

Short, self-report voice symptom scales: Psychometric characteristics of the Voice Handicap Index-10 and the Vocal Performance Questionnaire

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OBJECTIVE: Short, self-report symptom questionnaires are useful in routine clinical situations for assessing the progress of disorders and the influence of interventions. The Voice Handicap Index-10 (VHI-10) and Vocal Performance Questionnaire (VPQ) are brief self-reported assessments of voice pathology, apparently useful in the general voice clinic population. Little is known of the structure or internal consistency of either tool, nor whether they correlate. This study carried out a substantial, systematic evaluation of their performance in the Laryngology office setting.

STUDY DESIGN AND SETTING: 330 adult (222 women, 108 men) voice clinic attenders completed the VHI and the VPQ. **RESULTS:** The VHI-10 and VPQ each had a large, single principal component, high internal consistency, and were highly correlated (disattenuated $r=0.91$).

CONCLUSION: The VHI-10 and the VPQ are similar, short, convenient, internally-consistent, unidimensional tools.

SIGNIFICANCE: The total VHI-10 or VPQ score is a good overall indicator of the severity of voice disorders. (Otolaryngol Head Neck Surg 2004;131:232-5.)

One major initiative of contemporary outcomes research is the development of patient-centered outcome measures. Patient self-report symptom scales can provide valuable information about functional abilities and

quality of life.¹ A number of well established general health quality of life instruments have been developed with strong validity and reliability data.² Several disease or condition-specific patient questionnaires have been developed to examine voice-related quality of life.^{3,4} However, most of these questionnaires are time consuming to complete (and score) and arguably provide a degree of redundant information. In contrast, brief, concise but clinically-useful self report questionnaires are highly attractive in the clinical environment. Short questionnaires have been developed to address specific disorders, e.g. the Voice Outcome Survey is a measure specifically developed for patients with vocal cord paralysis.⁵ Similarly, the Voice Related Quality of Life scale focuses on the disability aspects of voice disorders.⁶

Two short-form, voice-related scales—the Vocal Handicap Index-10 item questionnaire (VHI-10) 1 and the Vocal Performance Questionnaire (VPQ) 7—have been described. The longer (30 item) versions of the VHI and the VPQ are reliable, valid, and sensitive measures of voice problems.⁷⁻¹⁰ Both short-form scales use a single total ‘severity’ score that assumes that all the items contribute to a unidimensional entity. However, there are insufficient psychometric data on either scale to support this assumption. Furthermore, data are required to examine whether these two questionnaires assess similar aspects of what is experienced by a patient with voice disorders.

The aims of this study were to examine: 1) whether or not these short scales truly are unidimensional tools, i.e. is the use of a total VHI-10 and/or VPQ score valid?; 2) the internal consistency (a form of reliability) of both short questionnaires; and 3) the correlation between them.

MATERIALS AND METHODS

Subjects

The sample studied was 330 people (108 men, 222 women) with a primary complaint of dysphonia (hoarseness) who were referred to Otolaryngology outpatient clinics. The mean age of the men was 55.2 years (SD = 15.5 years; range 23-88), and of the women was 48.2 years (SD = 17.5 years; range 17-87). They suffered from a wide range of dysphonia diagnoses, with

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Supported by a Wellcome Trust Health Services Research Grant. Ian Deary is the recipient of a Royal Society-Wolfson Research Merit Award.

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0194-5998/\$30.00

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doi:10.1016/j.otohns.2004.02.048

the commonest being muscle tension (hyperfunctional) dysphonia and chronic laryngitis. The sample also included patients with Reinke's oedema, papillomata, unilateral vocal fold paralysis, and vocal fold nodules. Patients with laryngeal cancer were not included. The study was approved by Newcastle and North Tyneside Local Research Ethics Committee.

Measures

Voice Handicap Index-10 (VHI-10). The VHI-10 is a 10 item, shortened version of the original 30-item Vocal Handicap Index.^{4,8,10} The VHI-10 represents a distilling of 3 sub-scales into one shortened scale. For each question the patient is required to rate each answer using a 5-point scale. The total score is used to indicate the severity of the voice disorders for the patient (maximum score = 40, minimum score = 0). Appendix 2 describes the text of each item in the VHI-10.

Vocal Performance Questionnaire (VPQ). The VPQ is a 12-item questionnaire that examines the physical symptoms and socio-economic impact of the voice disorder.^{7,9} It is designed using an answer format in which the patient selects the statement that best answers each question. The statements are graded in terms of severity of vocal performance. A numerical score from 1 to 5 is assigned to each answer and these are summed to provide a single total score of severity. The maximum severity score is 60 and minimum score is 12. Appendix 1 reproduces the VPQ, which readers are welcome to reproduce and use.

Statistical Analyses

The psychometric structure of the VHI-10 and the VPQ were examined using principal components analysis. The number of components underlying the correlations among the questionnaires' items was determined using inspection of the scree slope and the eigenvalues of the components. Internal consistency of the components was analysed using Cronbach's alpha. Pearson's correlation was used to quantify the correlation between the total scores from the VHI-10 and the VPQ.

RESULTS

Principal components analysis of the VHI-10 revealed only one component with an eigenvalue greater than one. The scree slope also suggested one component. This accounted for 51.6% of the total item variance. All of the 10 items loaded highly on this single component, ranging from .40 to .83 (mean loading = .71). The Cronbach alpha of the VHI-10 was 0.89, indicating high internal consistency.

Principal components analysis of the 12 items of the VPQ again revealed only one component with an eigenvalue greater than one, and the scree slope also suggested one component. This accounted for 52.4% of the total item variance. All of the 12 items loaded highly on this single component, ranging from .62 to .83 (mean loading = .72, i.e. very similar to that of the VHI-10). The Cronbach alpha of the VPQ was 0.91, indicating high internal consistency.

The mean score for the VHI-10 was 14.0 (SD = 8.3, range = 0 to 35) and for the VPQ was 28.1 (SD = 9.9, range = 12-55). The correlation between the VHI-10 and the VPQ was .82 ($p < .001$). This correlation is attenuated from the true value as a function the reliability of each questionnaire which, though very high, is not perfect. When this is taken into account the disattenuated correlation between the VHI-10 and the VPQ is .91.

DISCUSSION

This study reports much the largest data series to date on either the VHI-10 or the VPQ, a pair of brief, useful, self-report voice pathology questionnaires that are quick to complete and acceptable to patients. These data on a large range of voice pathologies suggest that both questionnaires are: unifactorial, which validates the use of a single total score; and highly internally consistent. Furthermore, the two questionnaires are highly correlated, suggesting they are assessing the same constellation of symptom complaints. These questionnaires are useful in circumstances where there is neither the time nor the need to assess multiple dimensions of a patient's voice disorder, which may be obtained from longer (30 item) questionnaires such as the Voice Symptom Scale (VoiSS) 3 and the original Voice Handicap Index (VHI) 4. In a research setting, the greater detail offered by these longer tools may be valuable. For busy clinicians, however, where time is limited, it is very helpful to have a short, reliable self-report measure to hand, for application in every patient, and which can readily be completed at sequential visits.

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APPENDIX 1: A VOCAL PERFORMANCE QUESTIONNAIRE

Paul Carding
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Name Date:

1. How do you think your voice sounds now (as compared to before your voice problems started)?

- (a) No different from usual voice
- (b) Only slightly different from usual voice
- (c) Quite different from usual voice
- (d) Very different from usual voice
- (e) Totally different from usual voice

2. Does your voice give you any physical discomfort when you talk?

- (a) No discomfort
- (b) Slight discomfort
- (c) Moderate discomfort
- (d) A lot of discomfort
- (e) Severe discomfort

3. Does your voice get worse as you talk?

- (a) Not at all – it stays the same
- (b) Occasionally when I talk
- (c) Often gets worse when I talk
- (d) Often gets a lot worse when I talk
- (e) Always gets a lot worse when I talk

4. Do you find it an effort to talk?

- (a) No effort at all
- (b) Slight effort sometimes (i.e. at the end of the day or when talking loudly etc.)
- (c) Quite an effort sometimes
- (d) An effort most of the time
- (e) A constant effort to talk

5. How much are you using your voice at present?

- (a) As much as I usually would
- (b) A little less than I usually would
- (c) Somewhat less than usual
- (d) A lot less than usual
- (e) Hardly at all

6. Does your voice problem stop you from doing anything that you would otherwise normally do?

- (a) Doesn't stop me doing anything that involves me using my voice
- (b) Stops me doing a few things that involve using my voice
- (c) Stops me doing a lot of things that involve using my voice
- (d) Stops me doing most things that involve using my voice
- (e) I can hardly do anything that involves me using my voice

7. In your opinion do you think that your voice is ever difficult to hear or understand?

- (a) Not at all
- (b) A little difficult
- (c) Quite difficult
- (d) Very difficult
- (e) Extremely difficult

8. Do OTHER people (eg. close family) ever comment that your voice is difficult to hear or understand?

- (a) No comments
- (b) Occasional comments
- (c) Quite often there are comments
- (d) Frequent comments
- (e) Very frequent comments

9. Since your voice problem started has your voice. . . ?

- (a) Improved a lot
- (b) Improved a little
- (c) Not improved at all
- (d) Deteriorated a little
- (e) Deteriorated a lot

10. Since your voice problem started have OTHER people (eg close family) commented that your voice has improved?

- (a) Other people say that my voice has improved a lot
- (b) Other people say that my voice has improved a little
- (c) Other people say that my voice has not improved at all
- (d) Other people say that my voice has got a little worse
- (e) Other people say that my voice has got a lot worse

11. Would you say that the sound of your voice was. . .

- (a) Normal
- (b) Not quite normal

- (c) Mildly abnormal
- (d) Quite abnormal
- (e) Very abnormal

12. How much do you worry about your voice problem now?

- (a) Not at all
- (b) Hardly at all
- (c) Quite a lot
- (d) A good deal
- (e) Almost all of the time

Assign a value of 1 to each (a) answer, a 2 to each (b) answer, and so on. Total range of scores is therefore 12 (normal) to 60 (very severe dysfunction).

Total Score

APPENDIX 2

Items in the Voice Handicap Inventory 10 item (VHI-10)

Item No.*	Verbatim item
F1	My voice makes it difficult for people to hear me
F3	People have difficulty understanding me in a noisy room
P10	People ask, 'What's wrong with your voice?'
P14	I feel as though I have to strain to produce voice
F16	My voice difficulties restrict my personal and social life
P17	The clarity of my voice is unpredictable
F19	I feel left out of conversation because of my voice
F22	My voice problem causes me to lose income
E23	My voice problem upsets me
E25	My voice makes me feel handicapped

*Refers to item number within the VHI 30-item version.