

Evaluation of the Correlation Between Turkish Voice Handicap Index-10 and Turkish Voice-Related Quality of Life Scale

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Original Investigation

Abstract

Objective: Aim of this study was to evaluate the correlation between Turkish Voice Handicap Index-10 (TVHI-10) and Turkish Voice-Related Quality of Life Questionnaires (TV-RQOL) on patients with dysphonia.

Methods: Two different groups were formed with patients with dysphonia and healthy individuals between February and July 2016. After medical history and otorhinolaryngologic and phoniatic examinations all the subjects completed TVHI-10 and TV-RQOL questionnaires. The correlation between scores of parameters of questionnaires were evaluated.

Results: Data of 104 patients (59 women, 45 men) with a mean age of 46±15 years in dysphonia group and 75 individuals (38 women, 37 men) with a mean age of 45±13.8 years in healthy group were evaluated.

TVHI-10 and TV-RQOL parameters' scores were significantly higher in dysphonia group than healthy group. There were positive and significant correlations between scores of TVHI-10 and TV-RQOL parameters of all 179 individuals. There was significant positive correlation between total scores of TVHI-10 and TV-RQOL values of all individuals ($r=0.949$, $p<0.001$).

Conclusion: There is positive significant correlation between validated Turkish versions of VHI-10 and V-RQOL questionnaires as a self-assessment measurement tools. The results of studies which use TV-RQOL can be compared with the results of the studies using TVHI-10.

Keywords: Voice, dysphonia, outcome assessment, quality of life



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Introduction

Voice, as the essential component of speech, plays a major role in human communication and reflects the physical, psychological and social attributes of the person. Dysphonia defines a range of variances in voice quality from hoarseness to feebleness (1). Dysphonia can be caused by a number of disorders that affect different structures, before all the generator (lungs), the vibratory (larynx) and the upper-supraglottic-airway (resonator and articulator) which are the three major systems in voice production (2).

A number of variables should be considered and evaluated in patients who present with voice disorder/dysphonia. Assessment of the treatment outcomes can therefore be considerably challenging for clinicians and researchers. Apart from methods such as perceptual voice assessment, videolaryngostroboscopy, aerodynamic and acoustic analysis that are performed by the clinician, patient-re-

ported assessments are also used in evaluating dysphonia (3).

Assessment of the patient's self-perception about and their experiences and emotions associated with their state of health is very important, and the impact their voice problem has on their life quality should also be measured. The extent to which voice disorder affects the patient's functional, physical, emotional and social status depends on various factors that vary from person to person. Proper description of the impact of voice disorder on the patient's life quality is an important part of the evaluation and affects the management process (4). Therefore, various perceptual and patient-reported assessment methods have been developed specific to dysphonia. The two patient-reported scoring systems that are most widely used in the world are the Voice Handicap Index-10 (VHI-10) and the Voice-Related Quality of Life (V-RQOL) questionnaire (5).

The Voice Handicap Index (VHI) was developed by Jacobson et al. (6) in 1997. There were no instruments available to assess the psychosocial outcomes of voice disorders until this study was presented. VHI was first presented as a 30-statement instrument that consisted of three sub-scales, namely functional, physical and emotional. Patients were asked to rate each item on a scale of 0 to 4. A higher total score indicated a more severe voice problem. VHI assesses the extent to which dysphonia affects the everyday life of the patient. In 2004 Rosen et al. (7) simplified the VHI as a 10-item questionnaire that addresses the most clinically significant statements. Compared to the source index, this shortened version referred to as VHI-10 was acknowledged and accepted as highly correlated, applicable and purpose-oriented. In 2008, Kılıç et al. (8) developed the Turkish VHI-10 (TVHI-10) using the original 30-statement VHI and presented in the literature after having studied its reliability and validity (Appendix-1). The TVHI-10 differed from VHI-10 of Rosen et al. (7) in terms of its lingual and cultural characteristics.

The Voice-Related Quality of Life (V-RQOL) questionnaire developed by Hogikyan and Sethuraman (9) in 1999 consists of 10 statements related to physical, functional and socio-emotional aspects, and a higher total score indicates a better quality of life. In 2016, Tezcaner and Aksoy (10) developed the Turkish version of the V-RQOL (TV-RQOL) scale and studied its validity and reliability (Appendix-2). This study demonstrated that the TV-RQOL, as a measuring method, contributed to the planning of treatment and the assessment of outcomes in patients with dysphonia.

While the first of the two Turkish scales which similarly aim to evaluate the impact of dysphonia on life quality, the TVHI-10 questionnaire subjectively examines the extent to which their voice problem causes discomfort for the patients, the TV-RQOL examines the extent to which the voice disorder interferes in their quality of life. Despite the similarities of some items, the objectives of the two scales are different, however can serve the same purposes in terms of treatment.

The purpose of this study is to examine the comparability of these two scales that are frequently used in scientific studies on voice disorders, assuming the results obtained in the studies are comparable. This will allow to mathematically convert the total scores from the two scales into one another, and provide a basis that can be used in future studies. This may allow to use a single scale for identifying the impact the voice disorder has on the patient and for assessing the treatment outcomes. The presented study is the first in which the correlation between the Turkish versions of the VHI-10 and V-RQOL is examined.

Methods

The presented study is a prospective, case-controlled clinical trial. The study was conducted in the Department of Otorhinolaryngology of the Ege University School of Medicine with the patients who presented with dysphonia in the period from February to July 2016 and healthy volunteers. Approval was obtained from the University's Ethics Committee for this study.

Both the patients and the potential participants of the healthy group were informed about the planned procedures and their study-specific written consents were obtained. Patients aged under eighteen, or those who were unable to provide written/verbal consent, or illiterate patients were excluded from the study. In addition to the above-stated, healthy volunteers were excluded from the study if:

- their anamnesis revealed a history of radiotherapy to the head and neck region, vocal fold surgery, cigarette smoking, trauma/surgery/radiotherapy in/to the neck region, long-term or occasional dysphonia, bad voicing habits.
- vocal fold lesion(s) that could lead to dysphonia were identified in ENT examination.
- perceptual voice quality assessment showed a score of two or higher on either the Grade, Roughness, Breathiness (GRB) scale or the VHI-10 scale.

Health and sociodemographic data of all cases were recorded in the report form, and all patients underwent ENT and neurologic examinations. Voice quality assessment was performed using GRB scale which is a simplified version of the Grade, Roughness, Breathiness, Astenicity, Strain (GRBAS) scale (11). Dynamic function of the larynx was assessed with videolaryngostroboscopy (Karl Storz Pulsar GmbH & Co. KG, Tuttlingen, Germany). All cases filled out the TVHI-10 and the TV-RQOL forms. On the TVHI-10 form, participants were asked to score the possible problems which individuals with dysphonia can experience in their daily life on a scale of 0 to 4 (0=never, 1=almost never, 2=sometimes, 3=almost always, 4= always). On the TV-RQOL form, participants were asked to score the possible voice problems by severity and frequency on a scale of 1 to 5 (1=none, not a problem, 2=a small amount, 3=a moderate (medium) amount, 4=a lot, 5=the problem is "as bad as it can be").

The data was statistically analyzed using the SPSS (IBM corp., Version 22.0, Armonk, NY, USA) software package. Median, standard deviation, lowest, highest, and ratio values were used in the descriptive statistics of the data. Distribution of cases by gender ratio and mean age was analyzed using the Pearson's Chi-Square and Mann Whitney U tests. The Mann Whitney U test was also used for comparing the TVHI-10 and TV-RQOL scores of the cases between the dysphonia and healthy groups. The Spearman's correlation analysis was used for correlation assessment. Impact levels and cut-off values were examined using the Receiver Operator Characteristics (ROC) curve. Confidence interval for the area under the ROC curve was 95%.

Results

The study included 179 participants, of which 104 were patients with dysphonia, and 75 were healthy individuals aged from 18 to 83. Distribution of the cases by age and gender are given in Table 1. No statistically significant differences were found with respect to gender and age between the groups ($p=0.129$). Distribution of the patients by diagnosis are shown in Table 2.

The mean total TVHI-10 score of the females in the patient group was 21.2 (min 5-max 38) and their mean total TV-RQOL score was 28.2 (min 14-max 42). The mean total TVHI-10 score of the males in the patient group was 21.1 (min 9-max 36); and their mean total TV-RQOL score was 26.7 (min 13-max 42).

Table 1. Distribution of groups by age and gender

		Group						p
		Dysphonia (104; 58.4%)		Healthy (75; 41.6%)		Total (179)		
		n	%	n	%	n	%	
Gender	Female	59	56.7	38	50.6	97	54.1	0.129
	Male	45	43.3	37	49.4	82	45.9	
Age*		46±15 (18-83)		45±13.8 (18-72)		45±14.5 (18-83)		0.113

*Ages are given as Mean±SD (min-max)

Table 2 . Distribution of the patients by diagnosis

Diagnosis	No (%)	Diagnosis	No (%)
Partial Laryngectomy	15 (14.4)	Presbyphonia	4 (3.8)
Nodule	13 (12.5)	Chronic laryngitis	3 (2.9)
Polyp	13 (12.5)	Mutational falsetto	3 (2.9)
Unilateral vocal fold paralysis	13 (12.5)	Psychogenic dysphonia	2 (1.9)
Reinke's edema	7 (6.7)	Type 2 sulcus vocalis	2 (1.9)
Cyst	7 (6.7)	Type 3 sulcus vocalis	2 (1.9)
Laryngopharyngeal reflux	6 (5.8)	T1a glottic carcinoma	2 (1.9)
Bilateral vocal fold paralysis	5 (4.8)	Laryngeal intraepithelial hyperplasia	1 (1)
Primary muscle tension dysphonia	5 (4.8)	Anterior glottic web	1 (1)

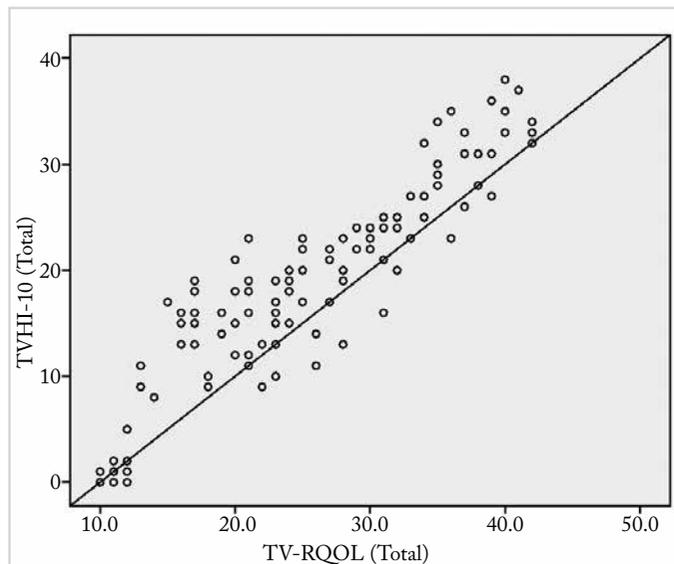


Figure 1. Correlation between Total TVHI-10 and TV-RQOL scores

In the healthy group, the mean total TVHI-10 score of the females was 0.3; and their mean total TV-RQOL score was 10.5. In the healthy group, the mean total TVHI-10 score of the males was 0.4; and their mean total TV-RQOL score was 10.4. Distribution of the mean TVHI-10 and TV-RQOL scores in the patient and healthy groups, and the statistically significant differences among the scores are shown in Table 3. When each parameter was reviewed individually, scores for TVHI-10 and TV-RQOL parameters were found to be higher for the cases in the dysphonia group versus those of the healthy group (p<0.05).

Correlation between the TVHI-10 values and the total TV-RQOL score values of all cases included in the study were found positive, very high and statistically significant (r=0.949, p<0.001).

Total TVHI-10 and total TV-RQOL scores of the dysphonia cases were found to be positively correlated with very high significance (r=0.873, p<0.001). Graphic presentation of the correlation between the TVHI-10 and TV-RQOL score values is given in Figure 1.

Discussion

The aim in the evaluation of the patients who present with voice problems is to identify the underlying cause of the problem and the characteristics of the cause. The main components of a clinical evaluation for these purposes are a general anamnesis, specialized voice-related anamnesis, auditory-perceptual voice quality evaluation, physical examination, visual examination of the phonatory airway anatomy and function, and acoustic analysis (12). Because this disorder can affect the person's life in many ways, it is important to understand in the evaluation process the impact such voice problem has on the person and their life quality. Since the clinician cannot assess the patient's experiences and emotions associated with their voice problem through a subjective or objective method, these can only be reported by the patients themselves (13). In our study, we determined that the Turkish versions of VHI-10 and V-RQOL, the two most frequently used questionnaires for assessing how an individual perceives the emotional, physical and psychological aspects of their voice problem, are highly correlated.

Portone et al. (14), in a pioneer study examining the correlation between the questionnaires used for assessing voice-related life quality, have analyzed the scores of 132 cases to investigate the correlation between the VHI and the V-RQOL surveys. This was the first study that examined the correlation between the original (English) versions of the VHI-10 and V-RQOL questionnaires. Given that both scales measure dysphonia-specific life quality based on patient reports, a high correlation was anticipated between the two, results were seen to support the hypothesis, and consequently VHI and V-RQOL were found to be highly correlated.

In 2014, Romak et al. (15) examined the correlation between the VHI-10, the shortened version of the VHI, and the V-RQOL scales to determine the level of correlation between the two sur-

Table 3. Distribution of and comparison between median TVHI-10 and TV-RQOL scores in dysphonia and healthy groups

	Dysphonia Group		Healthy Group		p
	Mean±SD	Min-Max	Mean±SD	Min-Max	
TVHI-10 (1)	2.28±0.9	0-4	0.18±0.4	0-1	<0.001
TVHI-10 (2)	1.5±1.1	0-4	0±0	0-0	<0.001
TVHI-10 (3)	2.24±1	0-4	0.02±0.1	0-1	<0.001
TVHI-10 (4)	1.71±1	0-4	0±0	0-0	<0.001
TVHI-10 (5)	1.85±1	0-4	0.09±0.3	0-1	<0.001
TVHI-10 (6)	1.68±1.1	0-4	0±0	0-0	<0.001
TVHI-10 (7)	1.68±1.1	0-4	0±0	0-0	<0.001
TVHI-10 (8)	2.31±1.1	0-4	0.04±0.1	0-1	<0.001
TVHI-10 (9)	2.28±1.1	0-4	0±0	0-0	<0.001
TVHI-10 (10)	1.9±1.1	0-4	0±0	0-0	<0.001
TVHI-10 (present voice)	1.74±0.8	0-3	0.02±0.1	0-1	<0.001
TVHI-10 (Total)	21.17±7.5	5-38	0.35±0.5	0-2	<0.001
TV-RQOL (1)	3.24±1	1-5	1.22±0.4	1-2	<0.001
TV-RQOL (2)	2.78±1.2	1-5	1.04±0.1	1-2	<0.001
TV-RQOL (3)	2.95±1	1-5	1.09±0.2	1-2	<0.001
TV-RQOL (4)	2.77±1.1	1-5	1.09±0.2	1-2	<0.001
TV-RQOL (5)	2.78±1.1	1-5	1±0	1-1	<0.001
TV-RQOL (6)	2.87±1	1-5	1.04±0.1	1-2	<0.001
TV-RQOL (7)	2.63±1.2	1-5	1±0	1-1	<0.001
TV-RQOL (8)	2.44±1.1	1-5	1±0	1-1	<0.001
TV-RQOL (9)	2.96±0.9	1-5	1.04±0.1	1-2	<0.001
TV-RQOL (10)	2±1	1-5	1±0	1-1	<0.001
TV-RQOL (Total)	27.41±7.8	12-42	10.51±0.6	10-12	<0.001

TVHI-10: Turkish Voice Handicap Index-10; TV-RQOL: Turkish Voice-Related Quality of Life Scale

veys for the purposes of reducing life quality assessment to a single scale. The study reports to have concluded a high level or correlation between the VHI-10 and the V-RQOL scales. In our study, we have similarly found the Turkish versions of the two scales to be highly correlated.

Conclusion

As patient-reported outcome measures for the evaluation of dysphonia, there is a positive and strong correlation between the parameters of the Turkish versions of the VHI-10 and V-RQOL scales. The results of our study can be useful for future studies that intend to combine the results of these two scales to assess life quality outcomes associated with voice problems. Clinicians can choose either of the questionnaires as suitable to their practice and compare the results of the TVHI-10 with the results of the TV-RQOL questionnaire. Nevertheless, it should be borne in mind that these two scales, although highly correlated and comparable, are not identical.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Ege University School of Medicine (Date: 16.02.2016; No: 16-1.1/11)

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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Appendix-1

TURKISH VOICE HANDICAP INDEX-10

Name, Surname: _____ Gender: _____ Age: _____

Education: Literate Primary School Middle School High School University

Occupation: _____ Are you a smoker? Yes No

Which of the following applies to your use of your speaking voice?

I rarely speak. I speak normal. I speak a lot.

Which of the following applies to your use of your singing voice?

I never sing. I sing occasionally. I sing a lot.

Mark the degree to which each of the following statements apply to you: (Answers: 0=never, 1=almost never, 2=sometimes, 3=almost always, 4=always)

1. I am tense when talking with others because of my voice.	0	1	2	3	4
2. I am less outgoing because of my voice problem.	0	1	2	3	4
3. People ask, "What's wrong with your voice?"	0	1	2	3	4
4. I speak with friends, neighbors, or relatives less often because of my voice.	0	1	2	3	4
5. People ask me to repeat myself when speaking face-to-face.	0	1	2	3	4
6. I find other people don't understand my voice problem.	0	1	2	3	4
7. My voice difficulties restrict my personal and social life.	0	1	2	3	4
8. I try to manage my voice to produce the right sound.	0	1	2	3	4
9. I use a great deal of effort to speak.	0	1	2	3	4
10. My voice makes me feel incompetent.	0	1	2	3	4

Total Score

Appendix-2

TURKISH VOICE-RELATED QUALITY OF LIFE SCALE

Name Surname.....

Date:.....

We are trying to learn more about how a voice problem can affect your day-to-day activities. Below, you will find a list of possible voice-related problems. Please answer all questions based on what your voice has been like over the past two weeks. There are no “right” or “wrong” answers.

Please answer the below questions considering both the severity and the frequency of the problem you experience, based on how “bad” it is (that is, the level of the problem you experience). Use the below-given scale to rate the extent of the problem:

1=None, not a problem

2=A small amount

3=A moderate (medium) amount

4=A lot

5=The problem is “as bad as it can be”

BECAUSE OF MY VOICE	How much of a problem is this?				
1. I have trouble speaking loudly or being heard in noisy situations	1	2	3	4	5
2. I run out of air and need to take frequent breaths when talking	1	2	3	4	5
3. I sometimes do not know what will come out when I begin speaking	1	2	3	4	5
4. I am sometimes anxious or frustrated because of my voice	1	2	3	4	5
5. I sometimes get depressed (because of my voice)	1	2	3	4	5
6. I have trouble using the telephone (because of my voice).	1	2	3	4	5
7. I have trouble doing my job or practicing my profession (because of my voice)	1	2	3	4	5
8. I avoid going out socially (because of my voice)	1	2	3	4	5
9. I have to repeat myself to be understood	1	2	3	4	5
10. I have become less outgoing (because of my voice)	1	2	3	4	5