CORRELATION OF VOICE HANDICAP INDEX SCORES WITH CLIENT PERCEPTIONS OF SEVERITY IN MALES V/S FEMALES WITH VOICE DISORDER

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Abstract

Voice is the mirror of personality, and an indispensable ingredient for effective communication. A person with dysphonia would thus be affected functionally and emotionally. The Voice Handicap Index (VHI) measures these effects of a voice disorder. The present study aimed at making the VHI more usable in India, and finding the correlation of VHI scores with clients' self-perceived severity of the voice disorder. The VHI was translated to Hindi and Marathi languages. Back-translation of these versions and test-retest reliability was done before administering them to one of two groups (Hindi and Marathi) of 30 typical individuals. 11 males and 21 females with dysphonia were then given the VHI in their language of choice, and finally asked to rate the severity of their disorder. Spearman's rank correlation coefficient and t-test were used. Frequency of distribution of scores was also analyzed for the entire sample of 92 individuals. The mean VHI scores of the normative sample and pathological samples were significantly different. Test-retest reliability was >0.9 for both Indian versions. There was a moderate correlation between VHI scores and client perceptions of severity. It was moderate for males, poor for females, and poorest for working women. In cases with a discrepancy between VHI scores and self-perceived severity, at least one subscale score correlated well with the client's perception. The results suggest that Hindi and Marathi versions may regularly be used for assessment. Correlation analysis shows that persons with dysphonia give more priority to only one of the three aspects of the disorder (functional, physical, emotional). Males view their problem more holistically while females tend to underestimate their problem, perhaps a salient characteristic of the Indian woman. The study was a pilot attempt at validating the VHI in Indian languages, and gave valuable information for assessment and therapy planning.

Key words: Voice Handicap Index, Indian, perception

Voice is an attribute which is unique in every individual. It is one of the major characteristics which distinguish one individual from another. Naturally, it holds an important position in a person's life, and in case it is disrupted in any way, it directly or indirectly affects the person functionally, socially and emotionally. This explains why persons with dysphonia report symptoms of psychosocial distress as a direct consequence of their dysphonia. These consequences of dysphonia are measured using quality-of-life measures.

Quality of life measures provide insight into what the person has experienced and recognize the centrality of his/ her point of view. Typically, they have been in the form of questionnaires. An important contribution to these was the development of a standardized self-assessment ordinal scale, the Voice Handicap Index (VHI) by Jacobson et al. (1997). The VHI (Jacobson et al., 1997) is a question and answer tool to subjectively assess the amount of handicap a voice disorder is causing. It consists of 30 questions representing several different problems in speaking situations, and the person has to rate the frequency of the problem on a 5- point scale where: 0=never; 1=almost never; 2=sometimes; 3=Almost always; 4=always. Each question tests one of three aspects- functional, physical and emotional. The letters "F, P, E"

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respectively precede each question number. There are thus three subscales and 10 questions belonging to each subscale.

Thus a VHI score form 0-30 represents a low score, and most likely there is a minimal amount of handicap associated with the voice disorder. A score of 31-60 represents moderate handicap, as is seen in people with vocal fold injuries, nodules, polyps or cysts. A score from 61-120 represents a serious amount of handicap due to a voice problem, and is often seen in patients with new onset vocal cord palsy, vocal cord scarring, etc. (Jacobson et al., 1997). The VHI has various uses ranging from assessing the impact of voice disorders, to measurement of functional outcomes and treatment efficacy (Rosen, Murry, Zin, Zullo & Sonbolian, 2000) in behavioral, medical and surgical treatments of voice disorders.

In Jacobson et al.'s (1997) study, an 85-item version of the VHI was administered to 65 consecutive patients seen at the Voice Clinic at Henry Ford hospital. The data was subjected to measures of internal consistency reliability and the 85-item version was reduced to a 30-item questionnaire, which had strong internal consistency reliability and test stability. Construct validity though was not fully evaluated here. Relationships between functional, emotional and physical subscales were moderately strong with Pearson product-moment correlation coefficients ranging from 0.70 to 0.79. In the same study, relationship between VHI score and voice disorder severity was studied. Results indicated a moderate relationship between the two self-assessment measures.

This was followed by studies comparing the VHI to other quality of life measures. Benninger, Ahuja, Gardener and Grywalski (1998) compared a general quality-of-life measure- Medical Outcomes Trust Short Form 36- Item (SF-36) and a voice-specific instrument, i.e., the VHI. They found that the two correlate with each other in the domains of social functioning, mental health and role function-emotional.

VHI scores have also been compared to other subjective voice-related measures like the Voice Symptom Scale (VoiSS) by Wilson, Webb, Carding, Steen, MacKenzie and Deary (2006), and Voice Related Quality of Life measure (V-RQOL) by Portone, Hapner, McGregor, Otto and Johns (2006). Portone et al. (2006) concluded that the VHI and V-RQOL are highly correlated but not interchangeable measures. Murry, Medrado, Hogikyan and Jonathan (2004) had explored the relationship between trained listener ratings of voice quality and patients' ratings of V-RQOL, and found that there is a moderate correlation, though each scale appears to provide unique information.

Krichke et al., (2005) tried to find if changes in Health Related Quality of Life (HRQL) depend on the kind of voice disorder, and the gender of the person, but concluded that they did not. Although it is perceived that women tend to perceive a disease in a different manner than do men, this study shows no significant difference in HRQL between men and women.

VHI results were also correlated by some researchers, with other tools like Voice Lab Measurements (Hsiung, Pai & Wang, 2002; Woisard, Bodin, Yardeni & Puech, 2006), and specific acoustic measures (Wheeler, Collins & Sapienza, 2006). These studies reveal poor correlation between VHI and objective/ acoustic parameters and conclude that they give independent information in practice.

The VHI has also been used to monitor treatment efficacy for voice disorders (Rosen et al., 2000). Roy et al., (2002) used the VHI as one of the measures to quantify benefit with voice amplification v/s vocal hygiene instruction for teachers with voice disorders. They also used the severity rating scale that has been used in the present study. In contrast to VHI results, data from the severity rating scale suggest the vocal hygiene group did not perform significantly better than the control group. The amplification group showed a decrease in mean VHI scores in contrast to the control group showing increases scores. Similar studies by other authors (Behrman, Rutledge, Hembree & Sheridan, 2008; Hall, 1995; Wolfe, Long, Youngblood, Henry & Olson, 2002) have used the VHI as one of the means to measure a dependent variable.

Certain specific populations have also been studied in detail using the VHI. Smith, Taylor, and Mendoza (1998) studied functional impact of nodules using the VHI, and found that the incidence of voice problems was more in females, and that females were affected more in areas like work and communication due to their voice disorder. A recent

retrospective study along similar lines was by Bouwers and Dikkers (2009) who concluded that the VHI was a good reflection of the psychosocial impact of voice disorders. The VHI has extensively been used to study the population of singers (Murry, Zschommler & Prokop, 2009; Rosen & Murry, 2000). Wingate et al. (2005) studied the population of older patients with adductor spasmodic dysphonia with reference to the VHI. Other populations that have been studied using the VHI include laryngectomees (Kazi et al., 2007) and teachers (Kooijman, Thomas, Graamans & De Jong, 2007) and student-teachers (Thomas, Kooijman, Donders, Cremers and De Jong (2007). However, there was no normative data available to describe expected VHI scores from adults with healthy voices. Hence Behrman et al. (2008) considered the upper limit of 11.5 as a cut off for a VHI score expected from a person without a voice disorder.

The VHI has been translated and validated in languages like Portugese (Guimaeaes & Aberton, 2004) and Hebrew (Amir, Ashkenazi, Leibovitzh, Michael, Tavor & Wolf, 2006). It has also undergone modifications, a recent one being the Pediatric Voice Handicap Index (pVHI) (Zur, Cotton, Kelchner, Baker, Weinrich & Lee, 2007). However, no study regarding the translation and validation to Indian languages has been published till date. The VHI would be much more useful clinically if translated and validated in Hindi and Marathi, especially Hindi being the national language of India. Thus there may be a large portion of the population of India that might not know English, but would be well-versed with these languages.

Hence the present study was aimed at making the VHI more usable in India and also measuring the correlation of VHI scores with clients' perception of severity of the voice disorder. The extent of correlation has further been compared across males and females and also across males and working women in particular.

Methods

Participants

The sample for the study included:

- Two groups of 30 symptom-free (as regards voice problems) age matched adults (21-60 years) who were proficient in Hindi (Khariboli dialect) and Marathi languages respectively who consented to participate in the study;
- A purposive sample of 32 persons with dysphonia (11 males, 21 females) referred for voice therapy from the Otorhinolaryngology department of B.Y.L. Nair Hospital who were included in the study after viewing their Indirect Laryngoscopy findings and obtaining their informed consent. Only persons with hyper functional dysphonia and dysphonia due to neurological causes were included in the study. Subjects above 60 years and below 21 years of age were excluded, as voice anomalies in these age groups may be attributed to organic changes- hormonal, mucosal, or changes due to aging. The time period between age of onset of dysphonia and initiation of therapy was not held as a control variable for two reasons. Firstly, for two individuals with identical time elapsed between appearance of symptoms and therapy, their VHI scores may vary. Secondly, the study dealt with comparing correlation coefficients (and not absolute VHI scores) of males and females with dysphonia. However all the data was collected at the onset of therapy since therapy was a variable that could influence the correlation between VHI scores and client perceptions of severity.

Tools and procedure

The tools used were the Voice Handicap Index (VHI) (Jacobson et al., 1997) and its translated versions whose equivalency to the original English version was established as described below.

The VHI was first translated to Hindi (Khariboli dialect) and Marathi languages by native speakers of those languages who were also well versed with English. Back translations were then performed by a clinical psychologist and a social worker, both of whom were experienced translators. On back-translation, statements 11, 17 and 23 underwent minor grammatical changes. However, all the statements conveyed the same meaning as the original English version. Each of these two translated versions was administered to one of the two groups (Hindi and Marathi) of 30 symptom-free adults. To check the test-retest reliability, the VHI was administered twice to 7 randomly selected subjects each in Hindi and Marathi (5 symptom-free individuals and 2 persons with dysphonia).

Once the equivalency of the translated versions was thus established, all the three versions of the

VHI were then used for collection of data from persons with dysphonia.

The persons with dysphonia were given the VHI in a language which they were most comfortable with, out of English, Hindi and Marathi. They were given the following instructions:

"This questionnaire helps us to see the difficulties you face due to your voice problem. Answer the questions by marking the appropriate option, to let us know how frequently you encounter that situation. (An example was given using the first question.) Rate the frequency of the situation on a five-point scale where 0=never; 1=almost never;

2=sometimes; 3=Almost always; 4=always."

	Marathi	Hindi
Overall test-retest reliability	0.96	0.92
Functional subscale	0.91	0.95
Physical subscale	0.87	0.84
Emotional subscale	0 94	0 98

Table 1: Reliability coefficients

Every question was read aloud and the client's response noted. The person was assured that there was no time limit. If the clinician had any doubt about the client having answered correctly, the client was asked whether he / she was sure they encountered that particular situation that frequently/ rarely. After filling up the questionnaire, the person was asked to self-rate the severity of his/ her voice disorder on a 4-point scale where: 0=normal; 1=mildly impaired; 2=moderately impaired; 3=severely impaired. The method of instruction was same as used in Jacobson et al., (1997).

The person was asked to rate, in his/ her opinion, how severe the problem was, on this scale. No specific instruction was given regarding the meaning of "severity".

Scoring and statistical analysis

The score obtained on VHI was put into one of the three categories- mild (0-30), moderate (31-60) and severe (61-120). These categories were then given ranks, such that: 1=mild, 2=moderate and 3=severe. The last question too yielded a rating of "mild", "moderate" or "severe" for all the persons with dysphonia. Spearman's rank correlation coefficient was computed for the entire sample (N=32) of persons with dysphonia. Separate correlation coefficients were also computed for males (N=11) and females (both working women and housewives, N=21), and compared. Further the correlation coefficient for only working women (N=14) was computed and was compared with that of males. The data was analyzed using the GraphPad Instat software.

Results

Indian versions of the VHI

As stated above, the back-translations yielded questions which conveyed the same meaning as the original English version. The test-retest reliability (using Pearson's Product-Moment correlation coefficient) was good for both the Hindi and Marathi versions, for the total and subscale scores. The precise values are given in Table 1.

The mean VHI scores of the normative samples in Hindi and Marathi were compared to the mean VHI scores of the dysphonia samples in the respective languages that were obtained in the second part of the study. On applying the unpaired t-test, there appeared to be a significant difference between the means of the normal and pathological population. The means and SDs (standard deviations) are seen in Table 2.

Correlation of VHI scores and self-perception

When Spearman's rank correlation coefficient was applied, the correlation between the clients' perception of voice disorder severity and VHI scores appeared to be 0.41, implying moderate correlation. The correlation coefficient for males was 0.65 (moderate correlation) while that for females was 0.21 (poor correlation). When only working women were included for analysis, the correlation was found to be very poor, i.e. 0.018.

To investigate the nature of the relationship between VHI scores and self-perceived severity, the means of total VHI scores (ranks) and self-perception (ranks) were compared. The trend seen was that in males the mean rank of the VHI scores was approximately the same as that of self-perceived severity, but for females, whether it was women in general or working women, the mean rank of VHI scores was always higher.

On observing individual data, it was seen that in persons in whom there was a discrepancy between VHI scores and self-perceived severity, at least one of the three subscale scores was seen to correlate well with the client's perception of severity. (For the

purpose of this comparison, the subscale scores too were categorized such that 0-10=mild, 11-20=moderate, 21-40=severe, in proportion with the categories of the total scores.)

Finally, an analysis of the frequency of distribution of the scores was also done which revealed that

- Ratings of symptom-free individuals were frequently '0' or '1', while those in patients range from '0-5'.
- Most symptom-free individuals rated statement F-1 and F-3 (which pertained to the voice not being heard in general and in noise) as '1'.
- More than 50% of the persons with dysphonia answered "never" for questions E-9, E-25, P-26 and E-27 to E-30, most of which pertain to the extreme effects of voice problems, e.g.: "My voice 'gives out' on me" or "My voice makes me feel handicapped".
- Patients with vocal cord palsy gave most ratings in the range of 2-4, while those with dysphonia due to vocal abuse gave most ratings on the range of 1-3.

Discussion

The fact that the meaning of the statements was unchanged in the back-translations and that the test-retest reliability was good suggests that the Indian versions may be appropriate for use clinically.

Further a significant difference in the means of the normative and pathological samples for both the Indian versions of the VHI implies that the questionnaire even in its Indian version, is correctly measuring what it is intended to measure. The means of the normative sample are also well within the range of 0-11.5 suggested by Behrman et al. (2008). Thus, the study may later be replicated with a larger sample size to validate the VHI in Indian languages, following this preliminary attempt.

None of the persons with dysphonia selected the option of "normal" to describe their voices, suggesting that they all were aware of their voice problem. The clients' perception of severity of the voice problem correlates moderately with the VHI, a finding that agrees with those of Jacobson et al. (1997) but disagrees with Carding (2000) who stated that there is a good correlation between the two measures.One reason for the moderate correlation may be that the person might be giving a higher priority to one of the three factors- functional, physical or emotional, to judge his problem. Between the two measures, at least one subscale score correlates well with self-perception of severity. In this case, giving the client a holistic view of his problem could be one of the goals in therapy. Another reason could be that there are other factors at play which are not included in the VHI, e.g. personality, status within the family and society, etc. Both these possibilities should be carefully explored in therapy.

These factors which may influence a person's self-perception of severity of the voice problem may work both ways, i.e., may worsen his/ her impression of the problem or make it better than what it actually is. Some of these factors may be:

- Biases due to inadequate information obtained from the wrong sources
- Occupational demands, i.e., whether or not the voice needs to be used extensively at the workplace
- Social status and power: This refers to the importance or status given to the person within the family or within society. E.g.: An influential person may feel that his/ her voice problem is more severe as against a person perceived as insignificant by society.
- Personality traits like introversion or extroversion will determine the degree to which a voice problem will limit functioning. Further, an introvert may also want to keep back information while filling up the questionnaire.

Marathi				Hindi			
Normative sample		Dysphonia sample		Normative sample		Dysphonia sample	
Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
6 16	5 23	46 64	24 42	5 73	5 53	45 6	16 96
t =6.14 with 13 degrees of freedom				t =7.30 with 9 degrees of freedom			

Table 2: Means and SDs of VHI Scores of normative and dysphonia samples

- Significant other people's opinion of the person's problem may also influence his/ her self-perception.
- Vulnerability of the person will determine the extent to which he/ she is influenced by other people's opinions.
- Perception of the voice problem in contrast to others: This means that if the person with a voice problem is surrounded by a lot of people with voice disorders or voices with a poor quality, his / her self-perception of the problem will be different from what it would have been, had he/ she been surrounded by people with excellent voices.

Finally, the person's literary skills and understanding may also lead to a poor correlation between the two measures, as the answers depend on what meaning is derived out of the question. Thus poor literary skills may lead to a wrong interpretation of the statement that is read.

The correlation coefficients show that males' perception of the severity of the disorder may be slightly more holistic and rational than females in general and working women, in whom the correlation of VHI scores and self-perceived severity is poor. Also, means of ranks obtained from VHI scores were always higher than means of ranks given to self-perceived severity for both the groups of women (all women and working women). This finding suggests that most Indian women tend to underestimate their problem, and hence perceive the severity as less in spite of the large number of limitations in function that the VHI might actually show.

Finally the analysis of the frequency distribution of scores reveals that:

- Most symptom-free individuals too face difficulties with volumes of their voices.
- The rating of "never" for questions 9 and 25-30 may either mean that most persons with dysphonia do not face so severe a problem, that they have not come to terms with it, or that they do not wish to admit to strong statements like feeling "embarrassed, angry, incompetent, or ashamed" due to their voice problems.
- Persons with vocal cord palsy face more severe problems, and thus higher VHI scores than those with hyper functional dysphonia, a finding that supports those of Jacobson et al. (1997).

An interesting fact which was also noted in a study by Guimaeaes and Abberton (2004) was that responses to statements P-5 (calling people around the house) and P-6 (use of a phone) would differ not only due to the severity of the voice problem but also due to a person's socioeconomic status. In fact, these are the only two questions where "because of my voice" is not stressed.

These findings on frequency distribution suggest that in future, the VHI may well be modified. Statements that elicit high ratings even in symptom-free individuals; or those that depend on socio-economic status, etc. may be excluded. The VHI could also be made more sensitive to the factors other than the voice problem that exacerbate or reduce the limitations in function, in line with the recent International Classification of Functioning, Disability and Health (WHO, 2001).

Conclusion

The VHI is already an invaluable tool in the field of voice therapy and research. Its translation to Indian languages would make it even more applicable and useful to the vast Indian population. Its moderate correlation with client self-ratings of severity leads to many possible conclusions. Firstly, that the person is probably giving relatively greater priority to one of the areas affected by the problem, an important clue for the clinician for where to start therapy in order to have a well-motivated client. Secondly, that there might be areas the person is unaware of, or does not want to look at (i.e., underestimation, especially in case of women). In such a case it would help to counsel the client to come to terms with these areas and deal with the problems.

One might also want to explore and try to modify the factors discussed above (e.g. excessive vulnerability) which might influence self-perception of the problem. This, in other words, implies that the VHI has scope for expansion to include these "other relevant factors" that contribute to the problem.

The study also opens doors to future research with a larger sample size, or controlling for the factors like socioeconomic status, age, occupation, etc. which may yield information specific to certain sub-groups of people. Validation of the VHI in other Indian languages may also be considered.

Finally, the study supports the fact that a subjective measure or a discrepancy in two findings does not complicate results, but gives us valuable new insights that can help us solve the problem more efficiently, ultimately leading to a better prognosis.

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