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MISCELLANEOUS

Validation of the Italian version of the Singing Voice Handicap Index

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Abstract Singers constitute a specific population that is particularly sensitive to vocal disability, which may have a higher impact on their quality of life compared to non-singers. A specific questionnaire, the Singing Voice Handicap Index (SVHI), was created and validated aimed to measure the physical, social, emotional and economic impacts of voice problems on the lives of singers. The aim of this study was to validate the Italian version of the SVHI. The validated English version of the SVHI was translated into Italian and then discussed with several voice care professionals. The Italian version of the SVHI was administered to 214 consecutive singers (91 males and 123 females, mean age: 32.62 ± 10.85). Voice problem complaints were expressed by 97 of the singers, while 117 were healthy and had no voice conditions. All subjects underwent a phoniatric consultation with videolaryngostroboscopy to ascertain the condition of the vocal folds. Internal consistency of the Italian version of the SVHI showed a Cronbach's α of 0.97. The test–retest reliability was assessed by comparing the responses obtained by all subjects in two different administrations of the questionnaire; the difference was not significant (p = ns). The SVHI scores in healthy singers was significantly lower than the one obtained in the group of singers with a vocal fold abnormality (29.26 ± 25.72 and 45.62 ± 27.95, $p < 0.001$, respectively). The Italian version of the SVHI was successfully validated as an instrument with proper internal consistency and reliability. It is a suitable instrument for the self-evaluation of handicaps related to voice problems in the context of singing.

Keywords Singing · Voice disturbance · Questionnaire design · Self report

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Introduction

Self-administered questionnaires are used to assess the impacts of health problems on the quality of life of patients. As indicated by the World Health Organization, a disability in performing a daily task, defined as a handicap, could cause a disadvantage in social, economic or environmental aspects of life [1]. Several questionnaires have been designed to measure the impact of voice problems on the lives of individuals: the most popular is the Voice Handicap Index (VHI) [2], which has been validated and translated into several languages [3–7]. The VHI was developed to assess the subjective perception of disability related to voice disorders in all types of patients [2].

Singers constitute a specific population of professionals particularly at risk for voice problems. Hoarseness frequently affects not only their speaking voice but also their singing voice, and consequently, their professional activity. The perception of a voice problem in singing is often related to specific symptoms, such as difficulty in the passaggio, vocal endurance and diminished range [8], aspects that are not assessed by the VHI. Furthermore, singers are often more sensitive to vocal

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disabilities, which may have a higher impact on their quality of life compared to non-singers [8, 9]. Hence, to obtain a self-assessing instrument able to evaluate vocal disability in singers, in 2007, Cohen et al. [10] created and validated a specific questionnaire, the Singing Voice Handicap Index (SVHI), aimed to measure the physical, social, emotional and economic impacts of voice problems on the lives of singers. The SVHI is a 36-item self-administered questionnaire that is able to assess difficulties related to voice health status typical of the singing professional, as demonstrated by its psychometric properties of reliability and validity [10]. The items address symptoms frequently reported to laryngologists and speech pathologists by singers. As demonstrated by Cohen et al. [11] among singers, the SVHI is also more sensitive to clinical changes than the VHI, which proves the validity of the SVHI in measuring treatment outcomes in the singing population. Furthermore, a Spanish version of the SVHI was validated in 2010 by Garcia-Lopez et al. [12]. The aim of this study was to validate the Italian version of the VSHI to provide a specific tool to assess voice handicaps in Italy resulting from singing-related voice problems.

Materials and methods

This study was approved by the ethics committee of the Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico, Milan.

Development of the Italian version of the SVHI

An Italian translation of the validated English version of the SVHI was carried out by a qualified professional translator. The first version of the questionnaire was then discussed by two phoniatricians, two speech therapists, two singing teachers and two professional singers to improve the translation and to make it more understandable to singers. Later, the new Italian version was re-translated in English by a second professional translator and, finally, re-translated in Italian language by a third professional translator. Each of the 36 items of the questionnaire was individually scored on a 5-point Likert scale ranging from "never" (score of 0) to "always" (score of 4). The raw scores ranged from 0 to 144. The Italian version of the SVHI is presented in Table 1. The score was based on how often each statement was experienced by the singer, with higher numbers representing more self-perceived handicaps [10].

Participants

The Italian version of the SVHI was administered to 214 consecutive singers (91 males and 123 females, mean age: 32.62 ± 10.85, range: 14–60 years) that went to voice clinic for a routine voice check up. All participants had at least 1 year of experience in singing as students, professionals or amateurs. The singing style was noted and categorized as classical or modern. The diagnosis of each patient in the study group was determined by the clinical history and by rigid and/or flexible laryngeal videoendoscopy including stroboscopy. The stroboscopic findings were classified into five groups: normal, functional (including incomplete closure with a gap along entire length of the vocal folds during phonation and subjects with absence of organic lesions but with perceptual audible voice changes and complaints), inflammatory (including hemorrhage, inflammation of the vocal fold mucosa, posterior laryngitis, and Reinke's edema), mass on vocal fold (including nodules, polyps, and cysts) and high stiffness of the vocal fold (including sulcus, vergeture, and scarring). All participants underwent phoniatric consultation with videolaryngostroboscopy.

Administration of the Italian version of the SVHI

All subjects were administered the Italian version of the SVHI (reported in Table 1) with the same modality; the subjects were asked to fill out the questionnaire following the instructions written at the bottom of the form, prior to a phoniatric consultation and the laryngeal examination. No indications were given by the staff of the Voice Center. The patients could not make any changes to the answers after the consultation. A second copy of the questionnaire was mailed 7 days after the first consultation with a request to fill out the questionnaire based on the perception of the present status and return the form. This timing was chosen because the patients' voice conditions would not have changed and because they would not be able to remember their previous answers [10].

Statistical analysis

The statistical tests were performed using SPSS 17.0 for Windows (SPSS Inc., Chicago, IL). The internal consistency of the questionnaire was determined by Cronbach's α coefficient; the item-total correlations were calculated for all items. The test–retest reliability was assessed for the total score of the SVHI. Pearson's product–moment correlation was used to evaluate the test–retest reliability of the SVHI by comparing the first and the second responses. The SVHI total scores of the singers with a vocal fold pathology (functional, inflammatory, mass on the vocal fold, high stiffness of the vocal fold) and of the healthy singers were compared to test the clinical validity of the questionnaire by the use of the nonparametric Mann–Whitney test.

Table 1 Singing Voice Handicap Index: original and Italian version

How frequently you have had the same experience in the last month?	Never	Almost never	Sometimes	Almost always	Always
Quanto frequentemente hai avuto questa percezione nell'ultimo mese?	Mai	Quasi mai	Qualche volta	Quasi sempre	Sempre
1. It takes a lot of effort to sing/Mi occorre un notevole sforzo per cantare	0	1	2	3	4
2. My voice cracks and breaks/La mia voce si incrina e si spezza	0	1	2	3	4
3. I am frustrated by my singing/Mi sento frustrato/a a causa del mio modo di cantare	0	1	2	3	4
4. People ask "What is wrong with your voice?" when I sing/La gente mi segnala che c'è qualcosa che non va nella voce mentre canto	0	1	2	3	4
5. My ability to sing varies day to day/La mia abilità canora varia di giorno in giorno	0	1	2	3	4
6. My voice "gives out" on me while I am singing/La mia voce viene meno mentre cant.	0	1	2	3	4
7. My singing voice upsets me/La mia voce cantata mi disturba e mi preoccupa	0	1	2	3	4
8. My singing problems make me not want to sing/perform/I miei problemi di voce mi tolgono la voglia di cantare/esibirmi	0	1	2	3	4
9. I am embarrassed by my singing/Mi sento imbarazzato/a a causa del mio modo di cantare	0	1	2	3	4
10. I am unable to use my "high voice"/Sono incapace di utilizzare i toni acuti	0	1	2	3	4
11. I get nervous before I sing because of my singing problems/Mi sento nervoso/a prima di cantare per via dei miei problemi di voce	0	1	2	3	4
12. My speaking voice is not normal/La mia voce parlata non è normale	0	1	2	3	4
13. My throat is dry when I sing/Sento la gola secca quando canto	0	1	2	3	4
14. I've had to eliminate certain songs from my singing/performances/Ho dovuto eliminare alcuni brani dal mio repertorio	0	1	2	3	4
15. I have no confidence in my singing voice/Non mi fido della mia voce cantata	0	1	2	3	4
16. My singing voice is never normal/La mia voce cantata non è mai normale	0	1	2	3	4
17. I have trouble making my voice do what I want it to Ho problemi nel far fare alla mia voce ciò che voglio	0	1	2	3	4
18. I have to "push it" to produce my voice when singing/Avverto presenza di aria nella voce (suono soffiato non intenzionale) quando canto	0	1	2	3	4
19. I have trouble controlling the breathiness in my voice/Avverto raucedine nella voce (non intenzionale) quando canto	0	1	2	3	4
20. I have trouble controlling the raspiness in my voice/Ho problemi nel cantare ad alto volume	0	1	2	3	4
21. I have trouble singing loudly/Ho problemi nel cantare ad alto volume	0	1	2	3	4
22. I have difficulty staying on pitch when I sing Mi è difficile mantenere l'intonazione quando canto	0	1	2	3	4
23. I feel anxious about my singing/Mi sento ansioso/a per via della mia voce cantata.	0	1	2	3	4
24. My singing sounds forced/La mia voce cantata risulta forzata	0	1	2	3	4
25. My speaking voice is hoarse after I sing/La mia voce parlata è alterata dopo aver cantato	0	1	2	3	4
26. My voice quality is inconsistent/La qualità della mia voce è discontinua	0	1	2	3	4
27. My singing voice makes it difficult for the audience to hear me/La mia voce cantata è udita con difficoltà dal pubblico	0	1	2	3	4
28. My singing makes me feel handicapped/Il mio modo di cantare mi fa sentire handicappato/a	0	1	2	3	4
29. My singing voice tires easily/La mia voce cantata si stanca facilmente	0	1	2	3	4
30. I feel pain, tickling, or choking when I sing/Avverto dolore, solletico, sensazione di soffocamento quando canto	0	1	2	3	4
31. I am unsure of what will come out when I sing/Non sono sicuro/a di cosa verrà fuori quando canto	0	1	2	3	4

Table 1 continued

How frequently you have had the same experience in the last month? Quanto frequentemente hai avuto questa percezione nell'ultimo mese?	Never Mai	Almost never Quasi mai	Sometimes Qualche volta	Almost always Quasi sempre	Always Sempre
32. I feel something is missing in my life because of my inability to sing/Sento che manca qualcosa alla mia vita a causa dei miei problemi nel canto	0	1	2	3	4
33. I am worried my singing problems will cause me to lose money/Mi preoccupo che i miei problemi nel canto comportino una perdita di denaro	0	1	2	3	4
34. I feel left out of the music scene because of my voice/Mi sento escluso dalla scena musicale per via della mia voce	0	1	2	3	4
35. My singing makes me feel incompetent/Il mio modo di cantare mi fa sentire incompetente	0	1	2	3	4
36. I have to cancel performances, singing engagements, rehearsals, or practices because of my singing/Mi capita di rinunciare a esibizioni, ingaggi, prove o esercitazioni a causa dei miei problemi nella voce cantata	0	1	2	3	4

Results

The total number of participants was 214:80 were classical singers and 137 were modern singers. Concerning the subjects' professional levels, 124 were singing students, 66 were professionals and 26 were amateurs.

There were 117 healthy singers with no voice complaints (45 males and 72 females, mean age: 31.94 ± 10.95 years, range: 14–60 years) confirmed by normal videolaryngostroboscopic findings. There were 97 singers with a voice problem (46 males and 51 females, mean age: 33.39 ± 10.74 years, range: 15–60 years) who had a clinical objective diagnosis by videolaryngostroboscopy; seven were included in the functional group, 31 in the inflammatory group, 52 in the mass on the vocal fold group and seven in the high stiffness of the vocal fold group.

All participants completed the questionnaire without assistance in <10 min. The mean score was 45.62 ± 27.95 for the pathological singers and 29.26 ± 25.72 for the healthy singers. As expected, the scores of the control group were significantly lower than the pathological group ($p < 0.001$).

Test–retest reliability and internal consistency analysis

The retest was completed by 70 subjects (29 pathologic and 41 healthy singers). The mean SVHI scores at the first and second submissions were 36.08 ± 31.37 and 34.33 ± 24.32, respectively. The internal consistency and reliability of the SVHI were very high (Cronbach's $\alpha = 0.97$); the correlation between the SVHI scores at the first and second submission (test–retest) was strong ($r = 0.98$, $p < 0.001$).

Clinical accuracy

Figure 1 shows the SVHI scores in each subgroup, and Table 2 reports the percentiles of the SVHI relative to each group. Both the functional group (mean score: 67.00 ± 34.28, range: 12–109) and the mass on the vocal fold group (mean score: 45.23 ± 25.98, range: 8–126) reported SVHI values significantly higher than the healthy group (mean score: 29.26 ± 25.72, range: 0–137; $p = 0.003$ and $p = 0.004$, respectively). No significant differences were found among the pathological subgroups, i.e. among functional, mass on the vocal fold, inflammatory and high stiffness (p = ns). Furthermore, the differences between the healthy group and the inflammatory group, (mean score: 41.23 ± 28.51, range: 0–143) and between the healthy and high stiffness of the vocal fold groups (mean score: 46.57 ± 30.74, range: 11–87) were not significant (both p = ns). The ANOVA results were unaffected by age, gender or style of singing.

Discussion

Singers constitute a specific population that demand particular voice care. Singers are affected by peculiar voice problems that need special medical evaluation and treatment. Singers, indeed, are more sensitive to many early symptoms of voice abnormalities, and they are more likely to seek help and report problems related to their singing voice [8, 13]. Singers represent 11.5 % of all patients at voice consultations, while constituting only 0.02 % of the general population [14]. Furthermore, compared to non-singers, singers have a prevalence of vocal disability and handicap, defined as "inability to perform due to a voice

problem" [13]. This is partly due to the importance they give to their voice status, a critical social and occupational factor that can significantly affect their quality of life [15, 16]. It is important for voice caregivers to understand the singer's point of view regarding his/her level of disability related to singing voice problems. A realistic overview of the singer's condition is critical to facilitate the most suitable management of this unique group of patients. Therefore, Cohen et al. [10] in 2007, created and validated a health status instrument for use in singers, called the SVHI. The SVHI has been shown to be a valuable tool to measure handicaps resulting from voice problems typical of the population of singers. The use of the SVHI can determine how voice problems impact the quality of life of singers [10, 11, 17].

The Italian version of the SVHI described in this study supports its important psychometric properties, as the internal consistency and the test–retest reliability were very high. Furthermore, the SVHI was able to discriminate between healthy voice conditions and some pathological voice conditions (functional disturbances and lesions with mass on the vocal fold), a result that further supports its validity. This difference is maintained regardless of gender and age. The SVHI score of Italian healthy singers (mean score: 29.26 ± 25.72) is perfectly consistent with that reported about 81 Spanish healthy singers by García-López et al. [12] (mean score: 28.43 ± 18.58).

According to Cohen et al. [17], singers with a mass on the vocal fold, as determined by stroboscopic diagnosis, had an SVHI score significantly higher than healthy singers. Additionally, in our research singers with a diagnosis of a functional voice disorder obtained a significantly higher SVHI score compared to healthy singers non-singers, whereas singers with an inflammatory pathology of the vocal folds or a lesion resulting in an increase of stiffness of the vocal folds did not have a significantly different SVHI score compared to healthy singers non-singers.

Concerning singers with an inflammatory aspect of the vocal folds observed by videolaryngostroboscopy, such as laryngitis and hemorrhage, our interpretation is that these types of disturbances are often short in duration; so in many cases, they constitute an occasional cause of dysphonia. Cohen et al. [17] found that the chronicity of a voice problem is a critical factor influencing the SVHI score, showing that singers with a longer duration of voice complaints perceived higher levels of handicap. The short duration of some inflammatory pathologies of the vocal folds could have caused the lower SVHI scores of this group of patients.

The other subgroup of pathological singers that did not show a significant difference of the SVHI scores compared to the healthy singers group are singers with lesions, such as sulcus or scarring, that lead to high stiffness of the vocal folds. For this group, a higher SVHI score is expected because these types of lesions are long in duration (sometimes they are congenital), instead the difference respect of healthy singers was slight there are two possible explanations. The first is that self-evaluation is simply another dimension than the biomechanics of vocal fold vibration, and that one need not to expect a clear relation. The second is that to notice the slight differences in SVHI

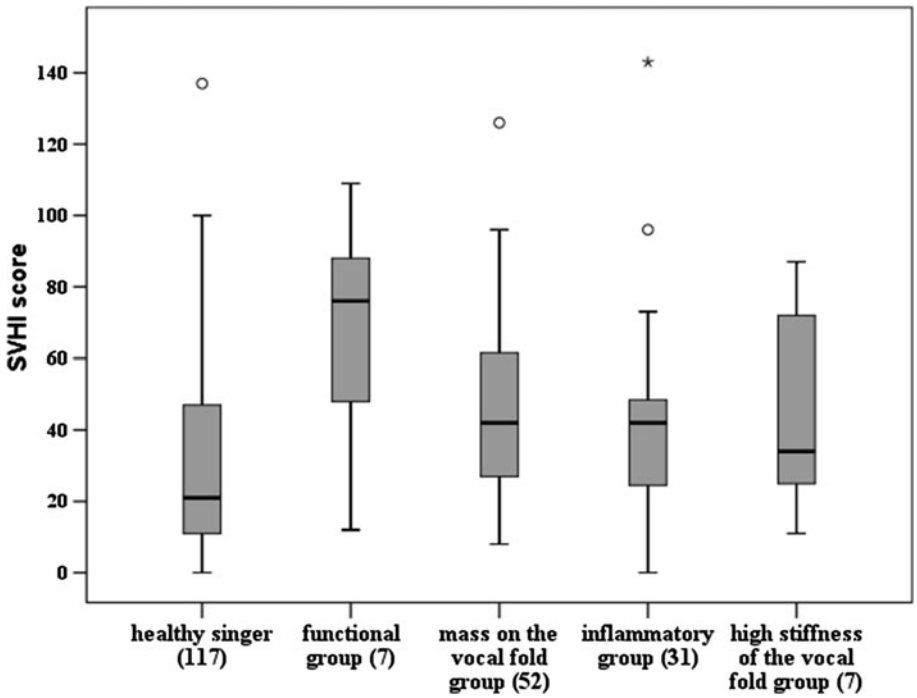

Fig. 1 SVHI scores in each subgroup

Table 2 Percentile distribution of the SVHI scores in each subgroup

Group	Percentile	
	25	50
Healthy singer	11	21
Functional group	36	76
Mass on the vocal fold group	27	42
Inflammatory group	23	42
High stiffness of the vocal fold group	20	34

scores between healthy and high stiffness of the vocal fold groups one needs to increase the number of pathological subjects.

The subgroup of non-healthy singers that obtained the highest SVHI scores are subjects with functional disorders, including incomplete closure of the vocal folds during phonation regardless of the association with muscular tension of the false vocal folds, and subjects with a presence of a mass, e.g., nodules, polyps or cysts, on the vocal fold. The difference in SVHI score between this subgroup and healthy singers is so wide as the sample size that is sufficient to conclude it is significant.

Concerning singers with a mass on the vocal folds, the difference could be caused by the strong impact that these pathologies have on the quality of the voice, resulting in changes in the typical characteristics of the voice and reduction in its range. Singers that have a great level of self-confidence with their voice during their performances may often find it difficult to compensate for conditions that alter their singing capacity. As such, singers may perceive a greater level of handicap during singing activities.

Functional disorders could manifest as changes in voice quality due to the increase of breathiness and the presence of vocal fatigue. Singers may perceive a high impact of these voice problems on their singing and teaching activities due to the worsening of voice quality and greater effort necessary to sing and speak.

It must be addressed that none of the singers selected to participate in this study refused to complete the questionnaire. Furthermore, all singers completed the SVHI in no more than ten minutes, without the need for assistance. This is important as it underlines the good compliance of the Italian version of the SVHI, demonstrating that it is acceptable and easy to administer.

Correlations between the Italian version of the SVHI and aspects that were not analyzed, duration of voice complaints, comorbidities and certain voice styles may be interesting areas for future studies. Furthermore, a more detailed study with homogeneous groups of different vocal fold pathologies could be useful to better analyze the disorder-specific health status instrument qualities of the Italian version of the SVHI.

Conclusions

The Italian version of the SVHI is a reliable and valid tool for measuring the level of handicap related to voice problems perceived by singers, as demonstrated by the adequate internal consistency and reliability. It is a well-tolerated instrument for the assessment of the impact of dysphonia on singers. The Italian version of the SVHI allowed discrimination between healthy and pathological vocal fold conditions.

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Organization WH (1980) International classification of impairments, disabilities, and handicaps: a manual of classification relating to the consequences of diseases World Health Organization. Switzerland, Geneva
2. Jacobson BH, Johnson A, Grywalsky A, Silbergleit A, Jacobson G, Benninger MS, Newman C (1997) The voice handicap index: development and validation. Am J Speech Language Pathol 6:66–70
3. Bonetti A, Bonetti L (2013) Cross-cultural adaptation and validation of the voice handicap index into Croatian. J Voice 27(1):130 e114–130 e137
4. Saleem AF, Natour YS (2010) Standardization of the Arabic version of the voice handicap index: an investigation of validity and reliability. Logoped Phoniatr Vocol 35(4):183–188
5. Behlau M, Lde Alves Dos Santos M, Oliveira G (2011) Cross-cultural adaptation and validation of the voice handicap index into Brazilian Portuguese. J Voice 25(3):354–359
6. Schindler A, Ottaviani F, Mozzanica F, Bachmann C, Favero E, Schettino I, Ruoppolo G (2010) Cross-cultural adaptation and validation of the voice handicap index into Italian. J Voice 24(6):708–714
7. Helidoni ME, Murry T, Moschandreas J, Lionis C, Printza A, Velegrakis GA (2010) Cross-cultural adaptation and validation of the voice handicap index into Greek. J Voice 24(2):221–227
8. Rosen CA, Murry T (2000) Voice handicap index in singers. J Voice 14(3):370–377
9. Murry T, Zschommler A, Prokop J (2009) Voice handicap in singers. J Voice 23(3):376–379
10. Cohen SM, Jacobson BH, Garrett CG, Noordzij JP, Stewart MG, Attia A, Ossoff RH, Cleveland TF (2007) Creation and validation of the singing voice handicap index. Ann Otol Rhinol Laryngol 116(6):402–406
11. Cohen SM, Witsell DL, Scearce L, Vess G, Banka C (2008) Treatment responsiveness of the singing voice handicap index. Laryngoscope 118(9):1705–1708
12. Garcia-Lopez I, Nunez-Batalla F, Gavilan Bouzas J, Gorriz-Gil C (2010) Validation of the Spanish version of the voice handicap index for vocal singing (SVHI). Acta Otorrinolaringol Esp 61(4):247–254
13. Phyland DJ, Oates J, Greenwood KM (1999) Self-reported voice problems among three groups of professional singers. J Voice 13(4):602–611
14. Titze IR, Lemke J, Montequin D (1997) Populations in the US workforce who rely on voice as a primary tool of trade: a preliminary report. J Voice 11(3):254–259

15. Gilman M, Merati AL, Klein AM, Hapner ER, Johns MM (2009) Performer's attitudes toward seeking health care for voice issues: understanding the barriers. J Voice 23(2):225–228
16. Franco RA, Andrus JG (2007) Common diagnoses and treatments in professional voice users. Otolaryngol Clin North Am 40(5):1025–1061
17. Cohen SM, Noordzij JP, Garrett CG, Ossoff RH (2008) Factors associated with perception of singing voice handicap. Otolaryngol Head Neck Surg 138(4):430–434