



Voice handicap in lyric singers

Desvantagem vocal em cantores líricos

Desventaja vocal en cantantes líricos

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Abstract

Introduction: The Classical Singing Handicap Index (CSHI) assists the singer in the perception of his voice and the impact of the vocal production in his professional life. **Objective:** To compare the self-perception of the vocal handicap in lyric singers and the sociodemographic variables, the vocal complaints, the use of spoken voice and the period of the vocal signals and symptoms. **Methods:** Cross-sectional and analytical research, with thirty lyric singers from a public singing school. A questionnaire with sociodemographic data about the voice and the CSHI was used. The independent variables were dichotomized and compared to the domains: disability, handicap and defect of the CSHI through the Mann-Whitney test adopting a level of statistical significance of 5% ($p \leq 0.05$). **Results:** The habit of clearing the throat was the most frequent symptom. The CSHI scores indicated higher averages in the Defect domain. There was a statistically significant difference in all the subscales and in the total among those with and without vocal fatigue (Inability $p = 0.003$, Handicap $p = 0.028$, Defect $p = 0.013$, Total $p = 0.007$); as well as the period of the vocal signs and symptoms between no problem/acute problem and chronic problem (Handicap $p = 0.011$, Defect $p = 0.008$, Total $p = 0.012$); and among those with and without vocal complaints ($P = 0.022$, being adjacent in the Total $p = 0.053$). **Conclusion:** The lyric singers presented vocal handicap among those who reported fatigue when speaking and/or singing, with vocal complaints and these ones in a period considered chronic.

Keywords: Music; Singing; Voice; Voice Disorders; Speech, Language Pathology and Audiology.

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Resumo

Introdução: O Índice de Desvantagem no Canto Clássico (IDCC) auxilia o cantor sobre a percepção da sua voz e o impacto da produção vocal em sua vida profissional. **Objetivo:** Comparar a autopercepção da desvantagem vocal em cantores líricos e as variáveis sociodemográficas, queixas vocais, uso da voz falada e período dos sinais e sintomas vocais. **Métodos:** Pesquisa transversal e analítica, com trinta cantores líricos de uma escola pública de canto. Utilizou-se um questionário com dados sociodemográficos, sobre a voz e o IDCC. As variáveis independentes foram dicotomizadas e comparadas com os domínios incapacidade, desvantagem e defeito do IDCC pelo teste Mann-Whitney adotando um nível de significância estatística de 5% ($p \leq 0,05$). **Resultados:** O hábito de pigarrear foi o sintoma mais frequente. Os escores do IDCC apontaram maiores médias no domínio Defeito. Houve diferença estatisticamente significativa em todas as subescalas e no total entre aqueles com e sem cansaço vocal (Incapacidade $p=0,003$, Desvantagem $p=0,028$, Defeito $p=0,013$, Total $p=0,007$); bem como quanto ao período de sinais e sintomas vocais entre sem problema/problema agudo e problema crônico (Desvantagem $p=0,011$, Defeito $p=0,008$, Total $p=0,012$); e entre aqueles sem e com queixas vocais (Defeito $p=0,022$; sendo limítrofe no Total $p=0,053$). **Conclusão:** os cantores líricos apresentaram desvantagem vocal dentre os que referem cansaço ao falar e/ou cantar, com queixas vocais e estas em um período considerado crônico.

Palavras-chave: Música; Canto; Voz; Distúrbios da Voz; Fonoaudiologia.

Resumen

Introducción: El índice de desventaja en el canto clásico (IDCC) auxilia al cantante en la percepción de su voz y en el impacto de la producción vocal en su vida profesional. **Objetivo:** Comparar la autopercepción de las desventajas vocales en los cantantes líricos y las variables sociodemográficas; quejas vocales, uso de la voz hablada y período de los signos y síntomas vocales. **Métodos:** Investigación transversal y analítica, con treinta cantantes líricos de una escuela pública de canto. Se utilizó una encuesta con datos sociodemográficos, sobre la voz y el IDCC. Las variables independientes fueron divididas y comparadas con los dominios Incapacidad, Desventaja y Defecto del IDCC por el test Mann-Whitney adoptando un nivel de significado estadístico de 5% ($p \leq 0,05$). **Resultados:** El hábito de carraspear fue el síntoma más frecuente. Los escores del IDCC apuntaron mayores promedios en el dominio Defecto. Se observó una diferencia estadísticamente significativa en todas las subescalas y en el total entre aquellos con y sin cansancio vocal (Incapacidad $p=0,003$, Desventaja $p=0,028$, Defecto $p=0,013$, Total $p=0,007$); así como en cuanto al período de los signos y síntomas vocales entre sin problema / problema agudo y problema crónico (Desventaja $p=0,011$, Defecto $p=0,008$, Total $p=0,012$); y entre aquellos sin y con quejas vocales (Defecto $p=0,022$, siendo limítrofe en el Total $p=0,053$). **Conclusión:** los cantantes líricos presentaron desventaja vocal entre los que mencionan cansancio al hablar y / o cantar, con quejas vocales en un período considerado crónico.

Palabras claves: Música; Canto; Voz; Disturbios de la Voz. Fonoaudiología.

Introduction

Lyrical music can be baroque, classical, and romantic. Lyrical genre is a classical composition containing voice melody, whose artworks are complex, and voice quality is of paramount importance, as well as vocal projection and the interpretative dimension.¹ Lyric singing requires a lot of vocal technique, as singers are required to enhance the sound of their voices over the orchestra and successfully overcome environmental acoustic obstacles maintaining voice quality.^{1,2} In this way, vocal projection is essential to the lyrical genre and specific settings and the harmonious action of a number of factors are needed in order to obtain it, such as: breath activation, voice emission, articulation of words, interpretation and the performance of the vocal tract as a whole.³

Speech-language pathology strives to formulate, apply and analyze vocal assessment protocols in the context of the research. The use of these tools may assist the perception of singers on their own voice, in addition to check the impact of vocal production in their professional lives.⁴ The Classical Singing Handicap Index-CSHI⁵ protocol is often used, since it aims to analyze vocal changes in the singing voice. Its domains are based on the classification concepts of the World Health Organization (WHO, 1980 - *International Classification of Impairments, Disabilities and Handicaps - ICDH*)⁶ concerning the health context: Impairment, Disability and Handicap. 'Impairment' means any loss or abnormality of the structure or psychological, physical or anatomical function, while 'Disability' is related to any restriction or lack of ability to perform daily tasks; and 'Handicap' addresses social, economic or environmental issues due to an impairment or disability.

With respect to the 'classical' term in the protocol, it was maintained in the translation into Portuguese, but such terminology is not usual in Brazil to refer to the classical genre, since it is a historical era.⁷

The vocal complaints in lyric singers requires a clinical work, with the application of CSHI as starting point to understand the relationship between voice and work activities of these professionals.⁷ It was noted that these professionals reported good voice and have reduced voice handicap,⁵ presenting a lower incidence of vocal signs and symptoms. It can be explained by the greater contact with

techniques and greater dedication to the study of singing.⁷ The same applies to bodily pains, since a study with lyric choristers found that sore throat was the only one of the thirteen types of pain of the research that was more reported among these professionals when comparing with the population in general, probably indicating that the exercises provide greater muscular endurance.⁸

However, despite the advances related to the vocal health of singers, the literature is still scarce on the impact of voice disorders on professional singers, especially those who are dedicated to classical music.⁵ Therefore, considering the peculiarities of this music genre and the influence that the voice has on human life, this study aimed to check the vocal complaints of higher incidence and compare the self-perception of the voice handicap in singers and sociodemographic variables, the vocal complaints, the use of the spoken voice and the duration of vocal signs and symptoms.

Method

Cross-sectional and analytical research, whose target population for convenience was composed of thirty lyric singers from a public singing school, whose purpose is to educate lyric singers to be capable and prepared to perform a classical repertoire. A questionnaire with sociodemographic variables was designed with closed (gender, educational level, marital status) and opened (age and income) questions; ten vocal signs and symptoms dichotomized in yes / no (clearing throat habit, dry throat, fatigue when speaking or singing, failing voice, hoarseness, difficulty when speaking or singing, feeling of lump in the throat, pain when speaking, burning sensation in throat, stinging sensation in throat); self-evaluation of the frequency of voice use on a daily basis (low, moderate, too much, excessive); duration of vocal disorder (one week, from two to three weeks, from three weeks to a month, more than a month, I don't have a vocal disorder) and applied to the Classical Singing Handicap Index (CSHI).⁵

The CSHI⁵ was translated to Brazilian Portuguese and consists of 30 questions on a 5-point Likert scale, in which 0 - corresponds to never, 1 - almost never, 2 - sometimes, 3 - almost always, and, 4 - always; the higher the score, the greater the severity of the voice handicap. There are three domains in this protocol: 1. 'Disability', which

is related to the impact of the voice disorder in professional activities and functional aspects of the voice; 2. 'Handicap', that is, the psychological impact of voice disorders, which is related to the emotional domain; 3. 'Impairment' is related to the self-perception of voice characteristics with respect to the organic domain.

Variables with more than one answer choice were dichotomized: age group according to the average (≤ 38 years / > 38); educational level (higher education with a specialization/high school); marital status (with or without a partner); household income according to the average ($\leq R\$2,000.00$ / $> R\$2,000.00$); self-assessment of the frequency of voice use in a daily basis (low or moderate / too much or excessive); vocal complaints (with or without complaints), duration of vocal complaint (no or acute/chronic disorder).

Ten vocal signs or symptoms were listed and dichotomized according to the number of complaints, in similar way to the work of Costa et al.⁹, that is, those who reported two signs or symptoms were considered without vocal complaint and those with three or more were considered with a vocal complaint. With respect to the duration of the vocal complaint, the study followed the recommendation of the American Academy of Otolaryngology-Head and Neck Surgery Foundation,¹⁰ which defines acute changes as those lasting for more than three weeks.

Data collection was conducted in three visits to a professional technical music school. The

approach with teachers and students of the final classes of lyrical singing training was conducted in September, 2016, when the participants were informed about the research. The Free and Informed Consent Term and the questionnaire were provided and participants signed and responded it during class breaks. Researchers remained in place to clarify any doubts and the questionnaires were collected in the same day.

After the collection process, the data were tabulated and analyzed in the *Predictiv Analytics Software* (PASW). A descriptive analysis was performed with relative and absolute frequency analysis, dispersion and central tendency measures. In order to compare the domains and total scores of the CSHI with sociodemographic and voice-related variables, a Mann-Whitney test was conducted with a significance level of 0.05 (5%). This study was approved by the Research Ethics Committee of the Faculdades Unidas do Norte de Minas, under the process no. 1.721.642.

The average age of the singers was 38.7 years (± 10.2), while the minimum age recorded was 18 years old and the maximum age was 60 years old and, finally, the predominant age group was of 41 to 50 years old. With respect to the number of residents in the home, the median was three, while the minimum was one and the maximum was five people. The average income was R\$2,025.10 ($\pm R\979.21). Women are the majority and a small portion has no higher education. Sociodemographic data from all singers are shown in Table 1.

Table 1. Distribution of sociodemographic variables by absolute and relative frequencies

Variables	N	%
Gender		
Female	24	80.0
Male	6	20.0
Age group		
18 to 20	1	3.3
21 to 30	7	23.3
31 to 40	8	26.8
41 to 50	10	33.3
51 to 60	4	13.3
Education level		
Higher education with a specialization	10	33.3
Higher education	16	53.3
High school	4	13.4
Marital status		
Single	13	43.3
Married	13	43.4
Divorced	3	10.0
Stable union	1	3.3
Income(Reference Salary) R\$ 880.00		
≤ 2,000.00	20	66.7
> 2,000.00	10	33.3

Results

With respect to vocal signs and/or symptoms, 23.3% (n=7) reported three or more vocal complaints and 76.7% (n=23) presented no complaint or less than two complaints. The clearing throat habit was the most reported symptom, followed by sore throat and fatigue when speaking or singing. It was noted that more than a half reported to speak too much or excessively; while with respect to the duration of the vocal disorder, 40.0% of participants reported noticing it for more than a month (Table 2).

The results of the CSHI scores show highest averages in the impairment domain (vocal self-perception), followed by the disability domain (impact on professional activities) and finally the handicap domain (psychological impact). The total average of the CSHI in the three domains

was 18.87. The mean, median, standard deviation, minimum and maximum values of all variables are shown in Table 3.

It can be noticed that there is a statistically significant difference for the domain scores and the total score of the CSHI according to the presence of vocal fatigue, whereas the worst scores were recorded for those with vocal fatigue. It was also observed that individuals with vocal complaints had a significant higher average in the Impairment domain over when compared to those without vocal complaints. With respect to the duration of such signs and/or symptoms, the result was statistically significant in Handicap and Impairment domains, as well as in the Total score among those with complaints for over a month. Data from all variables are shown in Table 4.

Table 2. Distribution of voice-related variables by absolute and relative frequencies

Variables	N	%
Clearing throat habit		
No	14	46.7
Yes	16	53.3
Dry throat		
No	20	66.7
Yes	10	33.3
Vocal fatigue when speaking or singing		
No	24	80.0
Yes	6	20.0
Failing voice		
No	25	83.3
Yes	5	16.7
Hoarseness		
No	26	86.7
Yes	4	13.3
Effort when speaking or singing		
No	26	86.7
Yes	4	13.3
Feeling of lump in the throat		
No	28	93.3
Yes	2	6.7
Pain when speaking		
No	30	100.0
Yes	-	-
Burning sensation in the throat		
No	30	100.0
Yes	-	-
Stinging sensation in throat		
No	30	100.0
Yes	-	-
Voice use on a daily basis		
Low	0	0.0
Moderate	14	46.7
Too much	11	36.7
Excessive	5	16.7
Duration of vocal disorders		
I don't have a vocal disorder	6	20.0
One week	12	40.0
Two to three weeks	0	0.0
Three weeks to a month	0	0.0
More than a month	12	40.0

Table 3. Results of central trend measures and variability of the three domains and of the total of the Classical Singing Handicap Index - CSHI in lyric singers

Variables	\bar{X}	\tilde{X}	σ	Minimum	Maximum
Disability	6.2	3.5	6.5	0.0	23.0
Handicap	4.8	3.0	6.0	0.0	24.0
Impairment	7.9	5.5	8.2	0.0	33.0
Total	18.9	14.0	19.1	0.0	71.0

\bar{X} Mean; \tilde{X} Median; σ Standard Deviation.

Table 4. Comparison of total scores and CSHI's subscales, disability, disadvantage and impairment, by sociodemographic and voice-related variables in lyric singers

Variables	N	Disability	Handicap	Impairment	Total
		\bar{X} (σ) p-value	\bar{X} (σ) p-value	\bar{X} (σ) p-value	\bar{X} (σ) p-value
Gender					
Male	6	5.2 (4.2) 0.938	3.2 (3.2) 0.773	6.7 (6.2) 0.835	15.0 (12.5) 0.897
Female	24	6.4 (7.1)	5.3 (6.52)	8.2 (8.7)	19.3 (20.6)
Age group					
≤ 38	13	6.1 (6.5) 0.850	6.5 (7.3) 0.175	11.2 (10.2) 0.089	23.9 (22.8) 0.217
> 38	17	6.2 (6.8)	3.5 (4.7)	5.3 (5.2)	15.1 (15.4)
Marital status					
No partner	16	7.6 (6.7) 0.161	6.0 (7.4) 0.659	10.2 (9.9) 0.196	23.8 (22.8) 0.197
With partner	14	4.5 (6.2)	3.5 (3.8)	5.2 (4.8)	13.2 (12.4)
Income					
≤ R\$ 2,000.00	20	7.4 (7.6) 0.550	5.5 (6.8) 0.490	9.6 (9.0) 0.077	22.4 (21.8) 0.333
> R\$2,000.00	10	3.8 (2.8)	3.6 (4.2)	4.4 (5.1)	11.8 (9.5)
Clearing throat					
Yes	16	4.9 (5.9) 0.326	3.4 (3.7) 0.614	5.9 (4.0) 0.851	14.3 (11.6) 0.618
No	14	7.6 (7.2)	6.4 (7.7)	10.1 (11.0)	24.1 (24.6)
Dry throat					
Yes	10	7.6 (8.1) 0.452	4.6 (5.8) 0.947	8.9 (9.2) 0.440	21.1 (21.4) 0.552
No	20	5.5 (5.7)	5.0 (6.2)	7.4 (7.9)	17.8 (18.4)
Vocal fatigue (speaking/singing)					
Yes	6	12.5 (6.1) 0.003	10.0 (8.8) 0.028	16.8 (11.5) 0.013	39.3 (23.6) 0.007
No	24	4.6 (4.7)	3.5 (4.5)	5.6 (5.4)	13.8 (14.3)
Voice use					
Low/moderate	14	5.0 (5.9) 0.358	3.7 (4.9) 0.256	5.6 (6.6) 0.104	14.4 (15.9) 0.151
Heavy to excessive	16	7.2 (7.1)	5.8 (6.8)	9.8 (9.1)	22.8 (21.3)
Vocal complaints					
No complaint	23	5.0 (5.4) 0.146	4.3 (6.0) 0.165	6.4 (7.41) 0.022	15.6 (17.5) 0.053
Presence of complaints	7	10.1 (8.7)	6.7 (6.2)	12.857 (9.2)	29.7 (21.6)
Duration of vocal disorder					
No / acute disorder	18	4.3 (5.0) 0.115	2.9 (4.4) 0.011	4.7 (5.3) 0.008	11.9 (13.4) 0.012
Chronic disorder	12	9.0 (7.7)	7.667 (7.1)	12.6 (9.6)	29.3 (22.2)

Mann-Whitney; \bar{X} Mean; σ Standard Deviation; p= Significance value at 5%

Discussion

Most of the participants of this research are female, which is similar to data found in other studies with singers.^{4,11,12}

Literature is still scarce as to the application of the CSHI instrument in people dedicated to the classical genre. In the validation for Arabic language, the CSHI was applied in 70 art singers (popular and lyric singers) and specialized singers (Quran reciters and priests) divided in asymptomatic (control group) singers and singers with voice disorders. The instrument has been shown good internal consistency and excellent reliability, being a valid and sensitive tool to be used to measure the handicap resulting from typical voice disorders in the population of singers, as so it is indicated for clinical practice.¹³

The CSHI total average in this study showed that participants have greater vocal handicap compared to the 59 lyric singers from other study, whose total was 15.12 points.⁵ But there was a similarity with respect to the order of domains as reported by findings of other studies, in which the Impairment domain (organic domain) prevails, followed by Disability domain (functional domain), and the Handicap domain (emotional domain).^{4,5,13,14} In addition, there was a similar classification from the highest to the lowest handicap in studies related to modern singing that applied the Modern Singing Handicap Index - MSHI, which is a protocol similar to the CSHI.^{12,15}

The clearing throat habit was followed by dry throat as the most prevalent symptoms, but the results were not significant with CSHI. Hoarseness was the most frequent vocal complaint (31.3%) followed by dry throat (26.0%) in the study of 150 choral conductors in São Paulo.¹⁶ Throat clearing was also the most reported complaint in three other studies (65.2%, 44.6% and 43.6% respectively).^{11,17,18} The clearing throat habit may damage larynx tissues and may cause changes in the quality of voice of singers.¹

Dry throat may harm voice emission and a study that compared this complaint to the particular characteristics of the singing voice found an association with a more restricted vocal range,¹⁶ meaning that there was a loss of the most low and/or high notes.

Vocal fatigue was the third self-reported complaint in this group of singers, but it was signifi-

cantly associated with all domains of the CSHI. A study with lyric singers recorded a high occurrence of vocal fatigue (76.4%) in the group with vocal complaint.⁵ A research on vocal symptoms and gender showed that there was a statistically significant difference favoring women in relation to fatigue when speaking.¹⁹ However, this study had a higher number of women, which may have influenced this result. A research with choral conductors in São Paulo found that fatigue after speaking was associated with a worse singing intensity; while fatigue after singing was associated with an inefficiency of the singing voice.¹⁶

A study with 32 chorus singers applied the Vocal Symptom Scale and recorded the highest score in the Physical subscale, which was statistically significant with Handicap and Impairment domains.⁴ This means that organic symptoms have a psychological impact and also impact the self-perception of voice characteristics, and that the harmful habits presented must be alerted, such as the excessive use of the spoken voice, especially on the period of vocal disorders.

More than half of the participants reported an excessive use of the spoken voice on a daily basis, but this information was also not correlated with the CSHI. A study with conductors, singers¹⁶ and amateur singers of evangelical schools¹⁸ showed a high occurrence of excessive speaking habits, 60.0% and 63.6%, respectively. In general, a person that has a great demand of spoken voice generates an overload thus compromising the performance of laryngeal structures that can impact the singing voice.¹⁶ A study with teachers found an association of 'talking too much or excessively' with self-reported vocal disorders.²⁰ Individuals with three or more vocal complaints had higher averages in Impairment and Handicap domains, as well as in the Total score, when compared with those without vocal complaints or with up to three complaints, with significant results in the impairment domain and a threshold result in Total score. Studies show a statistically significant difference among all CSHI scores and the presence and absence of vocal complaints.^{5,7}

Voice disorders in singers have a greater impact on quality of life when compared to non-singers.²¹ One way to achieve an effective vocal projection in lyric singing refers to the development of the self-perception of the voice, thus turning singers into experts of their own possibilities and vocal limits.²²

The study of lyric singers, of which 17 had vocal complaints and 42 had no vocal complaints, showed greater handicap for those with vocal complaints, thus showing the sensitivity of the CSHI protocol.¹⁴

With respect to the duration of vocal signs and/or symptoms, a significant portion of the participants of this study reported that they noticed it for more than a month. The result was statistically significant in Handicap and Impairment domains, as well as in the Total score among those with complaints for over a month. This is a cause of concern, since the absence of due care for the vocal disorder may compromise the performance and the singer's career. Vocal complaints lasting for more than three weeks may be a laryngeal dysfunction signal and an appropriate measure is the medical diagnosis by videolaryngoscopy in such cases.²³

This study has some limitations. Firstly, since it made a dichotomous question on the vocal complaints, it could have addressed it in a Likert scale to check the frequency of problems more accurately. Secondly, it would have been interesting to know the voice classification and the career duration as a singer. However, the relevance of the results observed in this study should be highlighted and further studies may contribute to the elucidation of vocal disorders in singers, since it is rarely addressed in the literature and may be deepened in future studies in order to identify the interference level of certain variables.

Conclusion

The clearing throat habit was the most frequent symptom self-reported by singers on this study. The CSHI scores recorded higher averages in self-perception of voice characteristics (Impairment), followed by the psychological impact of the voice disorder (Handicap) and, finally, as to the impact of the voice disorder in professional activities (Disability).

Lyric singers presented vocal handicap among those who reported fatigue when speaking and/or singing, with three or more vocal complaints and chronic vocal disorders, proving the need for greater research into the health, work and voice relationships in this population, as well as the need to develop programs aimed to protect the health of singers.

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