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ORIGINAL ARTICLE

Comparison between Voice Handicap Index and Voice Symptom Scale by Subjective Analysis of Voice Disorders

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ABSTRACT

Objective: Purpose of the present study was to use and compare two patient-derived scales voice handicap index (VHI) and voice symptom scale (VoiSS) for the assessment of the quality of life in patients of voice disorders and to assess their response to treatment.

Design: Longitudinal, cohort comparison study.

Setting: Department of Otorhinolaryngology, Maharana Bhupal Government Hospital, Udaipur, Rajasthan

Participants: Fifty patients with a complaint of change in voice attended ear, nose and throat outpatient department at Maharana Bhupal Government Hospital and Rabindranath Tagore Medical College, Udaipur from 7th July 2010 to 30th June 2011.

Materials and methods: Two self-reported patients derived scale VHI and VoiSS were applied to all 50 patients of voice disorders both before as well as after treatment and compared the effect sizes of both the scales.

Result: Out of 50 cases, maximum cases included in the study were of malignant growth larynx (30%) followed by vocal nodule (18%). A total of 60% were male, and 40% were female. Maximum cases were of 41 to 60 years of age group (48%). Both the patient-derived scales VHI and VoiSS were found equally useful in assessing the quality of life in patients of voice disorders. Outcomes were similar in both the scales. The mean scores in both the scales before treatment were reduced to almost half after the respective treatment.

Conclusion: The result suggested that both the scales (VHI and VoiSS) are equally important as the results were highly correlated and no strong evidence was found to favor either of the scales. These scales are very useful in the assessment of the impact of voice disorders on patient's life and improvement in the quality of life after respective treatment as well as in assessing response to treatment.

Keywords: Dysphonia, Quality of life, Voice handicap index (VHI), Voice disorders, Voice symptom scale (VoiSS).

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INTRODUCTION

Voice is a complex phenomenon that is produced by interaction among the respiratory, laryngeal and resonance sub-systems.[1]

The phonation or voice is produced when the air is expelled from the lungs through the glottis, creating a pressure drop across the larynx. The oscillations of vocal cords modulate the pressure and flow of the air through the larynx, and this modulated airflow is the main component of the sound of most voiced phones.

Describing the vocal function and evaluating the voice problems are, likewise, complex tasks.

Voice measurement can improve our understanding of voice production, helps us to identify links between laryngeal disorders and voice production, and document change with interventions. It is also an important part of all phonatory surgery.[1]

Voice measures are divided into three categories:

1. Patient scales
2. Perceptual evaluation
3. Measures

Patient Scales

- VHI
- VoiSS
- Voice Related Quality of Life (V-RQOL).
- Voice activity and participation profile (VAPP)
- Reflux symptom scale (RSI)
- Patient questionnaire of vocal performance (VPQ)
- Voice outcome survey (VOS)

Perceptual Evaluation

- Auditory perceptual scale
  a. Grade, roughness, breathiness, asthenia, and strain (GRBAS).

b. Consensus auditory perceptual evaluation-voice (CAPE-V).
c. Vocal profile analysis (VPA)

- Visual perceptual scale
- Tactile perceptual evaluation

Measures

Measuring voice is accomplished using:

- Acoustic analysis,
- Aerodynamic assessment, and
- Source measures.

Dysphonia can be defined as an impairment of the speaking or singing voice. It arises from an abnormality of the structures and or functions of the voice production system and can cause bodily pain, personal communication disability or an occupational or social handicap. The etiology of dysphonia is multifactorial. Genetic and psychological factors may predispose an individual to voice disorders.[2]

There are so many acute and chronic variables which can precipitate dysphonia. These include occupational vocal demands, trauma, environment, medications, health problems and lifestyle choices. Dysphonia is as disruptive to quality of life as any other chronic disease like angina, sciatica and chronic sinusitis.[3] The communicative issues associated to dysphonia can lead to depression, social withdrawal, and occupational handicap.[4]

OBJECTIVE

The objective of the present study is to use and compare VHI and VoiSS for the assessment of the quality of life in patients with voice disorders and their response to treatment.

Voice Handicap Index

It is a voice-specific outcome, measures patients' disability from voice disorders.

The index consists of a 30-item questionnaire, and each statement is noted from 0 (never) to 4 (always) composing a total score from 0 to 120, the higher the standard score, the higher the VHI (Table 1) .

Voice Symptom Scale

This scale is yet in progress.

VoiSS consists of 43 items on a five-point equal appearing interval scale that reflects the frequency of occurrence. The total score is 0 to 172 (Table 2).

The questions in VoiSS represent five aspects (or domains) of voice pathology-communication problems, throat infection, psychosocial distress, voice sound, and variability and phlegm.

MATERIALS AND METHODS

This study was carried out on 50 patients that came to Otorhinolaryngology OPD at Maharana Bhopal (M.B.) Hospital and R.N.T. Medical College, Udaipur from 7th July 2010 to 30th June 2011 with a clinical diagnosis of dysphonia.

All patients then underwent thorough history-taking, general physical examination, and uniformly documented detailed local examination.

The routine laboratory tests, viz. blood for Hb, TLC, DLC, ESR, urinalysis, skiagram soft-tissue neck lateral view, skiagram chest PA view were done in all cases.

An indirect laryngoscopic evaluation was performed in all cases. Direct laryngoscopy and histopathological examination were done in required cases.

Thus the clinical diagnosis was made of all the cases with voice problems. Then the 43-item questionnaire of VoiSS and 30-item questionnaire of VHI were applied to all patients. The results and scores of both the voice analysis tools (VoiSS and VHI) were then compared to each other.

All the patients under study were kept under follow up until the proper treatment of voice disorder was carried out. The follow-up period for the different patient was different as the treatment duration for all diseases is not the same.

The patients were assessed thoroughly again, and both the VHI and VoiSS questionnaire were reapplied to all the patients after treatment.

Only those patients who were able to complete the posttreatment questionnaire were included in the study. Laryngectomized and tracheostomized patients were excluded from the study.

The comparisons between pre and postintervention VHI scores and pre- and post-intervention VoiSS score s as well as between VHI and VoiSS scores were carried out to assess the role of these scores in deciding treatment pattern for the voice disorders as well as in assessing the quality of life of patients of voice disorders.

The improvement in the quality of life following treatment of voice disorder was assessed using the difference between pre and post VHI and VoiSS score.

RESULTS

The maximum number of cases of dysphonia, we encountered was of malignant growth larynx followed by a vocal nodule, globus and so on as plotted on the following table (Table 3).

Since the cases included in the present study were only those, who were able to complete our questionnaire

Table 1: Voice handicap index

S.No	Questionnaire	Score				
	Part I-F	*0*	*1*	*2*	*3*	*4*
1.	My voice makes it difficult for people to hear me.					
2.	People have difficulty understanding me in a noisy room.					
3.	My family has difficulty hearing me when I call them throughout the house.					
4.	I use the phone less often than I would like to.					
5.	I tend to avoid groups of people because of my voice.					
6.	I speak with friends, neighbors, or relatives less often because of my voice.					
7.	People ask me to repeat myself when speaking face-to-face.					
8.	My voice difficulties restrict my personal and social life.					
9.	I feel left out of conversations because of my voice.					
10.	My voice problem causes me to lose income.					
	SUBTOTAL _____					
	Part II-P					
1.	I run out of air when I talk.					
2.	The sound of my voice varies throughout the day.					
3.	People ask, “What’s wrong with your voice?”					
4.	My voice sounds creaky and dry.					
5.	I feel as though I have to strain to produce voice.					
6.	The clarity of my voice is unpredictable.					
7.	I try to change my voice to sound different.					
8.	I use a great deal of effort to speak.					
9.	My voice is worse in the evening.					
10.	My voice “gives out” on me in the middle of speaking.					
	SUBTOTAL _____					
	Part III-E					
1.	I am tense when talking to others because of my voice.					
2.	People seem irritated with my voice.					
3.	I find other people don’t understand my voice problem.					
4.	My voice problem upsets me.					
5.	I am less outgoing because of my voice problem.					
6.	My voice makes me feels handicapped.					
7.	I feel annoyed when people ask me to repeat.					
8.	I feel embarrassed when people ask me to repeat.					
9.	My voice makes me feel incompetent.					
10.	I am ashamed of my voice problem.					
	Subtotal _____					
	Total _____					

0 = Never, 1 = Almost Never, 2 = Sometimes, 3 = Almost always, 4 = Always

of VHI and VoiSS and were supposed to come for the follow up till the intervention for their voice disorder completed, so the data of prevalence of voice disorders may be different than in present study.

In the present study, the prevalence of voice disorders was found to be more in male (60%) patients as compared to female (40%) patient.

Also, the prevalence of cancer larynx and laryngopharynx was found to be more in male and prevalence of globus was more in female patients.

Globus pharyngis, in most cases, is caused by inflammation of one or more parts of the throat, such as the larynx and/or hypopharynx, gastroesophageal reflux disorder, due to cricopharyngeal spasm, laryngo-pharyngeal reflux or oesophageal versatility.[5]

In a few cases, the cause of globus is unknown, and the symptoms may be attributed to a psychogenic cause, i.e., a somatoform or anxiety disorder. It has also been recognized as a symptom of depression, that responds to antidepressive treatment. [6]

Table 2: Voice symptom scale

S.No	Questionnaire	0	1	2	3	4
1.	Do you have difficulty attracting attention?					
2.	Do you get frustrated by your voice problem?					
3.	Do you have problems singing?					
4.	Do people ignore you?					
5.	Is your throat sore?					
6.	Are you able to shout?					
7.	Is your voice hoarse?					
8.	When talking in company do people fail to hear you?					
9.	Do you lose your voice?					
10.	Does your voice problem reduce your social life?					
11.	Are you able to read aloud?					
12.	How often do you worry about catching a throat infection?					
13.	Do you cough or clear your throat?					
14.	Do you have pains in the chest?					
15.	Do you have a weak voice?					
16.	Do you have problems talking on the telephone?					
17.	Do you feel miserable or depressed because of your voice problem?					
18.	Does it feel as if there is something stuck in your throat?					
19.	Do you have swollen glands?					
20.	Do you talk less than you normally would?					
21.	Are you embarrassed by your voice problem?					
22.	Do you find the effort of speaking tiring?					
23.	Does your voice problem make you feel stressed and nervous?					
24.	Do you have difficulty competing against background noise?					
25.	Are you unable to shout or raise your voice?					
26.	Are you able to ask for things in shops?					
27.	Does your voice problem put a strain on your family and friends?					
28.	Do you have a lot of phlegm in your throat?					
29.	Do you run out of air when you talk?					
30.	Does the sound of your voice vary throughout the day?					
31.	Do people seem irritated by your voice?					
32.	Do you have a blocked nose?					
33.	Do people ask what is wrong with your voice?					
34.	Does your voice sound creaky and dry?					
35.	Do you feel you have to strain to produce voice?					
36.	Do you find other people do not understand your voice problem?					
37.	Do you try to change your voice to sound different?					
38.	How often do you get throat infections?					
39.	Is your voice worse in the evening?					
40.	Does your voice 'give out' in the middle of speaking?					
41.	Do you feel annoyed when people ask you to repeat?					
42.	Does your voice make you feel incompetent?					
43.	Are you ashamed of your voice problem?					
	Total					

0 = Never, 1 = Occasionally, 2 = Some of the time, 3 = Most of the time, 4 = All of the time

A total of 44% of cases examined in the present study were having a history of smoking or alcohol intake.

Moreover, all case of cancer larynx and laryngopharynx were having a history of smoking or alcohol intake or both which significantly proves cigarette smoking and alcohol intake as the important risk factor of cancer larynx and laryngopharynx.[7]

A total of 24% of all cases in the present study were having a history of vocal abuse either due to occupation or due to habit.

All cases of the vocal nodule, vocal cord papilloma, and vocal polyp were having a history of vocal abuse, which is showing the relationship between vocal abuse and development of vocal nodule or polyp.[8] Though vocal cord papilloma is a viral disease and is not associated with vocal abuse, in our case there was a coincidental history of vocal abuse.

Majority of the cases (48%) included in this study were of the age group of 41 to 60 years, and the rests were as shown in Table 4.

Table 3: Clinical diagnosis of patients with voice disorders

No	*Diagnosis*	*No. of cases*	*Percentage*
1.	M.G. larynx	15	30%
2.	Vocal nodule	9	18%
3.	Globus pharyngis	6	12%
4.	M.G. pharynx	5	10%
5.	Laryngitis	5	10%
6.	Pharyngitis	3	6%
7.	Vocal cord palsy	2	4%
8.	Vocal cord polyp	1	2%
9.	Vocal cord papilloma	1	2%
10.	Puberphonia	1	2%
11.	Goitre	1	2%
12.	Acute bronchial Asthma	1	2%
	Total	50	100%

Table 5: Presenting complaints of the patients

S.No.	*Presenting complaints*	*No. of cases*	*Percentage*
1.	Change in voice	35	70
2.	Difficulty in breathing	03	06
3.	Difficulty in swallowing	05	10
4.	Stridor	04	08
5.	Neck swelling	03	06
6.	Total	50	100

The presenting complaint of most of (70%) patients included in the present study, was the change in voice. The change in voice varied from simple harshness in laryngitis to hoarseness in carcinoma larynx. Six percent of the patient came with the complaint of neck swelling associated with dysphonia. 10% of patient were having to present complains of difficulty in swallowing, 8% were having stridor, and 6% patients came with complaints of difficulty in breathing (Table 5).

VHI scores of all the patients both before and after treatment were noted and also the differe nce between them was calculated (Table 6 and Fig.1).

Table 4: Age wise distribution of patients

S. No.	*Age-group*	*No of cases*	*Percentage*
1.	11–20	5	10
2.	21–30	5	10
3.	31–40	8	16
4.	41–50	12	24
5.	51–60	12	24
6.	61–70	07	14
7.	71–80	01	02
	Total	50	100

Table 6: Pre- and post-treatment VHI score

	Pre-treatment VHI score			*Post-treatment VHI score*			
Total count	Mean	Stand-ard deviat-ion	Stand-ard error	Mean	Stand-ard deviat-ion	Stand-ard error	Mean of difference
50	89.7	26.54	3.75	49.96	29.315	4.14	42.14

Table 7: Pre- and post-treatment VoiSS score

	Pre-treatment VoiSS score			*Post-treatment VoiSS score*			
Total count	*Mean*	*Stand-ard devia-tion*	*Stand-ard error*	*Mean*	*Stand-ard devia-tion*	*Stand-ard error*	*Mean of differ-ence*
50	119.28	37.98	5.37	63.16	35.32	4.99	56.12

A significant difference between pre- and post-treatment VHI score was found which shows the improvement in the quality of life of the patient after treatment of voice disorder.

Similarly, scores of VoiSS both before and after treatment were also noted and statistical analysis was done (Table 7 and Fig.2)

In case of VoiSS questionnaire also, a similar type of scores found showed improvement in the qual ity of life of the patient after treatment of the voice disorder.

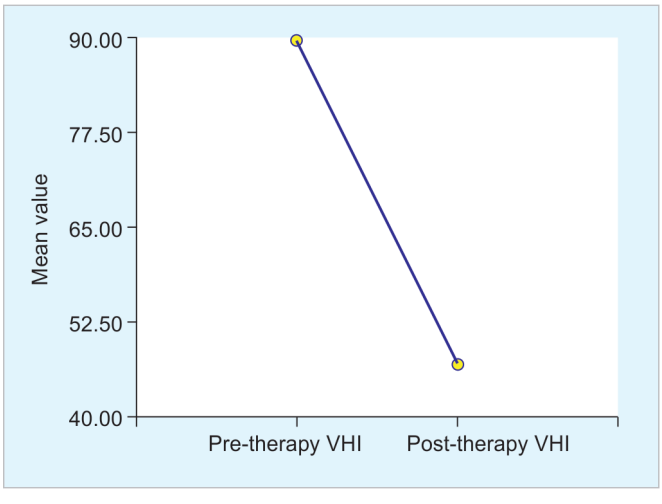

Fig.1: Plot of mean sections of pre- and post-therapy VHI score

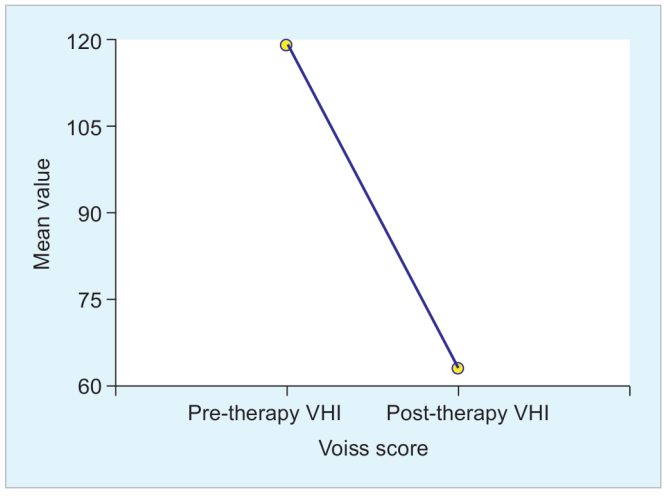

Fig. 2: Plot of mean sections of pre and post therapy VoiSS score

In both the VHI and VoiSS, the results were found to be similar and highly correlated, and the comparison did not favor any of the scale superior for evaluation purpose.

DISCUSSION

The VHI was first developed by Jacobson[9] to address the psychosocial consequences and impact of voice disorders on daily functioning and quality of life of patients.

Voice symptom scale was first described in detail by Deary et al.[10] They described all the components, factors and method included in VoiSS and proved VoiSS as an important, sensitive and easy tool to assess vocal function and disorders.

Various patient-scales other than VHI and VoiSS described for voice analysis includes the "V-RQOL" scale, "VAPP", "reflux symptom index," the "patient questionnaire of vocal performance," and the "voice outcome survey." Patients complete all scales, and it reflects the patients' perception of the problem and its consequences; these vary in length, construction and what they assess.

In the present study, we chose VHI and VoiSS out of these various scales to assess the degree of disability caused by various voice disorders and the impact of these voice disorders on the quality of life of the patient.

The follow-up these patients was carried out until the treatment/therapy of the disorder completed. Both questionnaires of VHI and VoiSS were then reapplied to the treated patient.

The pre- and post-treatment scores of both the VHI and VoiSS were then compared.

A similar detailed comparison between VoiSS and VHI was done by Wilson et al.[11] The study was carried out in 319 dysphonic patients, and the study concluded that the VoiSS is the most rigorously evaluated and psychometrically robust measure currently available for the self-assessment of voice quality.

Similarly, Steen et al.[12] done a comparative study between vocal performance questionnaire, VHI, and VoiSS to assess the responsiveness to change of a range of different measures, following voice therapy and surgery. The study suggested that the use of a voice-specific questionnaire is essential for assessing the effectiveness of any voice intervention. At the end of the study, all the three self-reported questionnaires were capable of detecting change, and scores were highly correlated. From this evaluation of 'sensitivity to change' of different measures, there was no substantial evidence to favor either the vocal performance questionnaire, VHI or VoiSS.

Both VHI and VoiSS are currently used as a tool for assessing patient handicap as a result of a voice problem by many speech-language pathologists (SLPs) as well as otolaryngologists. Several studies have shown that these indices are also useful in measuring functional outcomes of medical, behavioral and surgical treatment of voice disorders and they have also been used in assessing the effect of voice disorders on patients' daily living.

The overall VHI and VoiSS score, as well as the percentage change between, pre to post-intervention score, and scores on the individual subscales of the VHI and VoiSS can be important for assessing treatment options and treatment outcome.

In the present study, the total score for "VHI" was 120 while that for "VoiSS" was 172. The mean of scores of "VHI" of all the 50 patients before treatment was 89.7 which was reduced to almost half, i.e., 49.96 after respective treatment of the voice disorder.

Similarly, the mean of pretreatment VoiSS scores of all the 50 patient was 119.28, that reduced in posttreatment duration to 63.16.

In both the VHI and VoiSS, the results were similar and highly correlated, and the comparison did not favor any of the scale more for evaluation purpose.

For example, if a patient whose VHI or VoiSS score is indicative of the higher degree of handicap, a more aggressive treatment option may be more appropriate (i.e., surgery versus therapy).

In our study, variable methods of treatment were provided to the patients according to their disorders. For example, patients of pharyngitis, laryngitis, bronchial asthma, and globus wer e treated by medical treatment along with speech therapy while patients of puberphonia, vocal cord palsy, vocal cord polyp, vocal cord nodules, and vocal cord papilloma were treated by surgery, i.e., microlaryngeal surgery or thyroplasty followed by speech therapy. Patients of ca rcinoma larynx were treated either by surgery or radiochemotherapy alone or by combined approach according to the stage of a disease. Patients in which laryngectomy was done or those who were unable to complete the questi onnaire after surgery were excluded from the study.

The present study adds information regarding how VHI and VoiSS score relate to the degree of handicap a patient experiences as a result of their voice disorders. These scores also help the clinician and the patient providing additional information when weighing treatment options.

While comparing the pre- and post-intervention scores of VHI or VoiSS, we can conclude that how much improvement can occur in the quality of life of the patient after the treatment of the voice disorders. The more is the difference between pre and post intervention VHI and

VoiSS score; more is the improvement in the quality of life of the patient.

CONCLUSION

In the present study, the results of both VHI and VoiSS were similar and highly correlated, and the comparative study did not favor any of the scale more for the evaluation purpose.

Thus the study showed that both VHI and VoiSS are important tools to assess the disability caused by voice disorders and also very useful to measure the functional outcomes of medical, behavioral and surgical treatment of voice disorders. These scores help the clinician and the patient to compare various treatment options. The improvement in the quality of life of the patient as well as the effectiveness of various voice intervention can be assessed using these scales.

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