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What is This?
Disease-Specific Self-Efficacy in Spasmodic Dysphonia Patients

Amanda Hu, MD, FRCS1, Derek Isetti, MS, CCC-SLP2, Allen D. Hillel, MD3, Patricia Waugh, MS, CCC-SLP4, Bryan Comstock, MS5, and Tanya K. Meyer, MD3

Abstract

Objective. Self-efficacy (SE) is an optimistic self-belief that one can perform a novel task. This concept involves empowerment, self-esteem, and adaptation to a stressful situation. SE is a strong predictor of health behaviors. Our objectives were to study SE in spasmodic dysphonia (SD) and to develop a disease-specific SE-SD scale.

Study Design. Prospective study.

Setting. Academic hospital.

Subject and Methods. Disease-specific SE-SD items were developed with laryngologists, speech pathologists, and SD patients. These items, General SE Scale, Voice Handicap Index-10 (VHI-10), Consensus Auditory Perceptual Evaluation of Voice (CAPE-V), and Hospital Anxiety and Depression Scale (HADS), were administered to SD patients who presented for botulinum toxin injections.

Results. One hundred forty-five SD patients (mean age 59.5 ± 13.6 years) had a general SE score (Cronbach’s ρ = 0.894) of 33.4 ± 5.2 out of 40. This was negatively correlated with HADS-A (r = −0.42, P < 0.001) and HADS-D (r = −0.42, P < 0.001), but not correlated with VHI-10 (r = −0.098, P = 0.243) and CAPE-V (r = −0.047, P = 0.57). Factor analysis selected 8 items from the general SE scale and 5 disease-specific SE-SD items to generate a 13-item disease-specific SE-SD scale (Cronbach’s ρ = 0.907). Disease-specific SE-SD score was 42.1 ± 6.9 out of 52 and was negatively correlated with VHI-10 (r = −0.19, P = 0.005), HADS-A (r = −0.43, P < 0.001), and HADS-D (r = −0.57, P < 0.001), but not correlated with CAPE-V (r = −0.024, P = 0.60).

Conclusion. SD patients established on botulinum toxin injections have high degrees of general and disease-specific SE. Patients with higher SE-SD demonstrate lower vocal handicap and lower levels of anxiety and depression. A 13-item disease-specific SE-SD scale has been developed.

Keywords

self-efficacy, spasmodic dysphonia, quality of life

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S

ef-ficacy (SE) is an optimistic self-belief that one can perform a novel and specific task.1 This concept was introduced by psychologist Dr A. Bandura as a core aspect in his social cognitive theory. This judgement is not based on one’s skills, but is a belief that one can complete the task with whatever skills one possesses.2 SE overlaps with concepts of self-esteem and locus of control. This concept explores the emotional functioning, coping skills, and ability to adapt to a new and stressful situation. SE describes an individual’s ability to cope with adversity in various domains of life.1

Adversity in life can be encountered in cases of illness and health. SE has been shown to be a strong predictor of health behaviors.1 Studies in preventive health have shown that SE affects rates of smoking cessation, dietary changes to lower cholesterol, and levels of exercise.3-5 SE had also been studied in chronic diseases like fibromyalgia and diabetes.6-8

The General Self-Efficacy Scale (GSES) is a 10-item validated questionnaire that measures self-efficacy.9 It has been translated into 26 languages. The scale is self-administered and completed in 4 minutes. Patients rate statements on a scale of 1 to 4 and scores range from 10 to 40. Higher scores indicate higher degrees of SE, although there is no cut-off abnormal
Adductor SD is more common, comprising 82% of patients.15 Laryngeal muscles are involved, the patient has mixed SD. Overall prevalence of SD is about 5.9 per 100,000.16 There is no cure for SD. The current gold standard treatment is electromyographic-guided botulinum toxin injections to the affected muscles.15 This neurotoxin temporarily paralyzes the muscle and allows for an improvement in voice. Botulinum toxin lasts approximately 3 to 4 months; thus, patients must repeat the injections. Speech therapy and surgery play limited roles in treating SD.

Spasmodic dysphonia (SD) is a focal laryngeal dystonia.14,15 It is a chronic neurological disorder that results in task-specific dystonic contractions of the laryngeal musculature during speech, sparing other laryngeal functions such as singing, swallowing, or coughing. These contractions cause a characteristic, abnormal, vocal output. There are 3 forms of SD: adductor, abductor, and mixed. Adductor SD affects the thyroarytenoid, lateral cricoarytenoid, and interarytenoid muscles and causes a strangled/strained quality in speech. Abductor SD affects the posterior cricothyroid muscle and causes a breathy/distressing characteristic, abnormal, vocal output. There are 3 forms of SD: adductor, abductor, and mixed. Adductor SD affects the thyroarytenoid, lateral cricoarytenoid, and interarytenoid muscles and causes a strangled/strained quality in speech. Abductor SD affects the posterior cricothyroid muscle and causes a breathy/distressing.

The objectives of this study were: (1) to study self-efficacy (SE) in spasmodic dysphonia (SD) patients and (2) to develop a disease-specific self-efficacy spasmodic dysphonia (SE-SD) scale.

**Methods**

Disease-specific SE-SD items were developed through consultations with 3 laryngologists, 1 laryngology fellow, 3 speech language pathologists specialized in voice, and 2 patients with SD. Eleven disease-specific SE-SD items were developed (Table 1). These 11 items, the GSES, Voice Handicap Index-10 (VHI-10),17 and Hospital Anxiety and Depression Scale (HADS)18 were completed by the patients. Consensus Auditory Perceptual Analysis of Voice (CAPE-V)19 was administered by an expert clinician.

VHI-10 is a standardized, validated questionnaire that is a self-reported measure of a patient’s perceived handicap from his or her voice.17 Ten statements are answered on a scale of 0 to 4. Scores range from 0 to 40 and a score above 11 is abnormal. HADS is a standardized, validated measure of a patient’s self-reported symptoms of anxiety and depression.18 Fourteen items are answered on a 4-point (0-3) scale. Seven items report symptoms of anxiety and another 7 report depression; thus, the scores range from 0 to 21 for anxiety and depression, respectively. A score of 0 to 7 for either subscale is normal, a score of ≥11 indicates probable presence of a mood disorder, and a score of ≥10 is suggestive of a mood disorder. The two subscales are independent. CAPE-V was developed by the American Speech-Language-Hearing Association as a standardized guideline for an expert clinician to evaluate the quality of a patient’s voice.19 This evaluation is based on 6 attributes: overall severity, roughness, breathiness, strain, pitch, and loudness. An expert evaluates each parameter on a visual analog scale of 100 mm by indicating the degree of perceived deviance from normal. Higher scores indicate a larger abnormality (deviance). A speech language pathologist with over 30 years of experience in

<table>
<thead>
<tr>
<th>Table 1. Eleven Disease-Specific Self-Efficacy Items for Spasmodic Dysphonia</th>
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<tbody>
<tr>
<td>1. I am confident I can communicate well even when my condition is affecting me more than usual</td>
</tr>
<tr>
<td>2. When my condition gets worse, I know how to seek treatment</td>
</tr>
<tr>
<td>3. I feel I have an adequate amount of knowledge about my condition, despite it being complex</td>
</tr>
<tr>
<td>4. On a day-to-day basis, I feel I have an adequate amount of knowledge about my condition, despite it being complex</td>
</tr>
<tr>
<td>5. I can cope with having my condition</td>
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<tr>
<td>6. If I get side effects from my treatment, I can deal with them</td>
</tr>
<tr>
<td>7. I can communicate on the telephone</td>
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<tr>
<td>8. I can talk in a noisy environments</td>
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<tr>
<td>9. I can use my voice to express my feelings</td>
</tr>
<tr>
<td>10. I can manage the extra effort that it takes to talk</td>
</tr>
<tr>
<td>11. I can manage my voice on good and bad days</td>
</tr>
</tbody>
</table>

In a sample of 1594 healthy American adults, the mean general SE score was 29.48 ± 5.13.10 GSES measures overall personality traits and life philosophy. GSES does not tap into specific behavioral changes. “Disease-specific” measures have been developed to make a scale more pertinent to a condition. For example, disease-specific SE scales have been developed for multiple sclerosis, arthritis, and COPD.2,11-13

Eleven Disease-Specific Self-Efficacy Items for Spasmodic Dysphonia
voice performed all the CAPE-V evaluations for this study.

Any patient with SD who presented to the University of Washington Medical Center from September 2011 to June 2012 for their botulinum toxin injection was eligible for the study. Exclusion criteria were: patients who did not speak English, patients without the mental capacity to complete the surveys, and patients who declined participation.

Statistical analysis was performed using commercially available software (SPSS, version 20.0, IBM Corporation, Armonk, NY). Descriptive statistics were calculated. Factor analysis was used to choose items from the disease-specific and GSES items. Cronbach’s $\alpha$ was calculated as a measure of internal consistency or reliability to determine to what extent the scale was measuring the same construct. No sample size calculation was performed. This study was approved by the Institutional Review Board at the University of Washington.

### Results

One hundred forty-five SD patients completed the study. Two other patients were excluded: 1 patient did not have the mental capacity to complete the study and another patient declined.

Table 2 shows the demographic data for the study population. Most of the patients were female, had adductor SD, and were in their fifth decade of life. This population was well established on botulinum toxin injections, with average treatment duration of over a decade. These individuals perceived a moderate level of handicap from their voice, with an average VHI-10 score of over 25. Our speech language pathologist rated the quality of these patients’ voices as moderately abnormal, with an average CAPE-V score of greater than 40. Overall, GSES scores were high with a mean score of 33.4 $\pm$ 5.2 out of 40 (83.4% $\pm$ 13.0%) (Cronbach’s $\alpha = 0.894$). High general SE was negatively correlated with anxiety and depression, as measured by HADS-A ($r = -0.42$, $P < .001$) and HADS-D ($r = -0.42$, $P < .001$), respectively. It was not correlated with clinician perceived perturbation, as measured by CAPE-V ($r = -0.024$, $P = .60$).

No harm or adverse events were encountered.

### Discussion

This was the first study to examine the concept of SE in SD patients. A 13-item disease-specific SE-SD scale with high internal consistency and reliability has been created. The general SE score was negatively correlated with HADS-D and HAD-A. The disease-specific SE-SD scale was negatively correlated with VHI-10, HADS-D, and HADS-A. Patients with higher SE demonstrate lower self-perceived vocal handicap and lower levels of anxiety and depression.

Why is it important to study SE? The most important reason is that SE has been shown to be a strong predictor of health behavior. As mentioned in the introduction, SE has been shown to predict preventive health habits and patients’ management of chronic diseases. For example, higher SE was associated with a lower likelihood of dropout from a smoking cessation program. SE was a predictor of the...
behavior change necessary for initiating/maintaining diet therapy for cholesterol reduction. In patients with fibromyalgia, SE was associated with less pain and impairment. Diabetic patients with higher SE are more adherent to treatment, like exercise, diet, and oral medication intake. Patients with sickle cell disease who have higher SE also have lower reported physical symptoms, pain severity, and doctor visits.

Studying SE can be useful in clinical and research situations. Clinically, SE can be useful in counseling and in identifying patients who are not coping well with the disease. Extra resources, like patient support groups and speech language pathology services, can be offered to these patients. Studying SE in the research environment is also important. The intent of this study was: (1) to establish that patients who get treatment for SD have high SE, indicating that the expense and effort of treatment is successful and justifiable; (2) to develop a disease-specific SE scale that can be adapted to other voice disorders as a future research direction.

SE needs to be distinguished from other concepts and validated scales. VHI-10 captures a patient’s self-reported handicap from voice. VHI-10 can be thought of as a negative measure and a higher score indicates more limitations. VHI-10 also does not predict health behavior, but is a present measure of a patient’s voice. In contrast, SE refers to an individual’s positive, agentive capabilities and is task specific. SE also needs to be distinguished from quality of life, as measured by the Voice-Related Quality of Life questionnaire (VRQOL). VRQOL assesses self-perceived quality of life in two domains: social/emotional and physical functioning. This 10-item questionnaire provides a total score ranging from 0 to 100, with a higher score indicating better voice-related quality of life. This measure also does not predict health behaviors. Special consideration is also required to differentiate self-efficacy from self-esteem. SE is both domain and situation specific. A person could have a strong, generalized sense of self-esteem but have poor SE with regard to a specific task, like public speaking.

There are 3 SE studies with voice and speech patients in the literature. Gillespie et al studied the influence of clinical terminology on self-efficacy for voice. Teachers with vocal issues were exposed to terms like “misuse/abuse.” These patients then completed a Voice SE Questionnaire that was created by the authors. The study concluded that this negative terminology may harm the patient’s SE.

Wong et al studied voice SE by using a newly developed 13-item Voice Self-Efficacy Scale (VSES). They correlated the results with vocal disability, which was measured by the Voice Activity and Participation Profile. The results revealed that: (1) voice SE was negatively correlated with voice-related disability and (2) dysphonic subjects reported significantly lower levels of voice SE. Unfortunately, the VSES was written in Chinese and it is unknown if this scale would retain accuracy if translated into and used in a Western culture.

Ornstein et al developed a Self-Efficacy Scale for Adult Stutterers (SEAS) to estimate adult stutterers’ confidence for entering and maintaining fluency in a variety of speaking situations. SESAS scores significantly differentiated stutterers from normal controls and were negatively correlated with validated scales, like the Erickson Scale and the Perceptions of Stuttering Inventory. This study suggested that SE scales may be useful for measuring change during treatment.

The methods that were used to create the disease-specific SE-SD scale were recommended by the authors of the GSES. They recommended adding statements to the GSES to measure domain-specific changes in SE. They also recommended statements that included both a positive and negative aspect, like item 10 in the disease-specific SE-SD scale (Table 3).
Rehabilitation Adapted Index of Self-Efficacy). They adapted the 10 items from the GSES and added 5 items specific to COPD.

Among the 5 disease-specific SE-SD items, some items did not include the words voice or spasmodic dysphonia. For example, item 11 in disease-specific SE-SD scale (Table 3) was “I can cope with having my condition.” This item should not be considered generic. The concept of SE is very broad. For example, SE scales have been developed for playing golf and learning mathematics. In view of this diversity, item 11 is disease specific. The patients who completed this study knew that the “condition” was SD.

One of the challenges of this study was to determine how to gauge the patient’s response to the botulinum toxin treatment. In some diseases this is straightforward, like diabetes or COPD, when lab results or pulmonary function tests can be measured. In voice disorders, however, this measure can be complicated. The patient’s voice was a multidimensional phenomenon, with many facets and almost intangible to quantify. Validated questionnaires were used in this study; however, there was no gold standard. We looked at the following parameters and found both positive and negative attributes to each. VHI-10 was a personal and subjective measure of handicap reported by the patient. Professional voice users, like teachers, may not accept any imperfections in their voice; however, nonprofessional voices users, like computer engineers who are quiet all day, may not self-perceive any handicap with the same voice. CAPE-V was an expert’s judgement of the patients’ voice. An expert’s judgement of the voice was subjective and may be different from a layperson’s. Another measure that was considered was the duration of good voice over the total time elapsed from the previous botulinum toxin injection. This measure, however, was not correlated with SE. This measure could be affected by factors like distance from the patient’s home to the hospital, convenience of the patient’s schedule, and scheduling difficulties of the botulinum toxin clinics.

It is interesting that CAPE-V was not correlated with either the general SE scale or the disease-specific SE-SD scale. Also, the disease-specific SE-SD scale was negatively correlated with VHI-10, HAD-A, and HADS-D, as expected. CAPE-V was the only tool that was administered by an external expert listener (ie, not the patient), while the other 3 questionnaires were all self-administered by the patient. SE, however, is not a stable construct; it is expected to change over time, even in the same patient. Thus, it is difficult to calculate test-retest reliability. Third, we did not track SE longitudinally. The scale was purposely administered at the same point of the patient’s botulinum toxin cycle. At the time of their injection, we postulate that SE would be at the lowest because patients would have just dealt with the return of their symptoms. If the scale were administered at varying times of their cycle, it would add another variable to the study and dilute the power of the study’s sample size. Lastly, we chose patients who were well established on botulinum toxin. This decision may have decreased the variability of our SE scores; however, it also eliminated confounding factors and fluctuations that may be seen in new patients. SD patients who are receiving injections for the first time may also be overwhelmed by the experience. We attempted to correlate the duration of botulinum toxin treatment with the SE score; however, this correlation was not significant.

These limitations are all directions for future research. It would be interesting to study SE in a longitudinal fashion, as opposed to the cross-sectional fashion of this study, and to start with newly diagnosed SD patients. This would be a prospective study and require years to accrue enough patients. SE may be lower in patients who are newly diagnosed and increase as patients become established on botulinum toxin injections. Another future direction may be to adapt the disease-specific SE-SD scale to other voice disorders, as mentioned earlier in the discussion.

**Conclusions**

SD patients established on botulinum toxin injections have high degrees of general and disease-specific SE. Patients with higher SE demonstrate lower self-perceived vocal handicap and lower levels of anxiety and depression. A 13-item disease-specific SE-SD scale has been developed. SD may be a good model for studying SE in a voice disorder. Future directions of research include following SE longitudinally in SD patients and adapting the scale to other voice disorders.

**Author Contributions**

Amanda Hu, conception and design, data acquisition, interpretation of data, drafting manuscript, final approval; Derek Isetti, conception and design, data acquisition, revising manuscript, final approval; Allen D. Hillel, supervision, conception and design, revising manuscript, final approval; Patricia Waugh, data acquisition, revising manuscript, final approval; Bryan Comstock, statistical analysis, final approval; Tanya K. Meyer, supervision, conception and design, interpretation of data, revising manuscript, final approval.

**Disclosures**

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