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Reliability and validity of the Turkish pediatric voice handicap index

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ABSTRACT

Objectives: The aim of this study is to develop a Turkish version of the pediatric voice index (pVHI) and to evaluate its reliability and validity for cultural adaptation.
Methods: The original pVHI was translated to Turkish. It was administered to 151 parents of 40 dysphonic children and 111 non-dysphonic children. A cross-sectional descriptive model is used with two-sample methodology. The reliability, validity measures, sensitivity, specifity and receiver operating characteristics (ROC) analysis with AUC values were calculated.
Results: The findings showed that the Turkish version of the pVHI had highly significant validity, reliability and excellent internal consistency, sensitivity and specifity for functional, physical and emotional domains and the total score.
Conclusions: The Turkish version of the pVHI is a valid and reliable tool to assess the parents' perception about their children with voice disorders.

1. Introduction

Voice disorders are frequently seen in childhood. Their incidence was reported between 1 and 24% in different studies [1,2]. Presence of a voice disorder may negatively affect social relationships of children in many aspects. Thus, treating voice disorders in childhood plays a very important role in preventing the communication problems that may occur in adolescence and adulthood [3]. When planning a voice therapy program for a child, it is important to determine what the problem the child has. A problem can only be determined when it is properly addressed. Usually a multidimensional assessment process is undertaken and physical examination plays an important role to find out the laryngeal behaviour within this process. However, when children are concerned, it is not easy to use instruments for evaluation. Recently, several health-related perceptual self-assessment tools have been developed to assess everyday life of children, and how dysphonia affects their life [4]. Self-assessment tools such as the pediatric voice symptom questionnaire, the pediatric voice outcome survey, the pediatric voice-related quality of life, and the pediatric voice handicap index (pVHI) are used more frequently in clinics [5–9].

The pediatric voice handicap index is a self-assessment tool for pediatric voice disorders, which is filled by children's parents. The tool was developed by Zur et al. [9] by modifying the adult Voice Handicap Index (VHI). They modified the items by changing the language to reflect the parents' responses about their children and eliminating some of the items, which were not related to pediatric population. It consists of 23 statements. Those statements were divided into three sub-categories as functional (7 items), physical (9 items) and emotional aspects (7 items). The pVHI gives information about how dysphonia affects the children's social, emotional and educational life. The children's parents answer the questions by using a Likert scale ranging from 0 to 4.

The original VHI has been translated to Turkish by Kılıç et al. and validated for use with the adult patients [10]. However, its statements are too long and not explicit to use with pediatric patients. In some ENT clinics, the pVHI has been also translated to Turkish and is administered to pediatric patients. However, its reliability and validity study has not been done. Besides, there are no other self-evaluation tools for dysphonic children in Turkish. In the light of these, the purpose of this study is to develop a Turkish version of the pVHI (Turkish-pVHI) and to evaluate its reliability and validity. The original version of the English pVHI has been translated to Italian, Arabic and Korean [11–13]. All the versions of the pVHI have a high reliability and validity measures. However, in

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these studies the classification accuracy of their adapted scale has not been analyzed. Thus, another objective of this study is to take a first step to baseline its accuracy measures by determining the sensitivity and specifity of pVHI for Turkish pediatric population.

2. Materials and methods

2.1. Development of the Turkish version—pVHI

For the adaptation of the pVHI to Turkish, the items of the original version were first translated to Turkish by four speech language pathologists, and translated back to English by another four speech language pathologists. A qualified professional translator then compared the translations with the original items. The questionnaire was sent to investigators for reviews and comments. The final translation was pilot tested with ten parents of dysphonic children and the wording and meaning of each item in the pVHI were discussed with the clinician. Following this procedure, the questionnaire was modified on the basis of the suggestions and the final Turkish version of the pVHI (Turkish-pVHI) was generated (see Appendix A).

2.2. Design and participants

In this study, a cross-sectional descriptive model was used including two groups (patients and healthy controls).

All the patients in the study group were diagnosed by an ENT physician at four hospitals in four cities. The control group consisted of participants without present or past history of voice disorder, hearing loss, or any disability that might affect the child's speech and voice. The data of the control group was collected from schools in four cities.

The parents of each participant in both study and control groups independently completed the Turkish-pVHI. Informed consents were obtained from the parents of all children included in the study. Ethics approval was granted for the study.

2.3. Evaluation of psychometric properties

The SPSS software (version 22.0) was used for all statistical analyses. The Cronbach's alpha coefficient was used to assess the internal consistency of the Turkish-pVHI for both its three domains and total score. A value between $0.6 \leq \alpha < 0.7$ is considered acceptable, $0.7 \leq \alpha < 0.9$ is good, and $\alpha \geq 0.9$ is excellent. For test–retest analysis, the Turkish-pVHI was completed twice with an interval of 2 weeks by 31% (45) of the total 151 parents. The reliability analysis was assured by the Pearson correlation coefficients. The content validity of the Turkish-pVHI was verified for language and cultural appropriateness. For the validity measures a Mann–Whitney *U* test was used for group comparisons. Sensitivity, specifity and receiver operating characteristics (ROC) analysis with area under curve (AUC) values were calculated to observe the diagnostic accuracy of the Turkish-pVHI. $p < 0.001$ was considered to be statistically significant for all the analyses.

Table 1
Test–retest reliability and internal consistency of the Turkish-pVHI.

	No. of items	Test–retest realiability (Pearson correlation)	*p* Value	Internal consistency (Cronbach's alpha)
Functional	7	0.547	<0.001	0.912
Physical	9	0.768	<0.001	0.954
Emotional	7	0.691	<0.001	0.928
Total	23	0.547	<0.001	0.972

3. Results

3.1. Demographics

The patients were 40 dysphonic Turkish children. There were 11 (27.5%) females and 29 (72.5%) males, and the age range of the participants was 3–12 years with a mean age of 9.4 ± 2.5. The patients in this group were diagnosed with a variety of voice disorders: 35 children had vocal nodules (87.5%), 2 children had cysts (1.3%), 2 children had muscle tension dysphonia (1.3%), and 1 child had both vocal fold mucosal edema and a vocal nodule (0.7%).

The control group consisted of 111 non-dysphonic Turkish children. There were 33 females and 78 males. The ages of the control group ranged between 3 and 12 years with a mean age of 8.6 ± 2.5.

3.2. Reliability

The Turkish-pVHI was administered to 151 parents of both dysphonic ($n = 40$) and non-dysphonic ($n = 111$) children.

The internal consistency of Turkish-pVHI was found excellent for the overall evaluation ($\alpha = 0.97$). Similarly, the internal consistency of functional ($\alpha = 0.92$), physical ($\alpha = 0.95$), and emotional domains ($\alpha = 0.92$) were significantly high (Table 1). The internal consistency was also significantly high in the dysphonic group.

To verify test– retest reliability, Turkish-pVHI was given for a second time, with an interval of 2 weeks, to 31% (45/151) of the parents. The results of test–retest reliability of Turkish-pVHI and its domains are shown in Table 1. The correlation coefficient of Turkish-pVHI functional domain was $r = 0.547$, and those values were $r = 0.768$ for physical domain, $r = 0.691$ for emotional domain, and $r = 0.547$ when total scores were taken into consideration. All those correlations were highly significant ($p < 0.001$).

Inter-rater reliability was assigned between the two authors of the study as 100%.

3.3. Validity

The mean scores of the two dysphonic and control groups for the overall and each domain in the Turkish-pVHI are shown in Table 2. The mean Turkish-pVHI score of the total score is 40 in the

Table 2
The mean scores of the Turkish-pVHI (the total and domains) scores of both groups, and the results of Mann–Whitney *U* test.

Turkish version of the pVHI domain (maximum scores)	Dysphonic group		Control group		*p* Value
	Mean ± SS	Minimum–maximum score	Mean ± SS	Minimum–maximum score	
Functional (28)	10.9 ± 7.0	0–26	3.4 ± 4.2	0–23	<0.001
Physical (36)	18.5 ± 7.9	4–33	2.5 ± 4.7	0–33	<0.001
Emotional (28)	10.5 ± 7.2	0–25	2.7 ± 4.5	0–26	<0.001
Total (92)	40.0 ± 20.1	5–82	8.6 ± 12.4	0–82	<0.001