assess the outcome and an ideal tool to use for clinical or research purposes. However, TAHSI was validated to use in groups of children, not individual patients.[4]

Turkish is a commonly spoken language with an estimated 75.7 million native speakers worldwide.[5] To our knowledge, no validated Turkish version of TAHSI (t-TAHSI) is available currently. There are only regional data about tonsillectomy rates in Turkey; however, tonsillectomy is a common procedure in otolaryngology practice.[6] Therefore, in this study, we aimed to present the validation and cross-cultural adaptation of the TAHSI in Turkish language.

PATIENTS AND METHODS

This prospective single-center validation study was carried out at Istanbul Şişli Hamidiye Etfal Training and Research Hospital between May 15th, 2019 and December 31st, 2019. A total of 41 patients (20 males, 21 females; mean age 6.8±3.2 years; range, range, 3 to 15 years) were enrolled in the study who were scheduled for tonsillectomy. Inclusion criteria were age between 2-16 years and surgical indication for tonsillectomy with or without adenoidectomy. Guidelines were followed for indications for tonsillectomy published by the American Academy of Otolaryngology-Head and Neck Surgery Foundation in 2011.[7] Primary indications for tonsillectomy were recurrent tonsillitis and/or sleep disordered breathing. Exclusion criteria were prior history of peritonsillar abscess, possible malignancy in tonsils or adenoid, adenoidectomy alone, non-Turkish speaking proxy, coexisting medical conditions such as immunodeficiency, cleft palate, ear problems. Weight measurements were performed in the outpatient clinic for each participant. All procedures were performed under general anesthesia by five different experienced otolaryngologists. In control group, 42 asymptomatic healthy children (20 males, 22 females; mean age 9.5±3.84 years; range, 3 to 16 years) who presented to our clinic for routine examination were included. Children who were diagnosed with recurrent tonsillitis or sleep disordered breathing were excluded from control group. The study protocol was approved by the Istanbul Şişli Hamidiye Etfal Training and Research Hospital Ethics Committee. A written informed consent was obtained from the legal guardian of each participant. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Guideline published by Beaton et al.[8] was followed for cross-cultural adaptation. Forward translation was made by two bilingual individuals, one of which was uninformed. Both translators were native Turkish speakers and fluent in English. These two translations were synthesized and two other bilingual native English speakers who were not medical professionals back translated the synthesized version. Back-translated version was compared to the original for any discrepancies or loss of content. An expert committee consisting of three otolaryngologists and two translators analyzed the translations and final version of t-TAHSI was completed. For question 2, strep throat infection is not a common term in Turkish, so 'bacterial throat infection' term was used (Table 1).

The t-TAHSI was completed by the proxy of the affected child. The survey was given to the parent and was completed by the parent alone without any intervention in outpatient clinic when the patient was scheduled for surgery. To assess test-retest reliability, if the patient was scheduled for surgery within four weeks, the second copy of the survey was completed by the proxy during preoperative appointment, if the surgery was scheduled for later than six weeks, the proxy of the child was contacted via phone and a copy of the survey was sent via e-mail. Responsiveness of the survey was assessed in sixth month postoperatively in outpatient clinic. All patients presented to outpatient clinic for sixth month visit and all surveys were completed.

In control group, t-TAHSI was completed in outpatient clinic. For test-retest reliability, all

Table 1. Turkish version of Tonsil Adenoid Health Status Instrument

Bademcik ve Geniz Eti Anketi

Bizler bademcik ve geniz eti problemi olan çocuklar arasında bir çalışma yapıyoruz ve çocuğunuzun bademcik ve geniz eti ile alakalı yaşadığı sağlık problemleri ile ilgileniyoruz. Bu ankette doğru veya yanlış cevap seçeneği yok ve bizim için sizin fikriniz en önemlisi. Anket tamamen gönüllülüğe dayalı ve tamamlanması yaklaşık 3 dk sürmektedir.

Lütfen bu soruları çocuğunuzun son 6 ayını hatırlayarak cevaplayınız. Sorular birçok çocuğun bademcik ve geniz eti ile alakalı yaşadığı problemlerle ilgili. Eğer bir soru sizin çocuğunuz için problem oluşturmuyorsa o soru için lütfen 0 (hiç problem yok) seçeneğini işaretleyiniz. Lütfen soruları atlamayınız veya hiçbir soruyu boş bırakmayınız.

……..
……

Son 6 ay içerisinde, aşağıdaki durumlar çocuğunuz için ne kadar problem oluşturdu?
Lütfen en doğru cevabı yuvarlak içine alınız.

		Hiç problem yok	Çok hafif problem var	Orta derecede problem var	Oldukça ciddi problem var	Çok ciddi problem var
1.	Uykuda sesli şekilde horlama	0	1	2	3	4
2.	Bakteriyel (Beta streptokok) boğaz enfekiyonu	0	1	2	3	4
3.	Doktora çok defa gitme	0	1	2	3	4
4.	Arka arkaya 3 haftadan fazla antibiyotik alma	0	1	2	3	4
5.	Defalarca 2 haftadan daha kısa sürelerde antibiyotik alma	0	1	2	3	4
6.	Doktoru çok defa arama	0	1	2	3	4
7.	Uyku sırasında apne olarak bilinen düzensiz soluma veya soluk durması	0	1	2	3	4
8.	İki haftadan kısa süre kısa süreli tekrarlayan bademcik enfeksiyonları	0	1	2	3	4
9.	İki haftadan uzun süren , kronik ve sabit bademcik enfeksiyonu	0	1	2	3	4
10.	İlaçların ve muayenelerin maliyeti	0	1	2	3	4
11.	Gün içerisinde ağızdan nefes alıp verme	0	1	2	3	4
12.	Çocuğunuzun beklenildiği kadar kilo almaması ve büyümemesi	0	1	2	3	4
13.	Gün içerisinde sesli nefes alma	0	1	2	3	4
14.	Az iştah ve yeme problemleri	0	1	2	3	4
15.	Okulda veya evde davranış problemleri veya okul başarısında azlık	0	1	2	3	4

Cevaplarınız ve işbirliğiniz için teşekkür ederiz.

participants were contacted via phone in two to six weeks and a copy of t-TAHSI was sent via e-mail. All volunteers in control group completed the second copy of t-TAHSI.

Statistical analysis

Descriptive statistics were presented as mean and standard deviation. Age and weight were compared between study and control groups. In all statistical analysis, a p value of ≤0.05 was considered statistically significant. All statistical analyses were conducted on the IBM SPSS for iOS version 22.0 software (IBM Corp., Armonk, NY, USA).

To assess internal consistency, Cronbach's alpha value of the total scale was calculated for all 15 items. In addition, Cronbach's alpha value was calculated for each subscale with more than one item. A Chronbach's alpha value of ≥0.9 was considered excellent, 0.9> alpha ≥0.8 good, 0.8> alpha ≥0.7 acceptable, 0.7> alpha ≥0.6 questionable, 0.6> alpha ≥0.5 poor, and alpha <0.5 unacceptable.

Test-retest reliability was calculated by comparing mean test and retest scores in the control group of patients for each subscale. Goodman-Kruskal's gamma (γ) coefficient was calculated and a γ value of at least 0.70 was considered acceptable. Spearman correlation coefficients were calculated for each scale with more than one item.

To assess validity, inter-item Spearman correlations were calculated. Also, for each scale with more than one item, item-scale correlations were calculated for each item included in that scale. A coefficient ≥0.4 was considered as significant association. Finally, study and control groups were compared in terms of each subscale score with the Mann-Whitney U test to validate discrimination.

Table 2. Weight and age characteristics of study and control groups

	Study group	Control group	
	Mean±SD	Mean±SD	p
Mean age (year)	6.8±3.2	9.5±3.8	0.001
Mean weight (kg)	25.1±13.4	31.4±15.0	0.037

SD: Standard deviation.

Responsiveness to change was assessed by comparing subscale scores between test and retest responses of the study group. Test scores were those that were completed preoperatively and retest scores were those that were completed six months postoperatively. Wilcoxon test for matched pairs was used to compare test and retest scores.

RESULTS

Descriptive statistics for study and control groups can be found in Table 2. Mean age and mean weight were statistically significantly higher in control group compared to study group.

Cronbach's alpha was calculated to be 0.949 for the total scale. For the subscales, the following alpha values were calculated: airway and breathing subscale, 0.897; infection subscale, 0.894; healthcare utilization subscale, 0.895; and eating and swallowing subscale, 0.745. Total scale showed excellent internal consistency while airway and breathing, infection and healthcare utilization subscales showed good internal consistency. Eating and swallowing subscale showed acceptable internal consistency.

All scales showed high reliability to test-retest. Gamma coefficients for subscales were as follows: airway and breathing, 0.973; infection, 0.969; healthcare utilization, 0.876; eating and swallowing, 0.905; cost of care, 0.949; and behavior, 0.985. Spearman correlation coefficients were 0.960 for airway and breathing subscale, 0.959 for infection subscale, 0.817 for healthcare utilization subscale, and 0.838 for eating and swallowing subscale.

Inter-item matrix is presented in Table 3. Overall inter-item correlations were good. Most of the correlation coefficients that were less than 0.4 were of items 14 and 15. Item 14 showed poor correlation (correlation coefficient less than 0.4) with five items and item 15 with six items. Other poor correlations were between items 6 and 7, 5 and 12, and 10 and 12.

For airway and breathing subscale, item-item correlations in each subscale were as follows: for item 1, 0.884; item 7, 0.868; item 11, 0.897; and item 13, 0.848. For infection subscale, item 2 had

Table 3. Inter-item correlation coefficients

	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Item 15
Item 1	0.718	0.656	0.685	0.615	0.528	0.717	0.613	0.580	0.646	0.686	0.492	0.670	0.449	0.475
Item 2		0.797	0.731	0.677	0.534	0.618	0.738	0.714	0.713	0.609	0.449	0.552	**0.396**	0.345
Item 3			0.801	0.817	0.620	0.634	0.794	0.702	0.718	0.609	0.486	0.561	0.488	0.444
Item 4				0.831	0.603	0.495	0.852	0.744	0.749	0.539	0.413	0.514	0.427	**0.360**
Item 5					0.580	0.531	0.820	0.659	0.659	0.521	**0.359**	0.506	**0.301**	**0.368**
Item 6						**0.381**	0.535	0.521	0.449	0.518	0.451	0.438	0.448	**0.228**
Item 7							0.484	0.560	0.538	0.745	0.513	0.722	0.469	0.474
Item 8								0.763	0.689	0.607	0.415	0.524	**0.362**	**0.311**
Item 9									0.618	0.620	0.444	0.520	**0.370**	**0.282**
Item 10										0.614	**0.397**	0.535	**0.385**	0.449
Item 11											0.473	0.721	0.565	**0.339**
Item 12												0.591	0.561	0.407
Item 13													0.504	0.505
Item 14														0.443

Correlation coefficients less than 0.4 are presented bold.

correlation coefficient of 0.912; item 8, 0.913; and item 9, 0.886. For healthcare utilization subscale, correlation coefficients for each item were as follows: for item 3, 0.943; for item 4, 0.891; for item 5; 0.891; and for item 6, 0.762. Finally, for eating and swallowing subscales, coefficients for items 12 and 14 were found as 0.880 and 0.869, respectively. In all subscales, item-item correlations were good (correlation coefficient ≥0.4).

Subscale scores were statistically significantly lower in control group compared with study group. All *p* values were less than 0.001 (Table 4).

In Wilcoxon test for matched pairs, all subscale scores showed statistically significant decrease from pre- to postoperative responses for the study group. While *p* value was 0.007 for behavior subscale, for all the other scales, *p* values were less than 0.001. These findings suggested high responsiveness to change (Table 5).

DISCUSSION

There are several generic instruments available to assess the outcome of tonsillectomy. Glasgow Benefit Inventory and short form-36 are two of the most commonly used instruments for outcome assessment.[9,10] However, disease-specific health status assessment instruments are necessary to assess clinical changes. There are only a few disease-specific instruments available to assess

Table 4. Subscale score comparisons between study and control groups

	Study group	Control group	
Subscale	Mean ranks	Mean ranks	*p*
Airway and breathing	59.17	25.24	0.001
Infection	61.32	23.14	0.001
Healthcare utilization	61.57	22.89	0.001
Eating and swallowing	55.40	28.92	0.001
Cost of care	58.82	25.58	0.001
Behavior	50.93	33.29	0.001

Table 5. Subscale scores before and six months after surgery in study group

	Preoperative	Postoperative group	
Subscale	Mean±SD	Mean±SD	*p*
Airway and breathing	54.0±24.6	13.4±13.3	0.001
Infection	65.0±19.6	4.7±9.1	0.001
Healthcare utilization	56.4±20.2	3.5±6.3	0.001
Eating and swallowing	54.0±33.1	27.4±22.7	0.001
Cost of care	65.9±22.9	10.4±14.8	0.001
Behavior	42.7±38.0	29.3±30.1	0.007

SD: Standard deviation.

the outcome of tonsillectomy. The TAHSI is a widely used reliable, validated, disease-specific tool that consists of 15 questions divided into six subscales. Each item is scored using a 5-point Likert scale as follows: 0, not a problem; 1, very mild problem; 2, moderate problem; 3, fairly bad problem; 4, severe problem. A raw score for each subscale is obtained and by using the following formula and converted to a minimum of 0 and a maximum of 100: scaled score=([raw score-min score]/[max score-min score]) × 100, where max score indicates the maximum possible subscale score, and min score indicates the minimum possible subscale score. High scores indicate a high burden of disease and effective treatments should result in larger improvements in scores.

In this study, we present the validation and cross-cultural adaptation of t-TAHSI. We have shown that t-TAHSI is a reliable and validated tool. Psychometric properties of t-TAHSI are consistent with the original English version of TAHSI. Cronbach's alpha was calculated to be 0.949 for total scale and this rate confirms an excellent internal consistency.[11] Reliability coefficients in each subscale were high which confirmed the reproducibility of t-TAHSI. Our results are consistent with the original English and Spanish versions of TAHSI which shows a high homogeneity of all versions.[12]

Responsiveness to change reflects the effect of a clinical intervention that changes underlying QoL which provides support for the validity of the instrument.[13] The t-TAHSI demonstrated a high responsiveness to change consistent with English, Spanish, and German versions.[4,12,14] This confirms that t-TAHSI could be used as a useful tool in measuring effectiveness of tonsillectomy in Turkish language. When study group is compared to control group, all subscale scores were significantly lower in control group, which shows an appropriate discriminant validity of t-TAHSI. Thus, t-TAHSI can be used not only for research purposes, but also to detect the presence of disease and can also be helpful in determining the need for surgery. However, there are few objective data to support this allegation and periodical measurements using this instrument can help in determining the course of disease-specific health status in a child. Prospective studies assessing the validity and responsiveness to change of t-TAHSI on an individual basis would settle this issue.

Validity of a research instrument assesses the extent to which the instrument measures what it is designed to measure.[15] The t-TAHSI showed strong correlations between each item overall and between each item in subscales. Items 14 and 15 showed poor correlations with some items in other subscales which should be interpreted in terms of divergent validity.[4,12] In our study, item-item analysis in subscales showed good correlations consistent with original TAHSI which confirms the content validity of t-TAHSI.

The TAHSI can be useful for several purposes. First of all, as it is mentioned in the original article, TAHSI was intended for use in comparison of outcomes in groups, not individuals. Therefore, it could be a useful tool to assess outcomes in groups for research studies. Additionally, the instrument can be used to measure the impact

of surgical or medical treatment over time. As it is an easy to understand instrument, patient compliance is also high. We did not encounter any loss to follow-up and received all the second copies from all patients. Plus, it takes only a few minutes to complete the instrument which increases the patient compliance.

There are a few limitations of the current study that should be addressed. First of all, mean age and weight of the control group were higher than the study group. This issue can be explained by the negative effect of recurrent tonsillitis and adenoid hypertrophy on growth and weight gain.[16] Plus, it can be anticipated that children with recurrent throat infections present to the doctor earlier than unaffected children. Another limitation of our study is that our cohort may not be representative of all affected children in Turkey. However, despite these limitations, we believe that our results are valuable which could be used for future studies.

In conclusion, t-TAHSI has been shown to be a valid, reliable tool with good psychometric properties. Our findings are consistent with the original version of TAHSI and t-TAHSI can be used to assess the impact of tonsil/adenoid-related health status and effectiveness of tonsillectomy for Turkish speaking patients.

Declaration of conflicting interests

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