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Reliability and validity of the Chinese pediatric voice handicap index

Kena Liu[a], Shaofeng Liu[b], Zhou Zhou[c], Qinyi Ren[e], Jie Zhong[b], Renzhong Luo[b], Huabiao Qin[d], Siyi Zhang[a,e], Pingjiang Ge[a,e,*]

[a] School of Medicine, South China University of Technology, China
[b] Department of Otolaryngology, Guangzhou Women and Children's Medical Center, China
[c] Department of Otolaryngology, Shenzhen People's Hospital, China
[d] School of Electronic and Information Engineering, South China University of Technology, China
[e] Department of Otolaryngology, Guangdong General Hospital & Guangdong Academy of Medical Sciences, Southern Medical University, China

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ABSTRACT

Objectives: To evaluate the reliability and validity of the Chinese version of pediatric voice handicap index (pVHI).

Material and methods: The original English version-pVHI was translated into Chinese. Parents of 52 children with voice dysphonia and 43 children with no history or symptoms of voice problems were asked to fill the Chinese pVHI questionnaires twice with an interval of 2 weeks. GRB (Grade, Roughness, Breathiness) scale was used for perceptual assessment by two otolaryngologists and one speech pathologist for each child's voice. The internal consistency was assessed using Cronbach's alpha coefficient. Pearson's correlation coefficient was used to evaluate the test-retest reliability. The Kendall's coefficient of concordance W was used to assess the consistency of GRB scores of 3 voice specialists. The nonparametric Mann-Whitney test was used to assess the differences between the dysphonia group and controls. The correlation between pVHI and GRB scores were assessed using Pearson's correlation coefficient.

Results: The internal consistency of total score and three subscales scores of Chinese pVHI were 0.788–0.944. The test-retest reliability was 0.631–0.887($P < .001$). The pVHI scores of control group significantly were lower than the pathological group ($P = .000$). The GRB scores of 3 voice specialists have an excellent consistency ($W = 0.694–0.807$, $P = .000$). The pVHI scores positively correlated with GRB assessment ($P < .01$).

Conclusions: The Chinese version of pVHI had a good reliability and validity. It can be applicable and useful supplementary tool for evaluating parents' perception of their children's dysphonia.

1. Introduction

Dysphonia is frequently found in childhood. The incidence of pediatric voice disorders was estimated roughly from 6 to 23% [1,2], even 38% in some report [3]. The pediatric voice disorder may negatively affect communication, social, study, and emotion. Multidimensional assessments play an essential role to find out and quantify the laryngeal behavior problem. Because children with voice disorder have difficulty in complying with objective voice assessments, they mostly undergo instrumental evaluation such as acoustic or laryngoscopy and perceptual evaluation. But they do not provide information considering the pediatric impact on life [4,5]. Adult health-related quality of life instruments has been developed to measure the effect of the dysphonia, such as Voice Handicap Index-30(VHI-30) [6]. Recently, Pediatric Voice Handicap Index (pVHI) was developed by Zur et al. from adult VHI-30 [7,8]. The pVHI provide a good measurement of severity of a pediatric voice disorder in three domains: functional (7 items), physical (9 items) and emotional (7 items) from parent's recognition of children voice and its effect of the daily life about voice [7]. The English pVHI has been translated and developed in some countries because of good reliability and validity [9–15]. There is no previous validated Chinese version of pVHI has been reported yet. The aim of this study is to develop a Chinese version of the pVHI(Chinese version-pVHI) and to evaluate its reliability and validity.

2. Methods

2.1. Translation and development of the Chinese version-pVHI

The original English version of the pVHI was translated into

* Corresponding author. Department of Otolaryngology, Guangdong General Hospital and Guangdong Academy of Medical Sciences, South China University of Technology, No. 106, Zhongshan 2 Ave, Guangzhou City 510080, China.
E-mail address: gepingjiang@aliyun.com (P. Ge).

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Mandarin Chinese by three translators. One of the translators were language pathologist. Two of the translators were laryngologists. A professional translator compared and revised the translations with original items. The improved translations in Mandarin Chinese were reviewed and modified by laryngologist according to Chinese culture and language habits. Before clinical trial, the items were discussed and further modified by two laryngologists and three parents of dysphonic children. The pVHI questionnaire consists of 23 questions in three domains: functional (7 questions), physical (9 questions) and emotional (7 questions). A five-point scale ranging from 0 (nerve) to 4 (always) was used in Chinese version-pVHI. The revised Chinese versions-pVHI were retranslated back into English independently by qualified professional translators. The retranslated English versions were reviewed and confirmed by Dr. Karen B Zur [7]. A final Chinese version was generated and presented in this article.

2.2. Subjects

This study included dysphonia Children (40 males and 12 females). The age range in the dysphonic group was 4–12 years (7.42 ± 1.79 years). All patients with dysphonia have a diagnosis with bilateral vocal nodules confirmed by an otolaryngologist with laryngoscopy at Guangdong General hospital and Guangzhou Women and Children's Medical Center. The control group consisted of 43 parents of children who they have no present and history of a voice disorder, hearing loss, or any disability that might affect the child's speech and voice. The data of the control group were collected from schools in the two hospitals. The ages of the control group ranged from 5 to 11 years (7.40 ± 1.73 years). The parents of each participant in both study and control groups independently completed the Chinese-pVHI. GRB (Grade, Roughness, Breathiness) scale was used for the perceptual voice evaluation [16], with one experienced speech pathologists and two otolaryngologists rating each child's sustained vowel/a/which were recorded in the quiet room. The raters were blind to the participants. Therefore, data collection and analysis satisfied blindness.

2.3. Validity and reliability

Content validity was verified by comparing pVHI score between dysphonia and control group, and quantified by correlation with the GRB perceptual evaluation by three judges.

For reliability analysis, the Chinese-pVHI was completed twice with an interval of 2 weeks by 26.3% participants. To verify reliability, the test-retest results were performed by analyzing the internal consistency of items through Cronbach's alpha and Pearson correlation coefficients.

2.4. Statistical analyses

The SPSS 19.0 (SPSS Inc, Chicago, IL) was used for statistical analysis of the data. The different of pVHI score and GRB between dysphonia and control groups were analyzed using the Mann-Whitney U test. Pearson correlation coefficients calculated the relationship between the pVHI scores and GRB. The α value of significance adopted was 0.05.

3. Results

The alpha coefficient of the Chinese version is 0.944 in this study. For each domain of the Chinese version-pVHI, the alpha coefficient were as follows: functional (0.788), physical (0.892), emotional (0.902) (Table 1). The internal consistency of Chinese version-pVHI was found strong for the overall evaluation. The alpha coefficient of each domain area also was significantly high.

Test-retest reliability of Chinese version-pVHI and its domains are also shown in Table 1. Test-retest correlations of each domain and total scores were highly significant (P < .01). The correlation coefficient of the functional domain was r = 0.631, and the physical domain was r = 0.887, r = 0.771 for the emotional domain. The correlation coefficient of total scores was r = 0.831. Inter-rater reliability depended on their Kendall W coefficient by three experts' perceptual rank. The W coefficient value were 0.807 in Grade, 0.712 in Roughness, and 0.694 in breathiness in this study, and the correlation between raters was significantly high (P < .001) (Table 2).

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

pVHI	No. Of items	Internal consistency (Cronbach alpha)	Test-retest reliability (Pearson correlation)
Functional	7	0.788	0.631**
Physical	9	0.892	0.887**
Emotional	7	0.902	0.771**
Total	23	0.944	0.831**

**P < .01.

Table 2
Internal consistency of the perceptual rating by experts.

	W	χ^2	P
Grade	0.807	227.454	.000**
Roughness	0.712	200.680	.000**
Breathiness	0.694	195.737	.000**

**P < .01.

The mean scores of the total and each domain in the Chinese version-pVHI were 23.44(Total), 5.42(Functional), 12.85(Physical), and 5.17 (Emotional) in dysphonia group. The mean scores of pVHI were respectively 5.3(Total), 1.81(Functional), 2.12(Physical), and 1.37 (Emotional) in control group. The perceptual scores (G, R, B) in the dysphonic group were 1.94(Grade), 1.60(Roughness), and 1.07(Breathiness), respectively whereas those of perceptual scores in the control group were 0.67(Grade), 0.57(Roughness), and 0.19(Breathiness) (Table 3). There is a significant difference between dysphonia and control groups in the total and each domain scores of the Chinese version-pVHI(P < .01). Significant differences in perceptual rating between normal control vs. dysphonic groups were revealed (p < .01) (Table 3).

The scores of Chinese pVHI are correlated with perceptual parameters in this study. The range of correlation coefficient of “Grade,” “Roughness,” and “Breathiness” and Chinese pVHI score of each domain respectively was from 0.328 to 0.534(P < .01), and 0.309 to 0.479(P < .01), and 0.315 to 0.540(P < .01). Those correlation coefficients indicated the relatively moderate-to-high correlation between all domain of the Chinese version-pVHI and the perceptual rating in this study (Table 4).

Table 3
The scores of Chinese version-pVHI and perceptual evaluation in both groups, and the results of Mann-Whitney U test.

	Dysphonic group	Control group	P
pVHI scores[a]			
Functional	5.42 ± 4.18	1.81 ± 2.47	.000**
Physical	12.85 ± 7.26	2.12 ± 3.51	.000**
Emotional	5.17 ± 6.17	1.37 ± 2.17	.001**
Total	23.44 ± 16.42	5.30 ± 6.06	.000**
GRB perceptual rating[a]			
Grade	1.94 ± 0.83	0.67 ± 0.59	.000**
Roughness	1.60 ± 0.74	0.57 ± 0.54	.000**
Breathiness	1.07 ± 0.74	0.19 ± 0.28	.000**

**P < .01.
[a] Mean ± SD.