

Adaptation and Validation of the Voice Handicap Index in Latvian

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Summary: Objectives. To establish psychometric indicators of the Voice Handicap Index (VHI) (Latvian version) and their relationship to the psychometric indicators of the original items.

Study Design. Parallel group design.

Methods. The VHI was translated and adapted to Latvian. The translated version of the VHI (Lat-VHI) was completed by 54 patients with voice disorders and by 73 subjects without voice disorders forming the control group. A test-retest group included 54 subjects without voice problems, able to complete the questionnaire twice. The test-retest stability, internal consistency of items of the Lat-VHI, and content and convergent validity of the Latvian version of the VHI were analyzed.

Results. The interclass correlation coefficient ratio of all scales indicated statistically significant ($P < 0.001$) test-retest reliability for the Lat-VHI. High internal consistency was observed among the Lat-VHI total scale ($\alpha = .96$), functional ($\alpha = .92$), physical ($\alpha = .86$), and emotional scale ($\alpha = .91$) in the patient group. The Pearson moment correlation coefficient indicates a high correlation among the Lat-VHI total scale and subscales ($r > 0.94$), as well as a high correlation among subscales ($r > 0.81$) in the patient group. Convergent validity of the Lat-VHI was determined by comparing the Lat-VHI results with the Voice Disorder Severity scale results. Statistically significant correlation ($r = 0.78$, $P < 0.001$) was discovered in the patient group.

Conclusions. The Latvian version of the VHI is a psychometrically validated instrument whose indicators correspond to the psychometric indicators of the original sample.

Key Words: Voice–Subjective evaluation–Voice Handicap Index–Quality of life.

INTRODUCTION

A self-assessment of voice by the patient is very important in clinical practice. The objective evaluation of voice function gives information about quality of voice, functional, and structural integrity of the larynx but does not allow the investigation of the handicapping effect of voice disorders. It is the patient who has to live with his/her voice that provides this information.¹ The purpose of subjective self-evaluation was to determine the deviance of voice quality and the severity of disability or handicap in daily professional and social life and the possible emotional repercussions of the dysphonia.² One of the most used self-assessment methods of impact of voice disorders is the Voice Handicap Index (VHI). The VHI was developed in 1997.³ The VHI comprised 30 statements divided into three subscales—10 physical, 10 emotional, and 10 functional statements. Respondents use a five-point Likert scale to evaluate the extent to which each of these statements relate to their individual experience. The minimum total acquired points is 0 and the maximum is 120 points. Allocated time for filling out the VHI is 5–10 minutes. The VHI is adapted and validated in many languages: German,⁴ Chinese,⁵ Mandarin Chinese,⁶ French,⁷ Portuguese,⁸ Polish,⁹ Dutch,¹⁰ Hebrew,¹¹ Spanish,¹² Swedish,¹³ Brazilian Portuguese,¹⁴ Greek,¹⁵ Italian,¹⁶ Arabic,¹⁷ Hindi,¹⁸ and others. To date, no statistically valid and reliable instruments for measuring voice disorder handicap

exist in Latvian. The purpose of the study was to establish a Latvian version of the VHI and evaluate the psychometric indices of the original items in the English VHI to the same items translated into Latvian.

MATERIAL AND METHODS

The development of the VHI Latvian version included translation of the VHI into Latvian, administration of the VHI in a new cultural environment to persons with healthy voices and to voice patients, and empirical and statistical validation of the translated material.

VHI translation and protocol form development was as follows: (1) translation was performed by three highly qualified Latvian-English language practitioners, (2) symmetrical translation method was adopted, using the two-way translation approach, (3) emphasis was placed on the semantic compatibility of the items, (4) local cultural peculiarities were taken into consideration, (5) Voice Disorder Severity scale³ was included into the VHI form for validation of convergence, (6) the translated material was tested in a small pilot study (five males, five females, three of them with voice pathology, and seven with healthy voices) after which the formulation of some items was changed.

The test-retest reliability was evaluated with interclass correlation coefficients (ICC). The mean of the differences (\bar{d}) between the test and retest, and the standard deviation of the differences (SD_{diff}) were calculated.¹⁹ The 95% limits of agreement (LOA) were calculated as $\bar{d} \pm 2SD_{diff}$. The Bland and Altman²⁰ method was used for calculation of LOA. The correlation between the subscales of the Lat-VHI was analyzed using Pearson product-moment correlation.^{3,6} The reliability was considered as high if $0.8 \leq r \leq 1$.²¹ The items of the VHI scales have more than two responses; therefore, Cronbach alpha

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coefficient was used to determine internal consistency of scales of the Lat-VHI.²² Convergent validity of the Lat-VHI was determined by comparing the Lat-VHI results with the Voice Disorder Severity Scale results. As one of the variables collected ordinal data, but others in an interval scale, a Spearman rank correlation coefficient was calculated. The Mann-Whitney *U* test was used for analyzes of difference between VHI results in the control group and voice disorder group. $P < 0.001$ was accepted as the significance level. The differences of the VHI scores in different etiology groups were determined with the Kruskal-Wallis test. SPSS for Windows, version 13.0 (SPSS, Inc., Chicago, IL) was used for statistical analysis of the data.

RESULTS

Description of the participants

For validation of the Lat-VHI, three respondent groups were used. The voice disorder group included patients diagnosed with laryngeal disorders of varied etiologies using a transnasal flexible laryngoscopy (Storz, S6000). Laryngoscopy was performed by a certified phoniatician in the Outpatient Department of P.Stradins Clinical University Hospital, Riga. During the laryngoscopy examination, vocal folds structure and functionality was performed by instructing the patient to phonate the sound /i/. The voice disorder group included 54 patients (45 females and nine males; mean age 49.5 years) with voice disorders of various etiology. The control group included 73 participants (62 females and 11 males, mean age 36.6 years) with no identified voice pathology.

Respondents with voice disorders were classified into four ear, nose, and throat diagnostic groups:

- (i) structural changes of the vocal folds (vocal nodules, *edema Reineke plicae vocalis*, papillomatosis, patients with malignant larynx tumors after radiation therapy) (N = 14),
- (ii) functional voice disorders (vocal hypofunction and vocal hyperfunction) (N = 20),
- (iii) voice disorders caused by inflammatory processes (chronic laryngitis, laryngopharyngeal reflux) (N = 7),
- (iv) voice disorder of neurologic nature (condition after thyroid gland surgery, *paresis n. recurrens*) (N = 13).

The control group included respondents with no known voice disorders, representing various professions including physicians, health professionals (physiotherapists, occupational therapists), full-time students and others.

Nineteen (35%) of all voice disorder group participants were representatives of vocal professions (teachers, pastors, conductors) and 28 (38%) respondents from the control group worked in professions with a heavy voice load on an everyday basis.

The third group was created to establish the Lat-VHI test-retest reliability, that is, this group included 54 participants without voice problems who were able to fill out the VHI questionnaire twice with a specified time interval of approximately 1 month in between. The test-retest group included full-time

TABLE 1.
Demographic Characteristics of the Participants

Group	Female		Age			Occupational Voice Use
	N	N (%)	M	SD	Range	N (%)
Patients	54	45 (83.3)	49.5	16	17–79	19 (35.2)
Control	73	62 (84.9)	36.6	13	20–71	28 (38.4)
Test-retest group	54	49 (90.7)	36.1	11	20–62	28 (48.1)

Abbreviations: M, mean; SD, standard deviation.

and part-time students, the majority of whom were school-teachers attending the University Speech and Voice Research Laboratory (N = 42) for educational purposes. Twelve rehabilitation specialists were also included in the test-retest group.

Demographic characteristics of the participants are shown in Table 1.

Test-retest reliability

The Lat-VHI stability over time was determined using a test-retest method. Each participant of the test-retest group filled out the Lat-VHI form twice. The average time between both tests administrations were 28 days, range 9–41 days. The test-retest reliability of the Lat-VHI was determined using ICC. An ICC ratio of 1 indicates perfect reliability with no measurement error, whereas 0 indicates no reliability.²³ The ICC ratio of all scales indicated statistically significant ($P < 0.001$) test-retest reliability for Lat-VHI. The ICC for the VHI total scale was 0.77 with 95% confidence interval (CI) from 0.64 to 0.86, for the functional scale 0.77 (95% CI, 0.57–0.82), for the physical scale 0.79 (95% CI, 0.66–0.87), and for the emotional scale 0.69 (95% CI, 0.58–0.80). The mean difference between test and retest was from -0.08 to -0.87 . The Bland-Altman analysis indicates that the 95% LOA between two measures ranged from -2.2 to 2.05 for the physical and emotional subscales, from -2.91 to 2.29 for the functional subscale, and from -8.51 to 6.77 for the total scale of the Lat-VHI. According to Bland and Altman, the expectation is that 95% of differences must be less than 2 SDs, which is the definition of a repeatability coefficient as adopted by the British Standards

TABLE 2.
Test-Retest Reliability of the Lat-VHI

Scale	ICC	\bar{d} (SD)*	LOA†	P
Functional	0.70	-0.31 (-1.3)	-2.91; 2.29	<0.001
Physical	0.79	-0.08 (-1.07)	-2.20; 2.05	<0.001
Emotional	0.69	-0.48 (-1.07)	-2.20; 2.05	<0.001
Total	0.77	-0.87 (-3.82)	-8.51; 6.77	<0.001

Abbreviations: ICC, interclass correlation coefficient; LOA, limits of agreement.

* The mean of the differences between test and retest and standard deviation of differences.

† LOA = $\bar{d} \pm 2SD_{diff}$.

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