

## Validation of the Filipino Voice Handicap Index-10 (FVHI-10)

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**Rationale/Objective:** The Voice Handicap Index (VHI) is a self-assessment tool that evaluates the patient's reaction and perception to a vocal disorder. This study aimed to establish, validate and assess the reliability of the Filipino translation of the Voice Handicap Index 10 (FVHI-10).

**Methods:** The VHI-10 was translated and adapted to the Filipino language and culture with the help of the Sentro ng Wikang Filipino- University of the Philippines Manila. A self-assessment of voice quality and FVHI-10 were performed by the patients and their GRBAS scale scoring was rated by a speech language pathologist. The Spearman's correlation between the FVHI-10 and the self-assessment and GRBAS scale scores was obtained to test for validity. To evaluate the reliability of the FVHI-10, testing through determining internal consistency was conducted through the use of Chronbach  $\alpha$  coefficient, inter-item correlation, item-total correlation and Cronbach  $\alpha$  coefficient if tool item was deleted.

**Results:** Fifty five individuals participated in the study (29 males, 26 females, age range: 30-55 years) with the diagnosis of voice disorder based on complaints of hoarseness or dysphonia and laryngoscopic findings. Convergent validity was confirmed with moderate to strong correlation between the FVHI-10 and self-assessment ( $r=-.893, p<.05$ ) and GRBAS scale scores ( $r=.427, p<.05$ ). Reliability as measured through internal consistency was confirmed (Cronbach  $\alpha=.874$ ) (average  $p<.5$ ) (corrected item-total correlation $>0.3$ ) (average inter-item correlation $=.15-.85$ ).

**Conclusion:** The FVHI-10 was determined to be a valid and reliable instrument that can be utilized in the assessment of Filipino patients with voice disorders.

**Key words:** Dysphonia, voice disorder, reliability, validity, voice handicap index-10, quality of life, Philippines

Traditional voice disorder treatment and assessment protocols center on forms of objective acoustic

measurement, primarily focusing on components of voice production.<sup>1,2</sup> However, these measures do not take into account vocal function from the perspective of the patient, as well as the level of handicap experienced as a result of the disorder.<sup>2,3</sup> This handicap refers to the inability to perform certain tasks and the resulting social, economic and environmental disadvantage that results from this impairment.<sup>1</sup>

Nowadays, physicians have learned to manage patients in a more holistic approach, taking into consideration not just the biological and physiological aspects of the disease but the patient's emotional and functional well-being as well.<sup>4</sup> This involves the assessment of the effect an individual's perception of the impact of the voice disorder has on their overall vocal functions. Thus, various self-assessment tools evaluating the patients' reaction to their disease have been developed. Tools assessing patient-based, voice-specific outcome measures provide important information on how voice problems and limitations affect the quality of life of patients. Voice self-assessment tools provide important data not only for the diagnosis of the disease, but also for determining what intervention process would best suit the given situation, and monitoring results after interventions have been done.

In 1997, Jacobson, et al. developed a method of measuring voice handicap called the Voice Handicap Index.<sup>5</sup> This self-assessment tool is composed of 30 items divided into 3 domains: the functional domain, which involves the impact of the voice disorder in

daily activities; the emotional domain, which involves the feeling of the patient in regards to their disorder; and the physical domain, which involves the physical manifestations of the voice problem.<sup>6</sup> The overall goal of this assessment was to quantify the psychosocial consequences of voice disorders.

In 2004, a shorter version of the Voice Handicap Index was developed. Rosen, et al. (2004) studied the ten most clinically relevant aspects of the longer version of VHI, preserving reliability of the same self-assessment tool in the evaluation of voice disorders.<sup>1</sup> Adaptation of clinical tools such as the VHI in local language is a topic that should be considered.<sup>7</sup> Issues arise in the reliability and standardization of such assessment tools when translated into another language or dialect, as differences in standards for dialect or language and cultural knowledge could impact results, affecting the measurement of intended constructs.<sup>8</sup> Appropriate criteria must be met in the assessment and implementation of these tools in other languages. This would involve the etic translation, language and cultural adaptation taking into account the cultural differences that may alter the content and administering of the assessment, and assessment of psychometric properties of the tool.<sup>7,9</sup>

A self-assessment instrument translated to a language or dialect more familiar to the patient will give a more insightful evaluation of the patient's condition. The earlier validated version of the 30-item VHI by Umali and Hernandez (2006), which was translated to Filipino by the *Komisyon ng Wikang Filipino, Divisyon ng Pagsasalangwika* (Commission of Filipino Language, Division of Translation) has not been often used because it is quite lengthy and redundant.<sup>10</sup> The VHI-10 has already been translated to many languages such as Spanish, Portuguese and Chinese,<sup>11,12,13</sup> but a valid translation in Filipino has yet to be created. The validation of the shorter 10-item version in Filipino would allow for a faster and more focused assessment of the patient's voice problem. The development of a culturally valid tool from already-established assessment tools such as VHI-10 allows for competent assessment, planning and intervention from a measure that has already been established and is being utilized in other countries.<sup>14</sup>

The goal of this study is to establish, validate and assess the reliability of the Filipino translation of the

Voice Handicap Index 10 (VHI-10) as an assessment tool for initial evaluation and assessment of patients of voice disorders.

## Methods

The study protocol was approved by the Institutional Research Ethics Board. All participants signed the informed consent form before participating in the study. Patients age 19 years old and above with complaint of hoarseness or dysphonia that can read and understand the Filipino language were recruited from the Ward 10 Videostroboscopy Room and at the Out-patient Clinic, Department of Otolaryngology-Head and Neck Surgery of the Philippine General Hospital- University of the Philippines Manila.

Using item-to-respondent ratio of 1:5, a sample size of a minimum of 50 participants was deemed sufficient for this validation study.<sup>15</sup>

The VHI-10 was translated and culturally adapted to the Filipino language (Table 1) with the help of the *Sentro ng Wikang Filipino*- University of the Philippines Manila. Back translation to English was conducted by a group of randomly selected individuals (N=3), with one being drawn each from a pool of patients, residents and consultants of the department, to check the faithfulness to the original questions at varying levels of expertise. The primary evaluation of the questionnaire was performed by 20 random participants that were selected from a separate pool of patients. These individuals performed the Filipino VHI-10 (FVHI-10) in the presence of the investigator. Their comprehension of each question was discussed with the investigator. The questionnaire validation was conducted once satisfactory responses had been gathered.

After a detailed explanation of the study, the participants were asked to sign the informed consent forms (in Filipino). All participants underwent laryngoscopy as part of standard clinical diagnostic examination to check for lesions in the laryngeal complex as well to assess vocal cord mobility. Initially, they were asked to do a self-assessment of their voice quality based on a five-point scale: 0- poor / hindi kaaya-aya, 1- fair / medyo hindi kaaya-aya, 2- good / medyo kaaya-aya, 3-very good / kaaya-aya, at 4- excellent / lubos na kaaya-aya.

**Table 1.** GRBAS score and questionnaire FVHI-10, UP-PGH, 2023.

Participant No: Age/Sex: Work: Diagnosis:					
<b>Scoping findings:</b>					
<b>GRBAS Score:</b>					
<b>Paano mo isasalarawan ang kalidad ng iyong boses?</b>					
0= hindi kaaya-aya					
1= medyo hindi kaaya-aya					
2= medyo kaaya-aya					
3= kaaya-aya					
4=lubos na kaaya-aya					
<b>Filipino Voice Handicap Index 10</b>					
Basahin and sitwasyon at bilugan ang numero na katumbas sa iyong nararanasan.					
0= hindi            1= halos hindi            2= minsan            3= madalas            4= palagi					
F1 Nahihirapan ang mga tao na pakinggan ako dahil sa aking boses	0	1	2	3	4
F2 Nahihirapan ang mga tao na maintindihan ako sa maingay na kuwarto.	0	1	2	3	4
F8 Nalilimitahan ang personal kong buhay at pakikisalamuha ko sa iba dahil sa aking boses.	0	1	2	3	4
F9 Pakiramdam ko napag-iiwanan ako sa mga pag-uusap dahil sa aking boses.	0	1	2	3	4
F10 Nawawalan ako ng pagkakakitaan dahil sa problema ko sa aking boses.	0	1	2	3	4
P5 Pakiramdam ko parang kailangan kong pilitin na makapaglabas ng boses.	0	1	2	3	4
P6 Pabago-bago ang kalinawan ng boses ko.	0	1	2	3	4
E4 Nababahala ako sa problema ko sa aking boses.	0	1	2	3	4
E6 Pakiramdam ko mayroon akong kapansanan dahil sa aking boses.	0	1	2	3	4
P3 Tinatanong ako ng mga tao, “Anong nangyari sa iyong boses?”	0	1	2	3	4

The FVHI-10 questionnaire was then answered by each patient.

After answering the questionnaire, each participant was asked to read a standard set of sentences (Table 2). Each participant’s voice was recorded by the investigator using the Samsung Voice Recorder mobile application (Samsung Electronics Co., Ltd., Korea) and all recordings

were submitted to a speech language pathologist for voice quality evaluation using the GRBAS scale. The GRBAS Scale is an auditory perceptual evaluation method for dysphonia used by otorhinolaryngologists and speech language pathologists. This scale is used as a standardized form of voice assessment. Severity of hoarseness is quantified under G (grade), which represents

overall voice quality; R (roughness), audible impression of irregular glottic pulses and abnormal changes in pitch; B (breathiness), audible turbulent air leakage through incomplete glottis closure; A (asthenia), weakness in phonation or hypokinetic/ hypofunctional voice; and S (strain), audible impression of excessive force or vocal tension associated with phonation. The speech language pathologist was kept unaware of the FVHI-10 total score as well as the laryngoscopic findings of the participants. A comparison between the FVHI-10 score and the GRBAS scale score was then done using Spearman correlation.

**Table 2.** Standard text in Filipino used in GRBAS assessment, UP-PGH, 2023.

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- Nasugatan ang paa ng aso.
- Bumili si Eliseo ng karne.
- Isang taon na akong nakatira sa Makati.
- Nakakatulog ka ba ng husto sa oras?
- Masarap ang lutong ulam ni Lulu.
- Masarap ang pasalubong ni Pepe.
- Pumasok ang babae sa loob ng simbahan.
- Natapos ang pagsusulit kaninang tanghali.
- Malakas ang patak ng ulan kahapon.
- Ganito ang pagguhit ng bilog.

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All completed FVHI-10 questionnaires were filed in envelopes for encoding. All voice recordings and the soft copy database in Microsoft Excel file were stored in a hard drive which was accessible only to the investigators.

**Statistical Analysis**

Statistical Package for the Social Sciences, version 17.0 (SPSS, Inc., Chicago, IL) was the official software used in this study for statistical analysis. The confidence interval (CI) was set at 95%.

*Validity Assessment*

Validity of the FVHI-10 tool was tested by correlating the total scores obtained with the GRBAS scale score and the personal assessment of overall voice quality, respectively through the Spearman r test. The ranges of correlation were as follows: a value of <.3 was poor; .3-.5 was moderate, and >.5 was a strong correlation.

*Reliability Assessment*

Cronbach’s alpha is a form of measurement of internal consistency through the measuring of the homogeneity of a group. The value of this function is suggested to be desirable at 0.70 where higher Cronbach’s alpha values indicate consistent response values of an individual across a given tool.<sup>16</sup> Internal consistency can also be measured with inter-item correlations, where each individual item correlates with the overall tool and that items within the tool are positively correlated.<sup>17,18</sup> Inter-item correlation values are said to be most viable between .15 and .50 as less than the former value would indicate broadness, while more than the latter value is indicative of redundancies and non-discriminating items on the tool, where something unique is not being contributed to the construct.<sup>19,20</sup> Item-total correlation determines the correlation between the item score and the total score of the tool.<sup>21</sup> A value greater than 0.3 for this function indicated that the item possessed a significant relationship to the overall scale.<sup>22</sup> Criteria for the measurement of internal consistency are detailed in Table 3.

**Table 3.** Internal consistency criteriaa, UP-PGH, 2023.

Reliability and Validity Statistics	Criteria for a Good Tool
Cronbach’s alpha	Greater than or equal to .70
Average inter-item correlation	Between .15 and .50
Range of Cronbach’s alpha if item deleted	Deleting any item would decrease the alpha
Range of corrected item-total correlations	Greater than or equal .30

<sup>a</sup>Adapted from Paulsen and BrckaLorenz (2017). *Internal Consistency*. FSSE Psychometric Portfolio

**Results**

**Characteristics of Participants**

Fifty-five participants with a chief complaint of hoarseness were included in the study. From this, 29

were males (53%) and 26 were females (47%). Ages ranged from 19 to 82 years old with majority of the participants coming from the 30-55 years old age range or the working population. Among the 55 participants, 19 were unemployed. From the employed group, six possessed a voice-related line of work: 3 were teachers and 3 were sales personnel. The top three diagnoses confirmed by laryngoscopic findings were vocal cord paralysis, vocal cord nodules and laryngopharyngeal reflux.

**Validity Assessment**

The correlation among the two voice handicap tests with the FVHI-10 are depicted in Table 4. A strong negative correlation between the Filipino FVHI-10 score and the personal assessment of overall voice quality was observed ( $r = -.893$ ,  $P < .05$ ) (Table 4) which indicates that as the FVHI-10 score increased, the overall voice quality assessment score decreased. A moderate positive correlation between the FVHI-10 and GRBAS scores was also observed ( $r = .427$ ,  $P < .05$ ) (Table 4), indicating that as the FVHI-10 scores increased, GRBAS scores also increased.

**Table 4.** Correlation between voice handicap tests and FVHI-10, UP-PGH, 2023.

Voice Handicap Tests	Spearman Correlation Between Scores	
	r	p
Personal Assessment of Overall Voice Quality	-.893	.000
GRBAS	.427	.001

**Reliability Assessment**

*Cronbach's Alpha*

The value for Cronbach's alpha was  $\alpha = 0.874$ , indicating a high degree of internal consistency for all items in the Filipino Voice Handicap Index 10 test.

*Inter-item Correlation*

The inter-item correlation matrix, which depicts the intercorrelation between two items in the tool, is displayed in Table 5. The values of the average inter-item correlations indicate an acceptable level of intercorrelation between tool items (range = 0.15-0.50).

*Corrected Item Total Correlation*

Table 6 depicts the corrected item-total correlation and the range of each item's Cronbach's alpha if each item were removed. The latter function's value obtained in each item if they were to be deleted are all within an acceptable range ( $>0.7$ ). Despite this, it must be noted that the removal of items F10 (My voice problem causes me to lose income / *Nawawalan ako ng pagkakakitaan dahil sa problema ko sa aking boses*) and P6 (*The clarity of my voice is unpredictable / Pabago-bago ang kalinawan ng boses ko*) slightly increased the value of the Cronbach's alpha set at 0.874.

On the other hand, all items meet the criteria for corrected item-total correlation (greater than 0.30). Of these items, F10 and P6 were the least correlated, with the other items possessing a value greater than 0.50.

*FVHI-10 Scores*

The FVHI-10 mean scores and standard deviation for each of the ten items are depicted in Table 7. The mean  $\pm$  standard deviation VHI scores of the participants were  $2.10 \pm 1.36$ ,  $2.43 \pm 1.52$ ,  $1.81 \pm 1.74$ ,  $1.53 \pm 1.65$ ,  $1.05 \pm 1.62$ ,  $2.28 \pm 1.64$ ,  $2.50 \pm 1.35$ ,  $2.50 \pm 1.69$ ,  $1.79 \pm 1.86$ , for items F1, F2, F8, F9, F10, P5 and P6, E4, E6 and P3, respectively.

**Discussion**

The VHI-10 is a valid and reliable tool in assessing the impact of a voice disorder on the perceived affectivity and vocal ability of a patient.<sup>13</sup> The two attributes being evaluated in this study would be validity and reliability. Validity refers to the capability of the tool to measure a desired construct while reliability refers to how much of the data that has been obtained is trustworthy in the form

**Table 5.** Range and average values of inter-item correlation matrix of FVHI-10, UP-PGH, 2023.

Item in VHI-10	Item in FVHI-10	Item value	Range of Inter-Item Correlation (ρ)	Average Inter-Item Correlation (ρ)
My voice makes it difficult for people to hear me	Nahihirapan ang mga tao na pakinggan ako dahil sa aking boses	F1	.17-.65	.43
People have difficulty understanding me in a noisy room	Nahihirapan ang mga tao na maintindihan ako sa maingay na kuwarto	F2	.19-.65	.39
My voice difficulties restrict my personal & social life	Nalilimitahan ang personal kong buhay at pakikisalamuha ko sa iba dahil sa aking boses	F8	.20-.73	.47
I feel left out of the conversations because of my voice.	Pakiramdam ko napag-iiwanan ako sa mga pag-uusap dahil sa aking boses	F9	.23-.62	.5
My voice problem causes me to lose income	Nawawalan ako ng pagkakakitaan dahil sa problema ko sa aking boses	F10	.19-.23	.26
I feel as though I have to strain to produce voice	Pakiramdam ko parang kailangan kong pilitin na makapaglabas ng boses	P5	.13-.61	.42
The clarity of my voice is unpredictable	Pabago-bago ang kalinawan ng boses ko	P6	.07-.45	.27
My voice problem upsets me	Nababahala ako sa problema ko sa aking boses	E4	.30-.61	.44
My voice makes me feel handicapped	Pakiramdam ko mayroon akong kapansanan dahil sa aking boses	E6	.24-.62	.5
People ask, “What’s wrong with your voice?”	Tinatanong ako ng mga tao, “Anong nangyari sa iyong boses?”	P3	.07-.48	.36

**Table 6.** Item-total statistics of FVHI-10, UP-PGH, 2023.

Value of FVHI-10 Item	Corrected Item-Total Correlation	Cronbach’s Alpha if Item Deleted
F1	.64	.860
F2	.56	.865
F8	.69	.854
F9	.75	.849
F10	.37	.879
P5	.61	.861
P6	.39	.876
E4	.65	.857
E6	.75	.848
P3	.53	.867

**Table 7.** Mean and standard deviation data of the FVHI-10 among the participants, UP-PGH, 2023.

FVHI-10 items	Mean	Standard Deviation
F1	2.10	1.36
F2	2.43	1.52
F8	1.81	1.74
F9	1.53	1.65
F10	1.05	1.62
P5	2.28	1.64
P6	2.50	1.35
E4	2.50	1.69
E6	1.79	1.86
P3	2.69	1.56

of consistency and repeatability. This study established the validity and reliability of the FVHI-10 evaluation of voice disorders which is consistent with other studies evaluating the VHI-10 in other languages.<sup>11,23,24,25</sup>

A moderate correlation between the FVHI-10 and GRBAS score was observed ( $r=0.427$ ), indicating a sufficient convergent viability of the FVHI-10 in this regard. This is consistent with other studies which determined a high correlation between total VHI-scores and the overall severity resulting from GRBAS subscales.<sup>26</sup> The strength of the correlation can be attributed to the similarity in overall purpose between the two tests, with the former being used to assess the perception of the patient towards the impact of their voice disorder, and the latter being used to assess the severity of dysphonia.<sup>27</sup> A strong negative correlation ( $r=-.893$ ) between the FVHI-10 and the personal assessment of overall voice quality is observed, which indicates that a higher score achieved in the FVHI-10 normally results in a lower score on the self-perception of voice quality. The high Spearman correlation value also supports the convergent validity of the FVHI-10. Similar studies also utilizing the Spearman test to assess correlations between VHI other assessment tools yielded moderate to strong correlations.<sup>28,29</sup>

Cronbach's alpha served as the metric to assess the internal consistency of the FVHI-10. An  $\alpha=.874$  was obtained, proving the reliability of the tool. The items F10 and P6 that would increase the value of the Cronbach's alpha if they were to be removed indicate that their removal would even further improve the reliability of the test. These items could be evaluated for rewording or reformulation. The results of the average

inter-item correlation demonstrate acceptable values of interconnectedness between the items of the FVHI-10 (.15-.85), further supporting its reliability.

Results of the item-total correlation indicate that a linear correlation between each item and the total score exists. All items within FVHI-10 exceed the criteria needed for good internal consistency, contributing to the reliability of the tool.

Limitations to the study include the classification of participants based on variable tests rather than a generalized standard. The results of these tests are also impacted by the physical factors and emotional state of the patient during the time of testing as there are physical, emotional and functional aspects to voice handicap. The generalizability of the results is also limited by the sample size and selection criteria of the participants, which cannot be applied to other populations. The fluency of the participants in Filipino may also have impacted the results, as there may be differences in the levels of fluency in the language. These limitations are reflective of the difficulty in establishing a disorder assessment tool for specific organ function such as voice handicap, where there is no established concept of a "normal" voice, and there exists different perceptions as to what one's voice should be based on social and occupational use. Therefore, a valid tool in the assessment of voice disorders should take into account the varying conditions that influence a patient's assessment of handicap. In this regard, it can be recommended that the FVHI-10 can be used for this purpose.

Recommendations include further insight into the assessment of the FVHI-10 regarding aspects of the patient's demographic profile and functional well-being,

taking into account gender, age and occupation. Further analysis may also be conducted into the factorial structure which would study the grouping of the items into the functional, emotional and physical domains of the tool. Further reliability assessment may be performed through testing the validated FVHI-10 before and after intervention. Reliability of the FVHI-10 can further be improved through the reformulation and subsequent reliability testing of certain test items. Translation and validation of the FVHI-10 into other major Filipino language groups is also recommended.

### Conclusions

The study demonstrates the presence of adequate properties of validity and reliability in the Filipino translation of the VHI-10. The FVHI-10 can be easily administered and scored at the time of evaluation, and allows clinicians to gain insight on subjective complaints and the various factors influencing the perception of voice handicap of a patient. The FVHI-10 is an adequate representation of the VHI-10 and can be utilized by clinicians as a reliable and powerful measurement tool for voice handicap and disorders.

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