Validation of the Lithuanian Version of the Speech Handicap Index

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Summary: Objective. The objective is to study the cultural adaptation and validation of the Speech Handicap Index (SHI) questionnaire to the Lithuanian language.

Methods. Cultural adaptation and validation of the translated Lithuanian version of the SHI (SHI-LT) was performed as described by the Scientific Advisory Committee of the Medical Outcomes Trust. The SHI-LT was completed by 46 patients after total laryngectomy and by 60 healthy subjects of the control group. Validity and reliability of the SHI-LT were evaluated.

Results. The SHI-LT showed a statistically significant high internal consistency and test-retest reliability (Cronbach's $\alpha = 0.96–0.98$). Good validity of SHI-LT was reflected by statistically significant ($P < 0.001$) difference between the mean scores of the patients and control groups (74.7 ± 26.9 and 5.5 ± 6.5, respectively). No age or gender dependence of SHI-LT was found ($P > 0.05$). Receiver operating characteristic test indicated that SHI-LT scores exceeding 17.0 points (cutoff value) distinguish patients from healthy controls, with a sensitivity of 97.8% and specificity of 95.0%.

Conclusion. SHI-LT is considered to be a valid and reliable speech assessment tool for Lithuanian-speaking patients after laryngectomy.

Key Words: Speech disorders–Speech Handicap Index–Questionnaire–Laryngeal cancer–Total laryngectomy.

INTRODUCTION

Speech is one of the most important tools of human communication, the disturbance of which can affect the patient's quality of life and ability to function in society.[1] Speech impairment problems are common among patients with laryngeal cancer, especially after surgical treatment. In Lithuania, approximately 300 persons are diagnosed with laryngeal and hypopharyngeal cancer annually, with one half of the patients in advanced stages of cancer.[2] About 80 patients undergo total laryngectomy in combination with radiotherapy or chemotherapy annually. In most cases, respiration, taste, smell, voice, swallowing, and speech are all irrevocably altered after total laryngectomy, and this usually negatively affects a person's perception of his or her quality of life.[3] Consequently, the speech loss or impairment after laryngectomy is the most important clinical complaint of these patients, which can cause social isolation. Therefore, appropriate referral to speech rehabilitation is often recommended.[3–5] Speech assessment after laryngectomy should be noted for planning and control of rehabilitation, because communicative participation is associated with a person's cognitive function, time since diagnosis, and self-rated severity of speech impairment.[6]

There are several subjective and objective methods of patient's speech evaluation. Objective measures include acoustical and aerodynamic analyses and imaging techniques. Subjective methods consist of various scales, indices, and questionnaires. However, the most popular head and neck cancer-specific quality-of-life questionnaires include a limited number of items on speech problems.[7–9] For instance, the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Head and Neck module[8] includes a three-item speech scale; the Functional Assessment of Cancer Therapy-Head and Neck[7] includes two speech-related questions; and the University of Washington Quality of Life Head and Neck Questionnaire revised third version[9] includes one single speech item. On the other hand, most of widely used voice-related quality-of-life assessment tools focus on voice disorders and do not consider speech communication problems.[10–13] Moreover, voice is mainly a result of laryngeal function, whereas speech is a result of physiological contribution of respiration, phonation, articulation, resonance, hearing, and nervous system, and thus requires specific assessment tools.[14,15]

In 2008 Rinkel et al developed and validated the Speech Handicap Index (SHI) for Dutch patients with oral and oropharyngeal cancer.[16] SHI is a speech-specific quality-of-life questionnaire based on the Voice Handicap Index. It has 30 well-constructed questions to evaluate the patient's speech and psychosocial functions. The English version of the SHI was successfully validated by Dwivedi et al in 2011 for patients with oropharyngeal cancer.[15] The French version of this questionnaire was adapted and validated by Degroote et al in 2012 for patients with different voice disorders, articulation problems, and dysarthria after oropharyngeal cancer treatment.[17] The Chinese version of the SHI was adapted and validated by Li et al in 2016 for patients with oral and oropharyngeal cancer.[18] In 2014 Rinkel et al reported about the usefulness of SHI for assessment of speech problems in patients after laryngeal cancer treatment: CO_2 laser, radiation, chemotherapy, and laryngectomy.[4]

There was no validated questionnaire for subjective speech evaluation in Lithuanian language, so far. This study presents the results of the validation process of the Lithuanian version of the SHI (SHI-LT).

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Conflict of interests: All authors declare that they have no conflict of interest.

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MATERIALS AND METHODS

Development of SHI-LT

Validation of the SHI-LT was performed during 2014–2016 at the Department of Otolaryngology, Academy of Medicine of Lithuanian University of Health Sciences, Kaunas, Lithuania.

The development of SHI-LT was based on the English version of the SHI (Appendix S1).[15] According to the recommendations of the Scientific Advisory Committee of the Medical Outcomes Trust, forward and back-translation, comparison of back-translations with the source version, review by lay panels, committee review, and psychometric testing of the translated version were performed.[19]

Forward and back-translation (English-Lithuanian-English) of the SHI was made by professional bilingual translators to ensure that words and questions were correctly matched and meaning was not lost in the process. All the translators were informed about the objective and the procedure of the research. After translation, 22 persons from the medical staff of the Department of Otolaryngology reviewed the SHI-LT: nine items were corrected according to their remarks. After that, a committee of two experienced laryngologists (authors of this study: RP and VU) and a Lithuanian language editor reviewed the final version of the questionnaire.

To evaluate the cultural and linguistic equivalency of the loan-translation, the option "not applicable" was introduced to each item of the questionnaire, which was then administered to the patients (N = 34) with phonation and articulation disorders: unilateral laryngeal paralysis and maxillary fractures. There were 24 males and 10 females (mean age: 35.8 ± 14.4 years) who did not take part in the final application of the translated version of the SHI. None of the questions was shown to be invalid, and therefore the SHI-LT was accepted (Appendix S2).

Validation of the SHI-LT

Participants

SHI-LT was completed by 46 patients after laryngectomy (patient group) and 60 randomly selected healthy individuals (control group). Patients with severe cognitive problems or not fluent in Lithuanian language were omitted. Characteristics of the patients and controls are presented in Table 1. The study groups were homogenous with respect to the individuals' age and gender.

The patient group represented a rather common, clinically discriminative group of speech disorders. There were 46 patients after total laryngectomy. The mean follow-up after surgery was 43.9 ± 48.3 months (from 1 to 228 months). The control group consisted of 60 randomly selected healthy volunteers who considered their speech to be normal and had no speech-related complaints in the past. The speech of this group of individuals was also evaluated as normal by clinical speech specialists.

Methods

Each participant (patients and controls) filled in the SHI-LT questionnaire after comprehensive explanation. Thirty-three patients with persistent speech disorder (more than 1 month after laryngectomy) were asked to complete the questionnaire at baseline and again after 2 weeks to assess test-retest reliability. This interval was chosen according to the data of literature where the most effective test-retest interval is usually recommended to be short enough so that not many changes in the answers would occur, but long enough so that patients would not remember their previous answers. Typically, it is between 2 and 14 days after the first completion of the questionnaire.[19] The evaluation of SHI-LT, as well as other published versions of SHI, is based on Likert 5-point scale with the following categories: never (0), almost never (1), sometimes (2), almost always (3), and always (4). The total score is calculated by adding all the response values together and can range from 0 to 120 points. Higher scores indicate greater speech impairment. Speech domain score is calculated by adding question scores from questions 1, 2, 3, 5, 6, 9, 10, 13, 15, 18, 20, 21, 26, and 28. Psychosocial domain score is calculated by adding question scores from questions 4, 7, 8, 11, 12, 14, 16, 17, 19, 24, 25, 27, 29, and 30.

Statistical analysis

Statistical data analysis was performed using the commercially available *Statistical Package for Social Sciences – 19.0* (IBM Corporation, Armonk, NY). Internal consistency and test-retest reliability were determined using Cronbach's alpha coefficient and Spearman-Brown rank correlation coefficient (rho: r). Content validity index at the item level (I-CVI) and at the scale level (S-CVI) were calculated. Internal consistency of SHI-LT and its domains (S-speech, PS-psychosocial) was measured using Cronbach's alpha. High Cronbach's alpha (>0.70) and Spearman's correlation ($r > 0.60$) values would indicate adequate internal consistency and test-retest reliability.[20] Independent sample *t* test was employed to determine SHI-LT validity to discriminate patients and the control group; $P < 0.05$ level was considered to be statistically significant.

Receiver operating characteristic (ROC) curve analysis was used to determine the optimum cutoff value where sensitivity

TABLE 1.
Characteristics of the Study Groups

		Participants, n = 106		
Characteristics		Patients, n = 46	Controls, n = 60	*P*
Gender, n (%)	Male	43 (93.5)	55 (91.6)	0.59
	Female	3 (6.5)	5 (8.4)	
Age, years, m ± SD		61.7 ± 10.1	59.2 ± 13.1	0.29
Rehabilitation, n (%)	Esophageal speech	31 (67.4)	–	
	Artificial	15 (32.6)		