Original Research Article

Estimating Self Perceived Voice Handicap in Hyper functional Voice Disorders Using Bengali Transadapted VoiSS

Akanksha Kumari [1], Himanshu Kumar[2], Bibhu Prasad Hota[2], Indranil chatterjee[2]

[1]Post Graduate Trainee in Speech and Hearing, AYJNIHH, ERC, Kolkata, India.
[2]Lecturer in Speech and Hearing, AYNIHH, ERC, Kolkata, India.

Corresponding Author: Akanksha Kumari

ABSTRACT

VoiSS has been reported to be an important test for determining vocal handicap particularly in individuals with hyper functional voice disorders. With linguistic and cultural variability affecting VoiSS scores, it is pertinent to transadapt VoiSS in Indian languages. This study thus aimed to transadapt Voice Symptom Scale (VoiSS) in Bengali and explored self-perceived voice handicap in hyper functional voice patients using Bengali VoiSS. A total of 40 participants (mean age = 37.06 years, SD = $\pm$ 6.35) within the age range of 25 to 45 years participated in the study. The participants were further divided into two groups consisting of 20 males (mean age = 36.66 years, SD = $\pm$ 7.62) and 20 females (mean age = 35.93 years, SD = $\pm$ 5.82). Pearson's correlation coefficient and "t" test were used to examine the variability between the parameters. The mean values of scores of the physical parameter of VoiSS in Bengali and English versions were found to be 7.2 (SD = $\pm$ 0.62) and 6.6 (SD = $\pm$ 1.06) respectively. Similarly, the mean values obtained were 13.23 (SD = $\pm$ 2.13) for Emotional VoiSS in Bengali and 12.64 (SD = $\pm$ 2.23) for Emotional VoiSS in English. The mean value for Impairment VoiSS was found to be 25.22 (SD = $\pm$ 4.16) and the mean value for the same parameter in English VoiSS was found as 25.33 (SD = $\pm$ 4.24). The mean values of the total scores of VoiSS in Bengali (after 3 weeks interval) for hyper-functional voice disorder population was found to be 0.34 (SD = $\pm$ 0.026) respectively. The study concluded VoiSS-Bengali to be a valid tool for estimating voice handicap in hyper functional voice disordered patients having native language as Bengali. Further studies of the transadapted tool on various types of voice disorders will help in generalization of the results.

Key words: VoiSS, Hyper functional voice disorder, Self- perception.

INTRODUCTION

Voice impairment or *Dysphonia* arises from an abnormality of the structures and or function of the voice production system and can cause a personal communication disability, as well as occupational or social handicap. The communicative problems associated with dysphonia can lead to social withdrawal, occupational handicaps, and depression (Smith et al., 1998). Thus assessment of voice related handicap is crucial for effective vocal rehabilitation. With increasing use of outcome measures in health care industry for predicting treatment effectiveness, use of self perceived inventories for reporting voice related handicap has become routine in clinical practice. As patients having hyper functional voice disorder, have greater vocal demand and use as compared to the normal population, it is essential to identify and treat problem areas in which they report greater vocal handicap. VoiSS developed by

Wilson et al. (2004) is a patient based self assessment tool which addresses such issues and thus is gradually being incorporated in routine clinical practice. The Voice Symptom Scale (VoiSS) is a valid and reliable tool and consists of 30 items and 3 subscales: impairment (VoiSS-I), physical (VoiSS-P) and emotional (VoiSS-E). Each item has a 5 point, frequency-based response scale in which 0 = never, 1 = occasionally, 2 = some of the time, 3 = most of the time, and 4 = always (Wilson et al., 2004).

However, as tests for assessing voice handicap such as VoiSS are being developed in English, it becomes difficult to estimate the effect of voice disorder on an individual's psychosocial or socioemotional well-being belonging to a diverse linguistic, cultural and geographic setting.

India being a linguistically and culturally diverse country, application of English version of VoiSS may not yield exact results. Thus there is a need to transadapt VoiSS questionnaire in Indian languages for accurate estimation of vocal handicap. This study thus aimed to transadapt Voice Symptom Scale (VoiSS) in Bengali and explored self-perceived voice handicap in patients with hyperfunctional voice disorders using Bengali VoiSS.

METHODOLOGY
Participants
A total of 40 participants (mean age = 37.06 years, SD = ± 6.35) within the age range of 25 to 45 years participated in the study. The participants were further divided into two groups consisting of 20 males (mean age = 36.66 years, SD = ± 7.62) and 20 females (mean age = 35.93 years, SD = ± 5.82).

Inclusion criteria
1. All of these participants were diagnosed with hyper-functional voice disorder (such as vocal nodule, vocal polyp, thickened vocal cord etc.) by an otorhinolaryngologist through clinical examination and strobovideolaryngoscopy.
2. All the participants were proficient in reading Bengali and English lithography and had a minimum literacy of graduation level.
3. All the participants belonged to middle socioeconomic strata.
4. Participants without a history of neurological, cognitive and physical disorders.
5. Participants without any complaint of hearing or visual problem or with corrected vision and hearing.

Exclusion criteria
Participants with the following conditions were excluded from the study.
1. Participants with a history of neurological, cognitive and physical disorders.
2. Participants having inability in reading Bengali and English lithography.
3. Participants with a diagnosis of spasmodic dysphonia of neurological origin.
4. Participants diagnosed with functional voice disorders or with muscle tension dysphonia.
5. Participants suffering from pulmonary disorders causing reduced airflow during speaking.

Research design
Purposive sampling method was employed in selecting the participants in the study. All the participants pre-diagnosed with hyper functional voice disorders were considered for the study. A two group simple randomized experimental research design was used to compare the performance of male and female participants across the items of developed Bengali VoiSS and as well as to measure the test retest reliability.

Tools
1. Case history questionnaire.
2. Voice symptom scale -VoiSS (Wilson et al., 2004)
3. GRBAS scale (Hirano, 1981)
4. Dr. Speech software version 4 (Tiger DRS, Inc., 1998) fitted with MAX

CM-903 Electrets condenser microphone.

Procedure

The study was carried out in four consecutive phases.

Phase I: Transadaptation of VoiSS in Bengali (by using ITC guidelines, 2013).

The psychometric and linguistic validation (Guillemin, Bombardier & Beaton, 1993) of the English version of the Voice Symptom Scale (VoiSS) (Wilson et al., 2004) into the Bengali version of Voice Symptom Scale (VoiSS) included the following steps:

(a) Translation: Original version of Voice Symptom Scale (VoiSS) was given to five native Bengali Speech Language Pathologists (SLPs) having adequate reading proficiency in both Bengali and English language for conceptually equivalent translation. The five native speakers translated the English version into Bengali language separately.

(b) Back Translation: To measure homogeneity of the Bengali VoiSS, another five native Bengali Speech Language Pathologists (SLPs) with adequate proficiency in Bengali and English language and having no previous knowledge of the VoiSS questionnaire were asked to back translate the Bengali version of VoiSS into English. The Newly formed English VoiSS was correlated with English version of VoiSS by Cronbach's -α test which revealed α value of 0.82, thus confirming Bengali VoiSS to be valid.

Phase II: Construct validity

The developed Bengali version of VoiSS questionnaire was administered on subjects with hyper functional voice disorder. A Likert scale of 0 to 4 (0 = never, 1 = occasionally, 2 = some of the time, 3 = most of the time, 4 = always) was used to score the items under each parameter i.e. emotion, physical and impairment. The Bengali Voice Symptom Scale (VoiSS) and English Voice Symptom Scale (VoiSS) were both administered on the participants and construct validity was achieved by correlating the emotion, physical and impairment parameters of each scale.

Phase III: Concurrent validity

Concurrent validity was established by correlating the scores of participants across items of the Bengali VoiSS with other voice assessment protocols. The voice assessment protocols included:

1. GRBAS scale: parameters included Grade, Roughness, Breathiness, Asthenia, and Strain.
2. Acoustic voice analysis through Dr. Speech software version 4.0: parameters were Habitual F0, SD F0, Jitter, Shimmer and NNE.
3. Voice quality estimates measured through Dr. Speech software version 4.0: parameters were hoarse, harsh and breathy.

Phase IV: Test- retests reliability

In order to evaluate the reliability of the Bengali Voice Symptom Scale (Bengali VoiSS), Pearson's correlation test was used. For assessing test-retest reliability, the developed Bengali VoiSS was again administered on the participants after a period of three weeks following first administration of Bengali VoiSS. The retest was done without informing the participants of the scores of the previous test. The participants however underwent intervening treatment between test and retest conditions.

RESULTS AND DISCUSSION

The present study was aimed to develop and standardize VoiSS in Bengali and to measure its validity in clinical population along with establishing test-retest reliability. The study was aimed to obtain a correlation between scores of: **i)** Bengali version of VoiSS and English version of VoiSS, **ii)** Bengali version of VoiSS and GRBAS scale, **iii)** Bengali version of VoiSS and acoustic voice parameters analyzed using Dr. Speech, **iv)** Bengali version of VoiSS and voice quality estimates assessed using Dr. Speech Software and **v)** Bengali VoiSS in test-retest condition. Tabulation of data was done on Microsoft Excel spreadsheet using

Microsoft Office Package for Windows software. Statistical analysis was done using SPSS software (Version 16). Measure of correlation coefficient by Pearson's two-tailed test was used to compare the degree of similarity and dissimilarity between the scores across various conditions. The comparison of the scores of GRBAS, acoustic voice correlates of Dr. Speech software and English VoiSS across the Bengali VoiSS and the scores of Bengali

VoiSS across the test retest conditions are as follows:

1. Comparison of Emotional parameter of English VoiSS and Bengali VoiSS:

The mean values obtained were 13.23 (SD = ± 2.13) for Emotional VoiSS in Bengali and 12.64 (SD = ± 2.23) for Emotional VoiSS in English. It was observed that the mean values for emotional parameter of both Bengali and English version of VoiSS were close to each other.

Table1: Correlation between Emotional parameter of both Bengali and English version of VoiSS.

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Emotional VoiSS Bengali – Emotional VoiSS English	0.8**	0.01	40

** mark showing a high correlation

Good correlation was obtained across the emotional parameter of the Bengali VoiSS and English VoiSS.

2. Comparison of Physical parameter of English VoiSS and Bengali VoiSS:

The mean values of scores of the physical parameter of VoiSS in Bengali and

English versions was found to be 7.2 (SD = ± 0.62) and 6.6 (SD = ± 1.06) respectively. It was observed that the mean values for physical parameter of both Bengali and English version of VoiSS were near to each other.

Table2: Correlation between physical parameter of both Bengali and English version of VoiSS

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Physical VoiSS English – Physical VoiSS Bengali	0.7**	0.02	40

** mark showing a high correlation

The mean values across English VoiSS and Bengali VoiSS were in support with the study by Stojanovic et al. (2012) where the authors found that the excessive use or misuse of voice by vocal professionals may result in symptoms such are husky voice, hoarse voice, total loss of voice, or even organic changes taking place on vocal folds--minimal pathological lesions (MAPLs). Milutinovic & Bojic (1996) concluded that functional trauma is caused by excessive and improper use of the voice and may affect the speaking voice of nonprofessionals, but also the speaking and singing voice of vocal professionals.

Alipour & Karnell (2014) suggested that increase in supraglottic compression or excessive use of voice reduced ventricular width affecting voice quality.

3. Comparison of Impairment parameter of English VoiSS and Bengali VoiSS:

The mean value of the impairment parameter of VoiSS in Bengali was found to be 25.22 (SD = ± 4.16) and the mean value for the same parameter in English VoiSS was found as 25.33 (SD = ± 4.24). It was observed that the mean values for impairment parameter of both Bengali and English VoiSS were close to each other.

Table3: Correlation between Impairment parameter of both Bengali and English version of VoiSS

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Impairment VoiSS English – Impairment VoiSS Bengali	0.9**	0.00	40

**mark showing a high correlation

Similar studies done on smokers by scoring with VHI have reported functional and emotional scores of VHI in smokers showing better results (lower degree of handicap) than in nonsmokers. Trinite & Sokolov (2014) also investigated the VHI into Latvian language in which high internal consistency was observed among the Lat VHI total scale, functional, physical, and emotional scale in the patient group.

4. Comparison of overall scores of English VoiSS and Bengali VoiSS:

The mean values of the total scores of Bengali and English VoiSS were found to be 0.32 (SD = ± 0.029) and 0.33 (SD = ± 0.029) respectively. It was observed that the mean values for total scores of both Bengali and English version of VoiSS were close to each other.

Table4: Correlation between total score of Bengali and English version of VoiSS

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Total score of VoiSS English – Total scores of VoiSS Bengali	0.9**	0.00	40

** mark showing a high correlation

Similar standardization was done on Validation of the Voice Handicap Index: 10 (VHI-10) into Brazilian Portuguese (Costa, Oliveira, & Behlau, 2013). The authors achieved appropriate correlation between the total score in VHI. Bonetti & Bonetti (2013) concluded that intra class correlation coefficient estimation was also high, for both total VHI and subscales (functional subscale, physical subscale, and emotional subscale). Zur et al. (2007) developed pediatric version of VHI, they concluded high correlation between the VHI and the pVHI. The pVHI provides a high internal consistency and test retest reliability for subscales of emotion, physical and impairment.

5. Comparison of scores of Emotional parameter of Bengali VoiSS and GRBAS scale:

The mean values for Grade, Roughness, Breathiness, Asthenia and Strain in GRBAS scale were found to be: 2.4 (SD = ± 0.43), 2.2 (SD = ± 0.47), 2.1 (SD = ± 0.58), 1.6 (SD = ± 0.72) and 1.8 (SD = ± 0.4) respectively.

Table 5: Correlation between Emotional parameter Bengali VoiSS and GRBAS scale parameters (Grade, Roughness, Breathiness, Asthenia, and Strain)

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Grade - Emotional VoiSS Bengali	0.3	0.1	40
Roughness- Emotional VoiSS Bengali	0.6**	0.0	40
Breathiness - Emotional VoiSS Bengali	0.2	0.3	40
Asthenia - Emotional VoiSS Bengali	0.6**	0.0	40
Strain - Emotional VoiSS Bengali	0.6**	0.0	40

** mark showing a high correlation

This study was supported by Nikolaou & Tsaousis (2002) in which they reported a significant correlation between emotional intelligence and strain. Landa, Lopez-Zafra, Berrios, & Aguilar-Luzon (2008) found a differential effect of the emotional intelligence on strain. It clearly indicates that Emotional Intelligence affects strain. The results of studies conducted by Oginska-Bulik (2005) confirmed the role of emotional intelligence in perceiving occupational stress and preventing employees of human services (Teachers, nurses, probationary officers) from negative health outcomes. Jones, Carding, & Drinnan (2006) were the authors who observed that there was a high significant correlation between perceptual dysphonia severity as assessed by GRBAS and VoiSS questionnaire.

6. Comparison of scores of Physical parameter of Bengali VoiSS and GRBAS scale:

Table 6: Correlation between Physical parameter of Bengali VoiSS and GRBAS scale parameters (Grade, Roughness, Breathiness, Asthenia, and Strain

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Grade - Physical VoiSS Bengali	-0.6	0.7	40
Roughness - Physical VoiSS Bengali	-0.2	0.4	40
Breathiness - Physical VoiSS Bengali	0.2	0.2	40
Asthenia - Physical VoiSS Bengali	0.6**	0.0	40
Strain - Physical VoiSS Bengali	-0.3	0.1	40

** mark showing a high correlation

Similar standardization was done in factors predicting VHI (Senaris, Nunez, Corte, & Suarez 2006) where authors concluded that no parameter of GRBAS scale were found to predict the physical subscale. The findings of this study draws support from Gama, Alves, Cerceau, & Teixeira (2009) where the authors

concluded that grade, roughness, breathiness are not statistically correlated with physical parameter of VRQOL.

7. Comparison of scores of Impairment parameter of Bengali VoiSS and GRBAS scale:

Table7: Correlation between Impairment parameter of Bengali VoiSS and GRBAS scale parameters (Grade, Roughness, Breathiness, Asthenia, and Strain)

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Grade – Impairment Bengali VoiSS	0.4	0.7	40
Roughness - Impairment Bengali VoiSS	0.3	0.4	40
Breathiness - Impairment Bengali VoiSS	0.1	0.2	40
Asthenia - Impairment Bengali VoiSS	-0.2	0.0	40
Strain - Impairment Bengali VoiSS	-0.1	0.1	40

** mark showing a high correlation

This study finds support in findings of Jones, Carding, & Drinnan (2006) where the authors observed that there was a highly significant correlation between perceptual Dysphonia severities as assessed by Grade and impairment subsets of the VoiSS questionnaire. Karnell et al. (2007) concluded that there was relatively weak agreement between patient-based and clinician-based scales.

8. Comparison of scores of Emotional parameter of Bengali VoiSS and Acoustic parameters:

The mean values for real voice analysis parameters: Habitual F0, SD F0, Jitter, Shimmer and NNE were found to be 212.32 (SD = ± 78.66), 0.72 (SD = ± 3.36), 4.12 (SD = ± 3.06), -8.15 (SD = ± 5.56), and 4.06 (SD = ± 2.02) respectively.

Table 8: Correlation between Emotional parameter of Bengali VoiSS with real voice analysis parameters (Dr. Speech software): habitual F0, SD F0, jitter, shimmer and NNE

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Habitual F0 - Emotional VoiSS Bengali	0.9**	0.0	40
SD F0 - Emotional VoiSS Bengali	-0.2	0.4	40
Jitter - Emotional VoiSS Bengali	-0.3	0.1	40
Shimmer - Emotional VoiSS Bengali	0.1	0.8	40
NNE - Emotional VoiSS Bengali	-0.3	0.2	40

** mark showing a high correlation

Micheal (1993) concluded that fundamental frequency is affected, by emotion (i.e. anger, fear, joy and disgust). Emotions like anger will result in an increase of fundamental frequency. Anger affects high - frequency energy and downward - directed F0 contours. So the articulation rate increases. Fear also affects fundamental frequency, due to which mean

fundamental frequency and high frequency range increases affecting articulation. Joy and disgust also increases mean fundamental frequency, high frequency also affecting articulation. Whereas the findings can also be supported by Williams & Stevens (1972) who attributed that a given emotional situation are not always consistent from one speaker to another.

9. Comparison of scores of Physical parameter of Bengali VoiSS and Acoustic parameters:

Woisard, Bodin, Yardeni, & Puech (2007) observed that acoustic parameter such as jitter is never correlated with the physical subscale. Cho, Yin, Park, & Park (2011) concluded that in men, VHI, VRS, F0 tremor, shimmer, HNR, SNR, and amplitude tremor were related to mental fatigue. In women, only VHI was related to physical fatigue, and none of the acoustic parameters was related to the fatigue score. Perceptual evaluations were not related to fatigue in men or women, which suggests that self-rated symptoms and acoustic parameters related to voice quality are indicative of mental fatigue, and these features are prominent in men.

Table 9: Correlation between Physical parameter of Bengali VoiSS with real voice analysis parameters (Dr. Speech software) habitual F0, SD F0, jitter, shimmer and NNE

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Habitual F0 - Physical VoiSS Bengali	-0.4	0.8	40
SD F0 - Physical VoiSS Bengali	-0.1	0.7	40
Jitter - Physical VoiSS Bengali	0.2	0.3	40
Shimmer - Physical VoiSS Bengali	0.1	0.4	40
NNE - Physical VoiSS Bengali	0.6**	0.01	40

** mark showing a high correlation

10. Comparison of scores of Impairment parameter of Bengali VoiSS and Acoustic parameters:

This study can be supported by Teixeira, Nunes, Coimbra, Lima, & Moutinho (2008) where authors concluded that variations in voice quality are essentially related to modifications of the glottal source parameters, such as: F0, jitter, and shimmer. Voice quality is affected by prosody, emotional state, and vocal pathologies.

Table 10: Correlation between Impairment parameter of Bengali VoiSS with real voice analysis parameters of (Dr. Speech software): habitual F0, SD F0, jitter, shimmer and NNE

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Habitual F0 - Impairment VoiSS Bengali	-0.8	0.7	40
SD F0 - Impairment VoiSS Bengali	-0.0	0.9	40
Jitter - Impairment VoiSS Bengali	-0.8	0.7	40
Shimmer - Impairment VoiSS Bengali	-0.3	0.9	40
NNE - Impairment VoiSS Bengali	0.2	0.2	40

** mark showing a high correlation

11. Comparison of scores of Emotional parameter of Bengali VoiSS and Voice quality correlates:

Table 11: Correlation between Emotional parameter of BengaliVoiSS and voice quality estimates (Dr. Speech software version 4) (hoarse, harsh and breathy)

Parameter	Pearson Correlation (r)	Sig. (2-tailed) (t)	No. of participants
Hoarse-Emotional VoiSS Bengali	0.1	0.8	40
Harsh-Emotional VoiSS Bengali	0.2	0.4	40
Breathy-Emotional VoiSS Bengali	0.2	0.2	40

** mark showing a high correlation

12. Comparison of scores of Physical parameter of Bengali VoiSS and Voice quality correlates:

Table 12: Correlation between Physical parameter of Bengali VoiSS and voice quality estimates (Dr. Speech software version 4) (hoarse, harsh and breathy)

Parameter	Pearson Correlation (r)	Sig. (2-tailed) (t)	No. of participants
Hoarse-Physical VoiSS Bengali	-0.2	0.4	40
Harsh-Physical VoiSS Bengali	-0.2	0.4	40
Breathy-Physical VoiSS Bengali	0.3	0.2	40

** mark showing a high correlation

13. Comparison of scores of Impairment parameter of Bengali VoiSS and Voice quality correlates:

Table 13: Correlation between Impairment parameter of Bengali VoiSS and voice quality estimates parameter (Dr. Speech software version 4) (hoarse, harsh and breathy)

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Hoarse	-0.1	0.8	40
Harsh	0.3	0.1	40
Breathy	0.1	0.5	40

** mark showing a high correlation

14. Comparison of scores of Emotional parameter of Bengali VoiSS in 1st and 2nd test condition:

The mean values of the emotional parameter of VoiSS in Bengali in second testing i.e. after 3 weeks interval was found out to be 13.4 (SD = ± 2.09) respectively. It can be observed that the mean values for emotional parameter of Bengali VoiSS at first testing and after three week testing are almost the same.

Table 14: Correlation between Emotional parameter of Bengali VoiSS in test-retest condition (3 week after the test condition)

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Emotional VoiSS Bengali	0.8**	0.0	40

** mark showing a high correlation

Test- retest reliability of Voice Handicap Index in Swedish language was done using singers (Lamarche, Westerlund, Verduyckt, & Ternstrom, 2010). The author achieved appropriate correlation between the parameters (emotion, physical, impairment and total score) in test-retest condition. Xu et al. (2008) observed that the VHI total scores were significantly higher in dysphonic patients than in control subjects. This is also true for all VHI sub scores in the functional, physical and emotional domains.

15. Comparison of scores of Physical parameter of Bengali VoiSS in 1st and 2nd test condition:

The mean values of the physical parameter of VoiSS in Bengali in second testing (3 weeks after the test condition) was found to be 7.1 (SD = ± 0.68) respectively. It can be observed that the mean values for physical parameter of Bengali VoiSS at first testing and after three week testing are almost the same.

Table 15: Correlation between parameter of Physical of Bengali VoiSS in test-retest condition (3 week after the test condition)

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Physical VoiSS Bengali	0.8**	0.0	40

** mark showing a high correlation

Similar standardization was done in translation and adaptation of voice handicap index in Bengali. Whereas, validity of Voice Handicap Index in Bengali language was done using voice disorder (Datta, Sethi, Singh, Nilanketan, & Venkatesh, 2011). The author achieved appropriate correlation between the parameters (emotion, physical, impairment and total score) in both the versions of test in test- retest reliability. Lam et al. (2006) studied VHI in Chinese language; they concluded high test-retest reliability and high item-total correlation for both Chinese VHI-30 and VHI-10.

16. Comparison of scores of Impairment parameter of Bengali VoiSS in 1st and 2nd test condition:

The mean values of the impairment parameter of VoiSS in Bengali in second testing (3 weeks after the test condition) was found to be 26.33 (SD = ± 4.69) respectively. It can be observed that the mean values for impairment parameter of Bengali VoiSS at first testing and after three week testing are near to each other.

Table 16: Correlation between parameter of Impairment of Bengali VoiSS in test-retest condition (3 week after the test condition)

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Impairment VoiSS Bengali	0.7**	0.0	40

** mark showing a high correlation

Validity of Voice Handicap Index in Brazilian language was done using voice disordered population (Behlau, Alves, & Oliveira, 2011). The authors achieved high internal consistency and high test-retest reliability both for the overall VHI score and for the functional, physical, and emotional domains of the VHI in both the versions of test in test- retest reliability. Woisard, Bodin, & Puech (2004) where the authors validated VHI in French language, they concluded that the test-Retest stability of the pathological subjects was found to be satisfactory for both total score and subscale scores.

17. Comparison of total scores of Bengali VoiSS in 1st and 2nd test condition:

The mean values of the total scores of VoiSS in Bengali (3 weeks interval) for hyper-functional voice disorder population was found to be 0.34 (SD = ± 0.026) respectively.

Table 17: Correlation between total score of Bengali VoiSS in test-retest condition (3 week after the test condition)

Parameter	Pearson Correlation(r)	Sig. (2-tailed)(t)	No. of participants
Pre – post VoiSS Bengali	0.9**	0.0	40

** mark showing a high correlation

Similar standardization was done in translation and adaptation of voice handicap index in Arabic. Where, validity of Voice Handicap Index in Arabic language was done using voice disordered population (Saleem & Natour, 2010). The authors obtained strong Test-retest reliability. Malki et al. (2010) concluded that, the Arabic VHI showed a significant high internal consistency and reliability, high item-domain and domain-total correlation. Thus the referential attained VoiSS in Bengali established to be used in the clinical population by speech language pathologist and laryngologist.

SUMMARY AND CONCLUSION

VoiSS has been documented to be a psychometrically robust measure currently available for self-assessment of voice quality and handicap. The Bengali version of Voice Symptom Scale (VoiSS) developed in this study can be a valid and reliable tool that can be applied to the Bengali -Speaking population in India. This study implicates the use of Voice Symptom Scale (VoiSS) for self-assessment of voice handicap in voice disordered population and further could create scope for transadaptation of VoiSS in other Indian languages.

REFERENCES

- Alipour F, Karnell M. Aerodynamic and acoustic effects of ventricular gap. Journal of Voice. 2014; 28(2):154-60.
- Behlau M, Alves DSM, Oliveira G. Cross-cultural adaptation and validation of the voice handicap index into Brazilian Portuguese. Journal of Voice. 2011; 25(3):354-9.
- Bonetti A, Bonetti L. Cross-cultural adaptation and validation of the Voice Handicap Index into Croatian. Journal of Voice. 2013; 27(1):130.
- Cho SW, Yin CS, Park YB, Park YJ. Differences in self-rated, perceived, and acoustic voice qualities between high- and low-fatigue groups. Journal of Voice. 2011; 25(5):544-52.
- Costa T, Oliveira G, Behlau M. Validation of the Voice Handicap Index: 10 (VHI10) to the Brazilian Portuguese. Codas. 2013; 25(5):482-5.
- Datta R, Sethi A, Singh S, Nilakantan A, Venkatesh MD. Translation and validation of the voice handicap index in Bengali. Journal of Laryngology and Voice. 2011; 1(1):12.
- Gama AC, Alves CF, Cerceau JS, Teixeira LC. Correlation between acoustic-perceptual data and voice related quality of life in elderly women. ProFono. 2009; 21(2):125-30.
- Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. Journal of Clinical Epidemiology.1993; 46: 1417-32.
- Hirano M. Psycho-acoustic evaluation of voice: GRBAS scale for evaluating the hoarse voice. Clinical Examination of voice, New York: Springer Verlag.1981.
- Jones SM, Carding PN, Drinnan MJ. Exploring the relationship between severity of dysphonia and voice related quality of life. Clinical Otolaryngology.2006; 31(5):411-7.
- Karnell MP, Melton SD, Childes JM, Coleman TC, Dailey SA, Hoffman HT. Reliability of clinician-based (GRBAS and CAPE-V) and patient-based (V-RQOL and IPVI) documentation of voice disorders. Journal of Voice. 2007; 21(5):576-90.
- Lamarche A, Westerlund J, Verduyckt I, Ternstrom S. The Swedish version of the Voice Handicap Index adapted for singers. Logopedics Phoniatrics Vocology. 2010; 35(3):129-37.
- Landa AJM, López-Zafra E, Berrios MMP, Aguilar-Luzón MC. The relationship between emotional intelligence, occupational stress and health in nurses: a questionnaire survey. International Journal of Nursing Studies. 2008; 45(6):888-901.

- Malki KH, Mesallam TA, Farahat M, Bukhari M, Murry T. Validation and cultural modification of Arabic voice handicap index. European Archive of Otorhinolaryngology. 2010; 267(11): 1743-51.
- Micheal L, Jeannette M. Vocal expression and communication of emotion. Handbook of emotion. Fourth Edition. Guilford Press.1993; 188-196.
- Milutinović Z, Bojić P. Functional trauma of the vocal folds: classification and management strategies. Folia Phoniatricaet Logopedica. 1996; 48(2):78-85.
- Nikolaou I, Tsaousis I. Emotional intelligence in the workplace: Exploring its effects on occupational stress and organizational commitment. International Journal of Organizational Analysis. 2002; 10(4):327-342.
- Oginska-Bulik N. Emotional intelligence in the workplace: Exploring its effects on occupational stress and health outcomes in human service workers. International Journal of Occupational Medicine and Environmental Health. 2005; 18(2):167-175.
- Saleem AF, Natour YS. Standardization of the Arabic version of the Voice Handicap Index: an investigation of validity and reliability. Logopedics Phoniatrics Vocology. 2010; 35(4):183-8.
- Señaris GB, Núñez BF, Corte SP, Suárez NC. Factors predicting Voice Handicap Index. Acta Otorrinolaringológica Española. 2006; 57(2):101-8.
- Smith E, lenke J, Taylor M, Kirchener HL, Hoffman H. Frequency of voice problems among teachers and other occupations. Journal of Voice. 1998; 12(4): 480-488.
- Stojanović J, Ilić N, Stanković P, Arsenijević S, Erdevicki L, Belić B, Zivić L, Trinite B, Sokolovs J. Adaptation and validation of the Voice Handicap Index in Latvian. Journal of Voice. 2014; 28(4):452-7.
- Teixeira A, Nunes A, Coimbra RL, Lima R, Moutinho L. Voice quality of psychological origin. Clinical Linguistics and Phonetics Journal. 2008; 22(10-11):906-16.
- Williams CE, Stevens KN. Emotions and speech: Some acoustical correlates. The Journal of the Acoustical Society of America.1972; 52(4B):1238-1250.
- Wilson JA, Webb A, Carding PN, Steen IN, Mac Kenzie K, Deary IJ. The Voice Symptom Scale (VoiSS) and the Vocal Handicap Index (VHI): a comparison of structure and content. Clinical Otolaryngology & Allied Sciences. 2004; 29(2):169-174.
- Woisard V, Bodin S, Yardeni E, Puech M. The voice handicap index: correlation between subjective patient response and quantitative assessment of voice. Journal of Voice. 2007; 21(5): 623-31.
- Zur KB, Cotton S, Kelchner L, Baker S, Weinrich B, Lee L. Pediatric Voice Handicap Index (pVHI): a new tool for evaluating pediatric dysphonia. International journal of Pediatric Otorhinolaryngology. 2007; 71(1):77-82.

****