Voice handicap in singing: analysis of the Modern Singing Handicap Index – MSHI questionnaire

Desvantagem vocal no canto: análise do protocolo Índice de Desvantagem para o Canto Moderno – IDCM

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ABSTRACT

Purpose: To assess the sensitivity of the Italian self-assessment questionnaire Modern Singing Handicap Index – MSHI, translated and culturally adapted to Brazilian Portuguese as *Índice de Desvantagem para o Canto Moderno* – IDCM, comparing scores of amateur choir singers with or without voice complaints and non-singers according to gender, singing voice classification and singing activities. **Methods:** Two hundred twenty-six adults with ages between 16 and 66 years were divided into three groups: 58 singers with vocal complaints – SC; 112 singers without vocal complaints – SwC and 56 non-singers without vocal complaints – NS. The singers were selected from five university choirs of *a capella* Brazilian popular music, lead by the same conductor. The non-singers were recruited at the same institutions of the singers with similar demographic characteristics. The subjects filled in the IDCM individually. The IDCM is a questionnaire with 30 items divided into three subscales: disability (functional domain), handicap (emotional domain) and impairment (organic domain). The singers also did a self-assessment of their singing activities. **Results:** The mean IDCM score of the SC group (26.91) was higher than that of the SwC (16.61), and both were higher than that of the NS group (7.79). For the three groups, the impairment subscale showed higher scores, followed by disability and handicap. There were no score differences regarding gender, singing voice classification and singing activities. **Conclusion:** The questionnaire proved to be sensitive for modern singers with vocal complaints. Choir singers with vocal complaints had higher self-reported handicap in comparison to choir singers without vocal complaints and non-singers. Aspects of organic nature were highlighted with larger deviations.

Keywords: Voice; Quality of life; Evaluation studies; Protocols; Music; Occupational health; Questionnaires

INTRODUCTION

The World Health Organization defines health as a state of complete physical, mental and social well-being and not merely the absence of disease[1]. Recently this concept has been enlarged by adding aspects of quality of life, which is defined as the individual's perception of own position in life, in cultural context and values, regarding own purposes, expectations, standards and preoccupations[1-4]. In quality of life evaluation is crucial to have the subject perception as focus of the assessment instrument. Therefore, the main tools to verify the varied consequences of health issues are the questionnaires to quantify the impact of a disturbance in social, professional and financial relations[1].

Dysphonia represents a difficulty or deviation in voice production in which, most of times, does not represent an imminent risk of death to the person; hence the treatment is usually optional[5]. As voice is a multidimensional phenomenon, its evaluation must include the preceding complaint history, otolaryngologist evaluation and speech-language pathologist perceptual-auditory and acoustical evaluation. However, these assessments do not guarantee the voice problem measurement according to the person's perception[6-9].

Researches in severe vocal deviations, as spasmodic dysphonia, reinforce the importance of the vocal self-assessment in the voice evaluation[10], since the relation between a vocal disorder and quality of life loss is not always direct.

In professional voice usage, the relation between a vocal disorder and quality of life seems to be even more complex, since in some cases, i.e. teachers, a vocal deviation may not restrict professional activity; whereas in others cases, i.e. singers, belonging to vocal elite, a small deviation may cause a big impact in personal aspects (physical, mental, social, emotional and communication) as well in regard of professional and financial realms[11-13]. The problem may occur in speaking

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voice or be specific to singing voice. Although all problems in the singer voice may be considered severe due to their vocal demand, the perception of this professional regarding the vocal handicap is highly variable, either by broad diversity in voice use in different styles of singing and weekly hours than being more alert to vocal deviations, or to the use of voice as a work tool searching the adequate treatment in the beginning of the symptoms[14].

In the voice area, the VHI (Voice Handicap Index)[15] is the most known and used self-rating tool for voice disorder, developed in the US[16] and valid in almost 20 countries[17], including Brazil, entitled *Índice de Desvantagem Vocal* – IDV[18]. Usually this protocol is administered to adults with vocal complaints[19] and evaluate three different aspects: vocal disability, handicap and impairment.

The word impairment is defined as any temporary or permanent psychological, physiological, anatomic, and structural loss or abnormality. Disability means any restriction or reduction in the ability to fulfill an activity usually expected from the subject. Handicap is the resultant of impairment or disability characterized by the restriction or obstruction in fulfillment of an expected role, causing social, cultural, development and economic consequences[20,21].

Although the VHI validity and reliability are not questionable, its sensitivity to evaluate singers is poor, since the associated factors to subject perception of own vocal handicap in singing voice are not addressed in it[22], and do not regard the consequence of dysphonia in life of singers[14,23,24].

To address this population, VHI was adapted to singing voice[24,25]. After over 400 evaluations of singers, the Italian phoniatrician Franco Fussi suggested two versions for it: the Modern Singing Handicap Index – MSHI (entitled in Brazilian Portuguese as *Índice de Desvantagem para o Canto Moderno* – IDCM) and the Classical Singing Handicap Index – CSHI (entitled in Brazilian Portuguese as *Índice de Desvantagem para o Canto Clássico* – IDCC)[26].

The purpose of this study is to verify the sensibility of the Italian questionnaire Modern Singing Handicap Index – MSHI, translated and culturally adapted to Brazilian Portuguese as *Índice de Desvantagem do Canto Moderno* – IDCM, comparing the scores of amateur choir singers, with and without vocal complaints, with subjects' non-singers, regarding gender, vocal classification and singing activities.

METHODS

This research was approved by the Ethical Committee in Research of Centro de Estudos da Voz (CEP-CEV/ISEC 1215/07). All the participants (or their guardians) signed the informed consent, authorizing the execution and disclosure of this research and its results according to resolution 196/96 (BRAZIL. Resolutions MS/CNS/CNEP nº 196/96 of 1996, October 10).

A total of 226 volunteers aged from 16 to 66 years participated in the study. They were divided in three groups: 58 singers with vocal complaints – SC, 112 singer without vocal complaint – SwC and 56 people non-singers and without vocal complaints – NS. The singers were men (32 tenors and 48 basses) and women (49 sopranos and 41 altos), belonging to five amateur college choirs of Brazilian popular music, *a capella*, all governed by the same conductor. They all must have belonged to the choir at least for six months, with an average time of rehearsal of five hours per week, on two alternate days. All of them performed vocal warm-up varying from 20 to 30 minutes. The participants of NS group were recruited from the same institutions of singers, with similar demographic characteristics.

All the amateur choir singers filled in a self-assessment questionnaire with regards of identification, gender, birthday, choir name, vocal classification, time of singing, time of singing in choirs, time in the present choir, number of hours in singing lessons and/or vocal technique per week and number of weekly hours of rehearsal in choir, presence of voice disturbances (no, yes, sometimes) and in positive cases (yes and sometimes) the participant was guided to write when the problem started off and if there were any throat symptoms (burning, itching, pain, dryness sensation, tightness sensation and/or globus).

The MSHI protocol was translated and culturally adapted to Brazilian Portuguese as *Índice de Desvantagem para o Canto Moderno* – IDCM[27] (Appendix 1) and administered individually. The MSHI has 30 items, divided in three subscales: disability, handicap and impairment, which correspond respectively to the functional domain (i.e. "Due to my vocal disturbance I am forced to restrict my study/rehearsal time"), emotional (i.e. "I get worried when I am asked to repeat vocalizes or a singing phrase") and organic (i.e. "I have trouble controlling breathing to sing"). A five-points Likert scale was used to answer according to frequency of occurrence: 0=never, 1=rarely, 2=sometimes, 3=frequently, 4=always. The MSHI presents four scores: disability (functional), handicap (emotional) and impairment (organic) which with 40 points and the total score, composed by the sum of the previous scores with a maximum deviation of 120 points. As higher the punctuation, higher the handicap self-perceived.

The data was tabbed and analyzed as following: comparing the mean scores of MSHI between the genders of the three groups; comparing the mean MSHI scores between the vocal suits in the two singers groups; comparing mean MSHI scores of the three subscales and total of the three groups and the survey of the self-evaluation questionnaire data.

The significance level adopted was 5% (0.05). The non-parametric tests used were Mann-Whitney, Kruskal-Wallis, Friedman and Wilcoxon. To complete descriptive analysis, the Confidence Interval technique for mean was used.

RESULTS

The MSHI results indicate similar mean subscales (disability, handicap and impairment) and total scores between gender (male and female) and vocal classification/types (bass, alto, soprano, tenor) (Tables 1 and 2).

Comparing the MSHI mean scores for the SC, SwC and NS groups, there were significant differences in all comparisons, with higher mean scores to the handicap subscale, followed by disability and impairment subscales (Table 3).

Table 1. MSHI mean subscales and total scores according to gender

Gender		Disability		Handicap		Impairment		Total	
		F	M	F	M	F	M	F	M
SC group	Mean	8.45	6.80	4.63	5.85	13.74	14.45	26.82	27.10
	n	38	20	38	20	38	20	38	20
	p-value	0.329		0.993		0.838		0.928	
SwC group	Mean	4.96	4.40	2.85	3.43	8.73	8.83	16.54	16.67
	n	52	60	52	60	52	60	52	60
	p-value	0.740		0.440		0.875		0.829	
NS group	Mean	2.50	1.96	1.43	1.68	3.54	4.39	7.54	8.04
	n	28	28	28	28	28	28	28	28
	p-value	0.532		0.643		0.731		0.928	

Mann-Whitney Test (p≤0.05)
Note: F = female; M = male; SC group = singers with vocal complaint group; SwC group = singers without vocal complaint group; NS group = non-singers group

Tabela 2. MSHI mean subscales and total scores divided by vocal classification/type

	MSHI Subscales	Vocal type	Mean score	n	p-value
SC group	Disability	Bass	5.50	10	0.335
		Alto	9.71	17	
		Soprano	7.43	21	
		Tenor	8.10	10	
	Handicap	Bass	4.20	10	0.091
		Alto	6.41	17	
		Soprano	3.19	21	
		Tenor	7.50	10	
	Impairment	Bass	15.80	10	0.418
		Alto	16.06	17	
		Soprano	11.86	21	
		Tenor	13.10	10	
	Total	Bass	25.50	10	0.447
		Alto	32.18	17	
		Soprano	22.48	21	
		Tenor	28.70	10	
SwC group	Disability	Bass	4.68	38	0.718
		Alto	4.50	24	
		Soprano	5.36	28	
		Tenor	3.91	22	
	Handicap	Bass	3.16	38	0.579
		Alto	3.21	24	
		Soprano	2.54	28	
		Tenor	3.91	22	
	Impairment	Bass	8.74	38	0.953
		Alto	8.88	24	
		Soprano	8.61	28	
		Tenor	9.00	22	
	Total	Bass	16.58	38	0.983
		Alto	16.58	24	
		Soprano	16.50	28	
		Tenor	16.82	22	

Kruskal-Wallis Test (p≤0.05)
Note: SC group = singers with vocal complaint group; SwC group = singers without vocal complaint group

The three subscales and total mean scores were compared. There were significant differences between the studied groups to all comparisons (Table 4), highlighting the SC group always with higher results and the NS with lower results.

Table 3. MSHI mean subscales scores comparison

Subscales		Mean	n	p-value
SC group	Disability	7.88	58	<0.001*
	Handicap	5.05	58	
	Impairment	13.98	58	
SwC group	Disability	4.66	112	<0.001*
	Handicap	3.16	112	
	Impairment	8.79	112	
NS group	Disability	2.23	56	<0.001*
	Handicap	1.55	56	
	Impairment	3.96	56	

* Significant values (p≤0.05) – Friedman Test
Note: SC group = singers with vocal complaint group; SwC group = singers without vocal complaint group; NS group = non-singers group

Table 4. Comparison of the three groups in each subscale

Group		Mean	n	p-value
Disability	SC	7.88	58	<0.001*
	SwC	4.66	112	
	NS	2.23	56	
Handicap	SC	5.05	58	<0.001*
	SwC	3.16	112	
	NS	1.55	56	
Impairment	SC	13.98	58	<0.001*
	SwC	8.79	112	
	NS	3.96	56	
Total	SC	26.91	58	<0.001*
	SwC	16.61	112	
	NS	7.79	56	

*Significant values (p≤0.05) – Kruskal-Wallis Test
Note: SC = singers with vocal complaint group; SwC = sigers without vocal complaint group; NS = non-singers group

Finally, the mean scores of SC and SwC were compared regarding the self-assessment questionnaire. There were no significant differences between the two groups to all the questionnaire answers (Table 5).

DISCUSSION

Data about the problems affecting the professional voice

Table 5. Self-evaluation questionnaire

Questionnaire	Group	Mean	p-value
Time in present choir (years)	SC	2.28	0.832
	SwC	2.18	
Time of singing in choirs (years)	SC	5.53	0.826
	SwC	5.31	
Time of singing (years)	SC	7.73	0.456
	SwC	6.80	
Singing lessons (hours/week)	SC	0.74	0.176
	SwC	1.12	
Vocal technique (hours/week)	SC	0.73	0.240
	SwC	0.96	
Rehearsal time per week	SC	4.78	0.201
		5.37	

Mann-Whitney Test ($p \leq 0.05$)

Note: SC = singers with vocal complaint group; SwC = singers without vocal complaint group

user quality of life is limited, and even lower for amateur singers. It is known that voice disturbances in this professional result in changes, adaptations and/or interruptions in daily routine. Besides, the life style, the social environment and the professional vocal usage set may contribute to dysphonia set off or maintainance[11,12,28]. Dysphonia impact in voice professionals usually is deeply severe and may definitely compromise the career[11] or restrict hobbies or leisure activities.

Although it is known that dysphonia may cause important impact in daily activities and in people's quality of life, there are few instruments to quantify the impact of these disturbances in individuals' lives[14,28], and more specifically in professional voice users.

The male and female amateurs choir singers, of different vocal types/classification, present similar difficulties, which confirms the noninterference of this aspects in singing by factors that might involve the conductor care to classify voices, homogeneous distribution in diverse vocal types and similarity in vocal requirement[14,28].

The MSHI values were clearly higher to singers, which shows the relevance of having a specific instrument to the addressed population[29]. Comparing the three subscales, the impairment, corresponding to organic domain, showed higher scores followed by disability and handicap subscales, these last two representing respectively functional and emotional domain. Factors as lack of vocal technique, high vocal demand during speech and restricted experience in singing may justify this results[28], and consequently lead this subjects to a situation of potential vocal risk[24]. The reduced values of emotional domain may indicate that amateur choir singers do not depend financially on singing to for a living and, therefore, a small deviation in vocal quality may be accepted without producing psychological consequences, which is not true in professional singers, that financially depend on their voices, and any slight deviation in the vocal quality may have a huge impact on their quality of life[14], mainly regarding the psychological domain.

The MSHI scores comparison between the groups SC, SwC and NS and between the subscales into each group were significant to all analysis as the presence of vocal complaint as the determinant for the deviation. MSHI quantifies vocal handicap in singing activities due to any vocal problems so, the higher the presence of vocal complaints, the higher the probability of increased MSHI scores, showing the protocol sensitivity to singers population with complaints[14,28].

Finally, the comparisons between SC and SwC considering the self-assessment questionnaire to singing activities showed that the vocal complaints present in SC may not be explained by differences in singing voice usage routine, since both groups have similar behavior.

The inadequate vocal use by singer may prejudice own vocal health. Likewise, to understand the vocal complaints and difficulties of choir singers might help speech-language pathologists, vocal coaches, and conductors to provide health conditions of singing vocal use for this population.

CONCLUSION

Modern singers with vocal complaints present higher self-reported handicap when compared to singers without vocal complaint and non-singers. Modern singers with vocal complaint reported higher deviation in aspects belonging to the organic domain, reflecting the kind of difficult these population have. The questionnaire showed to be sensitive to this population, and may be administered by speech-language pathologists, vocal coaches and conductors in order to map vocal disturbances.

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RESUMO

Objetivo: Verificar a sensibilidade do protocolo italiano *Modern Singing Handicap Index* – MSHI, traduzido e culturalmente adaptado para o Português Brasileiro como Índice de Desvantagem para o Canto Moderno – IDCM, comparando os escores de coralistas amadores com e sem queixas vocais e de indivíduos não-cantores, de acordo com gênero, classificação vocal e atividades de canto. **Métodos:** Duzentos e vinte e seis indivíduos adultos, com idades entre 16 e 66 anos, foram distribuídos em três grupos: 58 cantores com queixas vocais – CCQ; 112 cantores sem queixas vocais – CSQ e 56 indivíduos não cantores e sem queixas vocais – GNC. Os cantores foram selecionados em cinco coros universitários de música popular brasileira, *a capella*, regidos pelo mesmo maestro. Os indivíduos não cantores foram recrutados nas mesmas instituições dos cantores, com características demográficas semelhantes. Os indivíduos preencheram individualmente o IDCM, questionário com 30 itens divididos em três subescalas: incapacidade (domínio funcional), desvantagem (domínio emocional) e defeito (domínio orgânico). Os cantores também realizaram uma auto-avaliação de suas atividades de canto. **Resultados:** A média dos escores do IDCM do CCQ (26,91) foi maior que a do o CSQ (16,61), e ambas maiores que a do GNC (7,79). Para os três grupos, a subescala defeito apresentou as maiores médias de escores, seguida por incapacidade e desvantagem. Não houve diferenças dos escores em relação ao gênero, classificação vocal e atividades de canto. **Conclusão:** O protocolo mostrou-se sensível para cantores modernos com problemas de voz. Coralistas com queixas vocais apresentaram maior desvantagem auto-relatada em relação aos sem queixas e não cantores. Aspectos de natureza orgânica destacaram-se com maiores desvios.

Descritores: Voz; Qualidade de vida; Estudos de avaliação; Protocolos; Música; Saúde ocupacional; Questionários

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Appendix 1. Brazilian version of the Modern Singing Handicap Index – MSHI questionnaire

Marque a resposta que indica o quanto você compartilha da mesma experiência:
Chave de resposta: 0: nunca; 1: quase nunca; 2: às vezes; 3: quase sempre; 4: sempre

O impacto do problema de voz nas atividades profissionais
Disability – Incapacidade

1	Sinto minha voz cansada desde o começo de uma apresentação.	0	1	2	3	4
2	Minha voz fica cansada ou alterada durante a apresentação.	0	1	2	3	4
3	Tenho que ajustar a minha técnica vocal, porque o problema de voz prejudica a minha emissão.	0	1	2	3	4
4	Meu problema vocal me obriga a modificar as músicas, limitar meu repertório ou mesmo mudar o tom.	0	1	2	3	4
5	Por causa do meu problema de voz sou forçado a limitar meu tempo de estudo/ensaio.	0	1	2	3	4
6	Sinto dificuldade nas apresentações por causa das alterações no meu rendimento vocal.	0	1	2	3	4
7	Não consigo fazer duas ou mais apresentações consecutivas.	0	1	2	3	4
8	Preciso da ajuda do operador de som para mascarar meu problema de voz.	0	1	2	3	4
9	Preciso tomar remédios continuamente para mascarar meu problema de voz.	0	1	2	3	4
10	Meu problema vocal me obriga a limitar o uso social da voz.	0	1	2	3	4

O impacto psicológico do problema de voz
Handicap – Desvantagem

1	Minha ansiedade antes das apresentações está maior que a habitual.	0	1	2	3	4
2	As pessoas com as quais convivo não compreendem minha queixa de voz.	0	1	2	3	4
3	As pessoas com as quais convivo têm criticado a minha voz.	0	1	2	3	4
4	Meu problema de voz me deixa nervoso e/ou menos sociável.	0	1	2	3	4
5	Fico preocupado quando me pedem para repetir um vocalize ou uma frase musical.	0	1	2	3	4
6	Sinto que minha carreira está em risco por causa do meu problema de voz.	0	1	2	3	4
7	Colegas, empresários e críticos já perceberam minhas dificuldades vocais.	0	1	2	3	4
8	Sou obrigado a cancelar alguns compromissos profissionais por causa da voz.	0	1	2	3	4
9	Evito agendar futuros compromissos profissionais.	0	1	2	3	4
10	Evito conversar com as pessoas.	0	1	2	3	4

Auto-percepção das características de minha voz
Impairment – Defeito

1	Tenho problemas com o controle da respiração para o canto.	0	1	2	3	4
2	Meu rendimento vocal varia durante o dia.	0	1	2	3	4
3	Sinto que minha voz está fraca ou tem ar na voz.	0	1	2	3	4
4	Sinto minha voz rouca.	0	1	2	3	4
5	Sinto que tenho que forçar minha voz para produzir os sons.	0	1	2	3	4
6	Meu rendimento vocal varia de modo imprevisível durante as apresentações.	0	1	2	3	4
7	Tento modificar minha voz para melhorar a qualidade.	0	1	2	3	4
8	Cantar está sendo uma tarefa difícil ou cansativa.	0	1	2	3	4
9	Minha voz fica pior à noite.	0	1	2	3	4
10	Minha voz fica facilmente cansada durante as apresentações.	0	1	2	3	4