Predictors of Six-month Change in the Voice Handicap Index in a Treatment-seeking Population

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**Summary: Objective.** To evaluate predictors of longitudinal change in patient-perceived voice impact as determined by the Voice Handicap Index (VHI).

**Study Design.** Prospective, survey study.

**Methods.** Patients consented to the University of Wisconsin Voice and Swallow Clinics Outcomes Database with voice concerns with a baseline clinic visit from November 2012 to January 2014 were eligible for the study. The VHI was sent to patients 6 months post clinic visit to determine change in voice handicap from baseline. General health was screened using the 12-item Short Form Health Survey, using physical component summary and mental component summary scores. Predictor variables included treatment (medical and/or behavioral); dysphonia sub-diagnosis; grade, roughness, breathiness, asthenia, and strain rating; age; sex; socioeconomic factors; smoking history; and comorbidity score.

**Results.** Two hundred thirty-seven patients met study criteria and were followed longitudinally. Eighty-two patients returned 6-month surveys. The VHI was significantly correlated with mental component summary scores. Patients with a higher grade in baseline grade, roughness, breathiness, asthenia, and strain score were more likely to receive voice intervention (P = 0.04). Six-month improvement in VHI score was associated with both higher initial VHI score and higher educational level in both univariate (P < 0.01, P = 0.04) and multivariate analyses (P < 0.01, P = 0.02). Voice treatment (medical and/or behavioral) was not a significant factor for improvement in VHI score.

**Conclusions.** Our results suggest that it is important to consider baseline self-perceived voice impact measures and educational level in setting expectations for voice treatment. Future studies examining the relationship between treatment patterns and voice-related patient outcomes are warranted.

**Key Words:** Voice–Voice disorders–Voice Handicap Index–Patient-centered outcomes–Long-term outcomes.

**INTRODUCTION**

Disorders of the voice and diseases of the larynx are a growing public health concern. Although typically benign and not considered to be life threatening, they often affect communication abilities in both social and occupational contexts and can adversely affect quality of life. Recent reports show that these disorders have direct healthcare costs in the United States approaching $4.9 billion annually, including evaluation and treatment costs. An estimated 7% of the workforce miss a day or more of work each year with nearly 50% of treatment-seeking patients reporting voice problems affecting their current work abilities. Dysphonia, or disordered voice, has a reported lifetime prevalence of nearly 30%, indicating a significant public health impact.

In the current healthcare climate, there is a growing emphasis on patient-centered care and outcomes. The patient’s own subjective concerns play an important role in the complex clinical evaluation as well as in guiding the basis for a treatment plan. The Voice Handicap Index (VHI) is a validated assessment tool that captures the severity of the voice problem from the patient’s perspective, including functional, physical, and emotional domains. It is widely used in clinical evaluations of dysphonia, which also includes clinician-rated measures of perception such as the overall dysphonia grade, roughness, breathiness, asthenia, and strain (GRBAS) or Consensus Auditory Perceptual Evaluation of Voice scales, patient medical history, videostroboscopy ratings, and objective acoustic and aerodynamic measures. However, the VHI is weakly correlated to other clinical voice evaluation measures, such as jitter %, shimmer %, signal-to-noise ratio, maximum phonation time, dysphonia severity index, subglottic pressure, and mean flow, and patients have demonstrated wide variability in their VHI scores presenting with similar vocal pathology and objective measures.

The VHI and other patient-reported voice scales like the Voice-Related Quality of Life questionnaire, Voice Symptom Scale, and Vocal Performance Questionnaire are commonly used in dysphonia outcomes research. However, factors driving patient-perceived improvement in voice handicap are not well understood. Studies have examined the same clinical evaluation measures listed above to predict patient perception using the VHI, but these were completed once and were not prospectively followed. Other studies have focused on treatment efficacy longitudinally, but looked at one specific diagnosis such as laryngeal cancer, vocal fold paralysis, or spasmodic dysphonia. One patient-centered outcomes study used voice-related quality of life measures (VHI, Vocal Performance Scale, and VHI-31).
Additionally, longitudinal five-year follow-up on patients with chronic laryngitis, and neurological disorders, age, sex, smoking history (yes, current or past, or no) are collected via a patient intake form. The Charlson Comorbidity Index quantified patient comorbidity using a program based on the original Charlson Comorbidity Index calculator. The index was originally created based on 1-year mortality data from 19 medical conditions with a weight of 1 (eg, myocardial infarct) to 6 (malignant tumor), with scores ranging from 0 to 37. Patient age is also factored into the overall score. Socioeconomic factors were collected via the US Census Bureau’s American Community Survey (ACS), based on patient five-digit zip codes; these data were obtained from the ACS 2007–2011 5-year estimates. Five-year estimates were chosen based on availability of data for patients living in small communities or rural areas and higher reliability of data compared with ACS 1-year and 3-year estimates.

Other patient variables were determined at the initial voice evaluation by the SLP and ENT, including diagnosis, auditory-perceptual rating (GRBAS), and baseline VHI severity. Clinician-perceived perceptual rating was completed using the GRBAS scale. Overall grade was chosen for this analysis, with scores ranging from 0 (normal) to 3 (severe). VHI severity was divided into four groups: no to minimal impairment (0–17), mild impairment (18–39), moderate impairment (40–59), and severe impairment (60+), based on cutoff values within the database.
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