



# Adaptation and validation of Spanish version of the pediatric Voice Handicap Index (P-VHI)



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## ABSTRACT

**Objectives:** The voice in childhood is a communication tool and a form of emotional expression. It is estimated that 6 to 23% of children may have voice disorders. There is a test, the Pediatric Voice Handicap Index (P-VHI), validated in English to assess the specific impact on quality of life of children with speech pathology. Spanish is the second most widely used language in the world in terms of number of speakers, with over 500 million native speakers, so it is necessary to have tools that allow us to evaluate the effects of dysphonia in Spanish-speaking children. The aim of our study is the validation of the Spanish version of the P-VHI.

**Material and methods:** We performed a cross-sectional study including patients between 4 and 15 years of age. The English P-VHI validated version was translated into Spanish and this translation was reviewed and modified by three specialists in Otorhinolaryngology. There were two study groups, children who had dysphonia ( $n = 44$ ) and a control group of children without alterations in voice ( $n = 44$ ). The questionnaire was always answered by parents.

**Results:** Significant differences were found between the group of children with dysphonia and the control group in the overall P-VHI score and the different subscales ( $p < 0.001$ ). Optimal internal consistency with a good Cronbach's alpha ( $\alpha = 0.81$ ) was found, with high test–retest reliability (Wilcoxon  $z: -0.847, p > 0.05$ ).

**Conclusions:** The Spanish version of the P-VHI is a validated tool that has good internal consistency. It is a reliable test that evaluates the Voice Handicap Index in the pediatric population, with easy application for daily clinical practice.

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## 1. Introduction

The voice in childhood is a communication tool and a form of emotional expression that is part of children's psychosocial development. The causes of dysphonia in children, like adults, can range from primary organ damage, functional impairment of the larynx or secondary organ damage as a result of altered laryngeal function. Dysphonia studies with children have shown an incidence between 6% and 23% [1,2]. Voice disorders in children are less common than might be expected, given that vocal abuse is so widespread in this age group [3].

To study child dysphonia we have the traditional endoscopic imaging tools that allow assessment the phonatory anatomical structures. This scanning method plays a fundamental role since it

can be done at any age, does not require sedation, is performed in consultation and allows a direct view of the vocal cords. However, there has been little study of the psychological evaluation of the causes of dysphonia and the impact on the lives of children. An investigation of the importance of voice disorders in children and adolescents showed that dysphonia caused discomfort and limited their participation in activities [4].

There are several instruments to assess disability generated by voice disorders in adults as well as the impact on their quality of life. These include the adult Voice Handicap Index (VHI) [5], the survey on the effects of voice (Voice outcome survey, VOS) [6] and the survey on quality of life related to voice (voice related quality of life, V-RQL) [7]. The VHI in adults is a survey consisting of 30 statements designed to be answered by the patient. A validated tool in many languages, it is used to assess the functional effect of dysphonia at both the physical and emotional level.

To assess the effects of dysphonia in children is even more subjective. The survey on the effects of pediatric voice (pediatric voice outcome survey, P-VOS) [8], which consists of five questions

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answered by parents, has been validated as an instrument to measure quality of life related to the child's voice, although it is not helpful in revealing the functional, physical and emotional aspects of voice disorders.

Zur et al. developed and validated in English a test adapted from the adult VHI to be applied in children, known as the Pediatric Voice Handicap Index (P-VHI) [9]. The modifications included changes in the language of the questions to be answered by the parents or guardians of dysphonic children and eliminating those that were not related to children. Recently, three studies were designed to evaluate the validity and reliability of the P-VHI versions in Italian, Arabic and Korean, which revealed that the instrument is easy to implement, highly reproducible and consistently shows excellent clinical validity in voice study in pediatrics [10–12].

The Spanish language is the second language in the world by number of speakers with over 500 million native speakers, so it is necessary to have tools that allow us to evaluate the effects of dysphonia in Spanish-speaking children. The aim of our study was to develop a Spanish version of the Pediatric Voice Handicap Index and assess its internal consistency, reliability and clinical validity.

## 2. Material and methods

### 2.1. Development of the Spanish version of the P-VHI

The original English version of the P-VHI was translated into Spanish, after translated back into English and compared by three specialist in Otolaryngology, independently, in order to adapt a vocabulary more consistent and understandable to the Spanish language. The final questionnaire is presented in Appendix A.

The P-VHI consists of 23 statements, divided into three groups, which assess the impact of voice pathology at the functional, physical and emotional level. Each of the statements requires an answer based on how often the respondent experienced each item. Each response is individually scored on a Likert scale of 5 points, ranging from "never" (score 0) to "always" (score of 4), with a range of total score ranging from 0 to 92 [13]. We also added a visual analogue scale at the beginning of the test for classifying the loquacity of the child. The test is designed to be taken by parents or guardians, who should be responsible for assessing a child's vocal disability in daily life.

### 2.2. Methods

A cross-sectional study was conducted in collaboration with the departments of Otolaryngology, Pediatrics and Rehabilitation. All parents were invited to participate freely after signing an informed consent explaining the objectives of our work, in accordance with the rules of the Ethics Committee of our hospital.

The questionnaire was answered by a total of 88 parents or guardians of children between 4 and 15 years of age seen from October 2012 through April 2014. The control group answered the survey from pediatric emergency visits. Data were obtained from parents of currently healthy children without acute disease (inflammatory or infectious upper airway) with no history of present or past conditions or voice pathology, or history of language delay or speech problems, hearing loss, neurological diseases or psychomotor retardation. Parents of children with speech disorders were recruited directly from the Otolaryngology voice inventory performed at diagnosis of the child's dysphonia, and from consultation with vocal rehabilitation in cases that were already engaged in speech therapy. A group of parents selected from the study group were asked to reply to randomly survey a second time with an interval of 2–8 weeks.

### 2.3. Statistical evaluation

The following statistical tests were performed using SPSS 16.0 (SPSS Inc., Chicago, USA). The internal consistency of the questionnaire was determined using Cronbach's alpha coefficient. An alpha value greater than 0.8 is considered good and greater than 0.9 is considered excellent, whereas any value above 0.7 is considered satisfactory.

The Student *t*-test was used to measure the clinical validity of the variables used in the test analysis.

The Wilcoxon test was used to analyze the reliability by test–retest of the second group of randomly selected parents.

## 3. Results

### 3.1. Clinical validity

All parents participated in the study by answering the survey without any need of help. No significant differences ( $p > 0.05$ ) were observed when comparing gender and age between the control group and the group of dysphonic children. The demographics of the group of control children and the study group of children with voice disorders are shown in Table 1. The mean score on the visual analogue scale that assessed the child's talkativeness as subjectively perceived by parents showed no significant differences between the groups, obtaining an average of 5.7 in the control group and 5.5 in the dysphonic group.

In the group of dysphonic children, the following pathogenic causes were found: vocal nodules, inclusion cyst, functional dysphonia, recurrent paralysis and laryngeal papillomatosis. The most prevalent disease was laryngeal nodules in 86.36% of cases (Table 2).

There were statistically significant differences between the study groups in the mean total P-VHI score and the average score for each functional, physical and emotional item obtained in both groups (Table 3). Analysis of the data using the Student *t*-test showed that children with dysphonia present a Voice Handicap Index with values 20% higher than the control group ( $24.52 \pm 4.86 \pm 11.5$  vs.  $6.6$ ,  $p < 0.001$ ).

In children with speech disorders, a higher average score on the physical item, comparing the functional and emotional item was found.

### 3.2. Internal consistency

The results of the statistical study of internal consistency of the P-VHI showed a statistically significant satisfactory overall coefficient ( $\alpha = 0.81$ ). The physical item P-VHI was the component

**Table 1**  
Demographic characteristics of patients.

| Patients           | n  | Male       | Female     | Mean age         |
|--------------------|----|------------|------------|------------------|
| Dysphonic children | 44 | 35 (79.5%) | 9 (20.4%)  | 9.1 years (5–14) |
| Control children   | 44 | 26 (59%)   | 18 (49.9%) | 7.9 years (4–14) |
| Total              | 88 | 61         | 27         | 8.5 years        |

**Table 2**  
Main diagnoses in the group of children with dysphonia.

| Patients                 | n  | %    |
|--------------------------|----|------|
| Vocal fold nodules       | 38 | 86.4 |
| Inclusion cyst           | 2  | 4.5  |
| Functional dysphonia     | 2  | 4.5  |
| Recurrent paralysis      | 1  | 2.3  |
| Laryngeal papillomatosis | 1  | 2.3  |
| Total                    | 44 | 100  |

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