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Keywords

Speech perception
Quality of life
Voice
Dysphonia
Self-assessment
Voice disorders

Descritores

Percepção da fala
Qualidade de vida
Voz
Disfonia
Auto-avaliação
Distúrbios da voz

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Received: 5/11/2011

Accepted: 3/5/2012

Perceived dysphonia by the clinician's and patient's viewpoint

Disfonia na percepção do clínico e do paciente

ABSTRACT

Purpose: To verify the relationship between the clinician's vocal evaluation and vocal self-assessment and voice-related quality of life. **Methods:** Participants were 96 individuals: 48 with vocal complaints and voice deviation (VCG), mean age of 51 years, with diagnosis and indication of voice therapy; and 48 with no vocal complaints and healthy voices (NVCG), mean age of 46 years. All participants answered the Voice-Related Quality of Life (V-RQOL) questionnaire, performed a vocal self-assessment and were submitted to auditory-perceptual analysis of voice. **Results:** Mean V-RQOL scores were different between groups for all domains. Self-assessment results also showed differences between groups, which was not the case in the auditory-perceptual analysis of sustained vowel and connected speech, showing that the patient's perception was worse than the clinician's. There was correlation between the V-RQOL domains (Socio-emotional and Physical: 76.8%; Socio-emotional and Total: 90.8%; Physical and Total: 95.8%), as well as between the Socio-emotional (-52.9%), Physical (-43.1%) and Total (-52.2%) domains and the self-assessment. However, no correlation was found between auditory-perceptual analysis and self-assessment measures, except for a weak correlation between vocal self-assessment and auditory-perceptual analysis of the sustained vowel (33.3%). **Conclusion:** The clinician's perception does correspond to the individual's self-perception of his/her vocal quality and the impact of a voice deviation on his/her quality of life, but not directly. The individual's perception about his/her vocal quality and voice-related quality of life complements the clinician's perception regarding the overall degree of the voice deviation.

RESUMO

Objetivo: Verificar a relação entre a avaliação do fonoaudiólogo e a autoavaliação vocal e o impacto da disfonia na qualidade de vida do paciente. **Métodos:** Participaram 96 indivíduos, 48 com queixa e alteração vocal (GQ), média de idade de 51 anos, com diagnóstico e indicação de fonoterapia, e 48 sem queixa vocal e voz saudável (GSQ), média de idade de 46 anos. Todos responderam ao protocolo Qualidade de Vida em Voz (QVV), realizaram autoavaliação e foram submetidos à avaliação perceptivo-auditiva da voz. **Resultados:** Os escores médios do QVV dos grupos foram diferentes para todos os domínios. A autoavaliação mostrou valores bem distintos para os grupos, diferentemente dos obtidos na perceptivo-auditiva da vogal sustentada e da fala encadeada, mostrando que a percepção do paciente foi pior que a do clínico. Observou-se correlação entre os domínios do protocolo QVV (Sócio-emocional e Físico: 76,8%; Sócio-emocional e Total: 90,8%; Físico e Total: 95,8%), assim como entre os domínios Sócio-emocional (-52,9%), físico (-43,1%) e total (-52,2%) com a autoavaliação. Entretanto, não se observou correlação entre a análise perceptivo-auditiva e as medidas de autoavaliação, com exceção de uma baixa correlação entre autoavaliação vocal e a análise perceptivo-auditiva da vogal sustentada (33,3%). **Conclusão:** A percepção do clínico corresponde à percepção que o indivíduo tem da sua qualidade vocal e do impacto da alteração de voz na sua qualidade de vida, contudo não de forma direta. A percepção do indivíduo sobre a própria voz e sobre o impacto da disfonia na sua qualidade de vida complementa a percepção do clínico quanto ao grau geral desta alteração.

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Conflict of interests: None

INTRODUCTION

Voice evaluation is traditionally focused on the clinician's perception, which makes the auditory-perceptual analysis the most important assessment tool in voice therapy⁽¹⁻³⁾. This assessment is essential to the clinical practice when complemented by other voice evaluation modalities, since it guides the diagnosis and management of the case in order to guarantee an adequate treatment planning. Because it is based on the clinician's perception, the auditory-perceptual analysis is considered a subjective assessment with variable reliability; it can be influenced by previous training, by the experience, perception skills and personal preferences of the evaluator, by the speech task, among other factors^(1,2,4-6).

It is important to emphasize that the subjectivity of perceptual analysis is not enough reason for this analysis not be used, because, since voice is a fundamentally perceptual phenomenon⁽²⁾ in response to an acoustic stimulus⁽⁷⁾, it is logical that the auditory-perceptual analysis is the best candidate to evaluate such phenomenon⁽²⁾. Other aspects that influence the popularity of this assessment in clinical settings are: low cost, short time of application, comfort to the patient, and few pre-requisites of technical knowledge and skills. In addition to its wide clinical use, the auditory-perceptual analysis is very used in voice research^(1,2).

Due to the fact that the auditory-perceptual analysis is criticized for its subjectivity, objective measures have been announced as a better alternative. However, despite the decades of research that explored those measures, no ideal objective assessment has been established yet. Thus, the auditory-perceptual analysis will always be valuable, regardless of the technological advance. When acoustic methods fail, the perceptual analysis can be relied on⁽²⁾.

Subjectivity in the health area is not limited only to the assessment focused on the clinician's perception, but also on the patients' perception about their health status. The World Health Organization (WHO) has broadened the concept of health including aspects of quality of life in the definition of physical, mental and social well-being⁽⁸⁾. Hence, in clinical practice, data obtained through auditory-perceptual and acoustic analyses are not enough to measure the real dimension of a voice disorder, since they do not provide information about the patient's perception regarding the limitations faced on daily activities⁽¹¹⁾. Self-assessment must be valued^(3,10) and taken into consideration as fundamental part of the voice evaluation^(12,13).

In clinical practice, specifically in the voice area, some self-assessment protocols investigate the impact of a voice disorder on the individual's quality of life^(9,11,14-16). It is worth highlighting that the patient's perception of this impact depends on individual, social, cultural and professional characteristics, and hence it is not always related to the severity or prognosis of the voice deviation^(1,17,18).

A research⁽¹⁷⁾ compared the vocal quality deviation according to the clinician's and the patient's perception. The authors concluded that both the clinician and the patient mostly assess and experience dysphonia in a different way. While the patient's perception reflects social and emotional effects of the voice

problem^(2,17,19), clinicians perform a specific evaluation, based on their experiences and internal references, considering only the vocal deviation. The study also concludes that the use of assessment instruments focusing both clinician and patient are fundamental in clinical practice^(2,17).

Even though there are instruments that help and complement the voice practice, there are still few researches^(14,20) that correlate clinician's and patient's perception regarding the severity of vocal deviation. Therefore, the purpose of this research was to verify the relationship between the speech-language pathologist's evaluation and the patient's vocal self-assessment, as well as the impact of dysphonia on his/her quality of life.

METHODS

The research project was approved by the Research Ethics Committee of the Centro de Estudos da Voz (CEV), under number 0216/08. All participants signed the Free and Informed Consent.

Participants were 96 adults with ages between 25 and 81 years, 76 women and 20 men, who were distributed into two groups: with vocal complaints and deviation (VCG), and without vocal complaints and with healthy voices (NVCG). The VCG comprised 48 individuals (38 women and 10 men) with ages between 31 and 76 years (mean of 51 years), who sought for help at an Otorhinolaryngology outpatient clinic, being diagnosed with dysphonia and referred to voice therapy. The medical diagnosis was not an inclusion criteria for this research, that is, individuals were included on the VCG due to the reported vocal complaint and the voice deviation observed by the speech-language pathologist at the time of evaluation. Data collection of this group (VCG) was conducted after the otorhinolaryngologist's referral to voice therapy, during vocal assessment. Therefore, none of the individuals had been submitted to previous voice therapy. Moreover, none of them presented any other communication disorder (inclusion criteria).

The NVCG comprised 48 individuals (38 women and 10 men) with ages between 25 and 81 years (mean of 46 years), selected and assessed at the same institution, at the Ophthalmology outpatient clinic, due to complaints of reduced visual acuity. In addition, accompanying persons and personal contacts also participated in this research. This group was composed by individuals with no voice complaints who did not present vocal quality deviation (observed by the first author) during data collection.

The procedures performed were: self-assessment of vocal quality, administration of the Voice-Related Quality of Life (V-RQOL) protocol, and auditory-perceptual analysis of the overall voice deviation (performed by a speech-language pathologist with experience in voice). For the vocal self-assessment, individuals were asked to evaluate what they thought of their own voices on a five-point scale, selecting one of the following options: 1. excellent, 2. very good, 3. good, 4. fair, and 5. poor.

In order to evaluate the impact of their voice problem on their quality of life, subjects answered the V-RQOL protocol⁽⁷⁾, validated into Brazilian Portuguese by Gasparini and Behlau⁽¹¹⁾.

This questionnaire has ten items, including six in the physical domain and four in the social-emotional domain. The items are straight forward and the time of administration is short. The questionnaire produces three scores: physical, social-emotional and total. The results vary from 0 to 100, and the higher the score the worse the quality of life^(7,9,17).

For the auditory-perceptual analysis (APA), voice samples were registered in a portable computer (HP Pavilion dv6000) using the SoundForge 4.5 software. The recordings were registered with a head-mounted microphone (Bright®) at a set distance of five centimeters from the mouth, in a quiet room. The following voice tasks were collected: sustained vowel /*ε*/ (as in «bed»), and number counting from 1 to 20, both in habitual pitch and loudness, selected by the participant. The perceptual analysis was performed by a speech-language pathologist with experience in voice, who presented an acceptable reliability (sustained vowel: $p=0.655$; numbers: $p=0.317$), as analyzed by the Wilcoxon test (with 5% significance level). The judge/evaluator was blind to the studied population, and was asked to judge the overall voice deviation (overall impact) according to a five-point scale one that included the following options: 1. excellent, 2. very good, 3. good, 4. fair, and 5. poor. Two analyses were performed: one for the sustained vowel and one for the numbers.

Two separate analyses were performed: one for the sustained vowel, and one for the counting of numbers. Voice samples were presented by loud speakers, in a quiet room.

Data were statistically analyzed using the Mann-Whitney test for groups comparison (VCG and NVCG). The Spearman correlation test was used to measure the degree of correlation between all the variables: between V-RQOL domains, between self-assessment and V-RQOL domains, between perceptual analysis (sustained vowel and numbers) and V-RQOL domains and self-assessment.

RESULTS

In the comparison between groups (VCG and NVCG), it is observed that both analysis using instruments focused on the patient presented significant difference ($p<0.001$ for all items). On the other hand, when the groups were compared according to the clinician's analysis, only the sustained vowel task presented significant difference ($p=0.006$). The mean V-RQOL scores were lower for the VCG (Table 1).

Statistical analysis showed correlation between some of the variables studied (Table 2). When the V-RQOL scores were compared, there were positive correlations between physical and social-emotional scores (76.8%, $p<0.001$), between total and social-emotional scores (90.8%, $p<0.001$), and between total and physical scores (95.8%, $p<0.001$). Moreover, there was negative correlation between vocal self-assessment and all V-RQOL scores (-52.9%, $p<0.001$; -43.1%, $p=0.002$; -51.2%, $p<0.001$). No correlations were found between auditory-perceptual analyses (sustained vowel and numbers) and the

Table 1. V-RQOL, vocal self-assessment and perceptual analysis scores according to the groups with and without vocal complaints

Variables	Group with vocal complaint		Group without vocal complaint		p-value
	Mean	SD	Mean	SD	
V-RQOL					
Social-emotional score	70.7	28.9	98.8	3.8	<0.001*
Physical score	65.2	21.9	98.0	4.9	<0.001*
Total score	67.6	23.3	98.3	3.4	<0.001*
Self-assessment	4.23	0.81	2.92	0.87	<0.001*
Perceptual analysis - Vowel / <i>ε</i> /	1.83	1.02	1.31	0.66	0.006*
Perceptual analysis - Numbers	1.31	0.97	0.98	0.64	0.111

Intra-rater reliability: sustained vowel $p=0.655$; numbers $p=0.317$

* Significant values ($p\leq 0.05$) – Mann-Whitney test

Note: SD = standard deviation

Table 2. Correlations between the studied variables for the group with vocal complaints

Variables	Social-emotional domain	Physical domain	Total score	Self-assessment
Physical domain	76.8% <0.001*	-	-	-
Total score	90.8% <0.001*	95.8% <0.001*	-	-
Self-assessment	-52.9% <0.001*	-43.1% 0.002*	-51.2% <0.001*	-
Perceptual analysis - Vowel	-9.6%	-13.7%	-13.2%	33.3% 0.021
Perceptual analysis - Numbers	-25.9%	-28.3%	-26.4%	25.9%

*Significant values ($p\leq 0.05$) – Spearman Correlation

V-RQOL domains, as well as between the perceptual analysis of number counting and the self-assessment. It is important to emphasize that the correlation found between the perceptual analysis of the sustained vowel and the vocal self-assessment was very weak.

DISCUSSION

Auditory-perceptual analysis is usually used in the clinical routine of Speech-Language Pathology, specifically in the voice area, and despite the advances in other types of assessment, such as acoustic analysis, there are no evidences that it is going to be discarded⁽²⁾. Perceptual analysis is frequently considered gold standard for the classification of voice disorders, and it is used by experienced clinicians along with other complementary assessment tools^(1,2). This analysis is part of a set of tests used in vocal assessment, which must comprise both subjective and objective data, including the individual's perspective about the impact of the voice problem on his/her quality of life. Easily administered self-assessment questionnaires are used in order to assess the individual's perspective of the impact of a voice problem, such as the Voice-Related Quality of Life (V-RQOL) protocol^(9,11). This instrument was selected to be used in this research because it is short and easily answered⁽²¹⁾.

The patient's participation during vocal assessment is of vital importance, because he/she is the only one that can provide information that are crucial for the diagnosis and the management of the case⁽²²⁾, such as all the perceptions about what is it like to live with a voice problem. The set of information obtained by the clinician⁽²³⁾ and the patient's perception can contribute for a broader analysis of the dimension of the problem and, possibly, direct the management more carefully.

Hence, this study investigated the possible relationship between the individual's perception of his/her own voice and the impact of dysphonia in his/her quality of life and the auditory-perceptual analysis of the overall voice deviation performed by the clinician. The hypothesis of this research was that there would be a correlation between these two modalities of assessment, however clinical evaluation would not be able to completely measure the degree of functional, social and emotional deviation produced by the voice disorder. We were able to identify that there is indeed a correlation between the perceptions of the clinician and the patient (Table 2), but it is not strong nor straight forward. While the dysphonic individual has an overall evaluation of the impact of his dysphonia, focused not only on his/her judgment of the sound of the voice, but also on the physical, social and professional restrictions, the clinician performs a more specific analysis, focused on his/her judgment on the sound of the voice. Therefore, a broader investigation is necessary in the voice clinical routine, using subjective and objective assessments and including the perspective of the patient⁽²²⁾. Some contributions in the area reinforce this statement^(2,17), evidencing the importance of using instruments based both on the clinician's and the patient's perceptions. Instruments based on the clinician characterize the severity of dysphonia, whereas instruments that analyze the perception of patients reflect the effect of dysphonia on several domains of their lives.

The scores of the V-RQOL show that individuals without vocal complaint present higher values that indicate better voice-related quality of life. On the other hand, in the group of individuals with vocal complaint, as expected, scores were lower, suggesting that the dysphonia produces a negative impact on their lives^(9,10,11,21).

A similar pattern of findings was observed in the results of the vocal self-assessment, since the individuals with vocal complaints perceived their voices as being worse when compared to the individuals with healthy voices. Thus, both the V-RQOL and the self-assessment showed the same type of perception. In this study, we observed that individuals with vocal complaints perceived their voices as fair (mean=4.23) and those that did not have vocal complaints perceived their voices as good (mean=2.92). Other researches that also investigated self-assessment and quality of life reported that individuals with deviated vocal quality perceive the negative effect of dysphonia on their lives, presenting low V-RQOL scores^(9,10,17), that is, the worse their vocal self-assessment, the worse their quality of life. In the present study, this correlation was also positive, since individuals with vocal complaints that self-rated their voices as fair had lower V-RQOL scores, in opposition to what happened to the group without vocal complaints.

The mean value of the auditory-perceptual analysis of the sustained vowel was similar for both groups. This is probably due to the fact that there were no extreme voice deviations in the sample studied. Therefore, the mean overall degree of deviation was very similar to the values of a vocal quality without deviation⁽²⁴⁾. This is not a surprising finding, even though the population has vocal complaint and deviation, since the voice quality deviation is assessed within a continuous range that can vary from no deviation at all to a very severe deviation. There are no definite categories of voice deviations and, therefore, the limits between some voices may not be evident. For instance, a voice with a deviation that falls within the normal variability and a mildly deviated voice may sound very similar.

When the relationship among the studied variables is analyzed, a positive correlation was found among all the V-RQOL scores. The vocal self-assessment also correlates with the V-RQOL scores. These findings suggest that individuals with voice deviation present a negative effect on any social-emotional and/or physical aspects of their lives⁽²⁰⁾. Hence, the worse the score of a V-RQOL domain, the worse the other V-RQOL scores, indicating that when an individual perceives a greater impact on the aspects related to the functional use of his/her voice, he/she will somehow have a negative effect on emotional aspects too⁽¹⁰⁾. The same occurs with the vocal self-assessment, indicating that the worse the individual's perception of his/her voice deviation, the worse the influence of this disorder on all dimensions of his/her quality of life, previously mentioned^(10,15,17,19). Some studies support this statement^(13,17), reporting that individuals with dysphonia have an overall impact on their quality of life, and not specifically over a certain domain⁽²²⁾.

When we studied the relationship between patient's and clinician's evaluations, the correlation was not as direct and strong as the one found between self-assessment and V-RQOL

scores. This lack of correlation was probably found because the impact produced by dysphonia may not be measured only by the voice sound⁽¹²⁾. The weak correlation between the auditory-perceptual analysis and self-assessment indicates that the speech-language pathologist, even technically experienced, may not be able to estimate accurately the impact that the voice deviation produces to the patient^(10,17,22). One should remind that when assessing his/her own voice, the individual perceives several dimensions: the sound of the voice, the effort used during speech, the fatigue associated to voice production, personal, professional and social limitations⁽²⁵⁾ imposed by the voice problem, well-being alterations, voice changes according to age⁽²⁶⁾, among others. Therefore, the judgment is based on auditory, sensorial, psychological, and physical references, etc. On the other hand, clinicians base their judgment only on the sound stimuli, and do not have access to the other dimensions⁽²⁾.

Similar findings were also found in an American study⁽¹⁷⁾ that evaluated the reliability of methods based on the clinicians' perception, comparing them to the methods based on the patients' perception of his/her vocal quality. The research analyzed 103 perceptual assessments. When the authors correlated the patients' perception data obtained with the V-RQOL and the IPVI (Iowa Patient's Voice Index), they found that the weak correlation may be explained by the fact that the patient's perception varies widely according to his/her expectations. The results also showed a weak correlation between clinician's and patients' evaluations (total V-RQOL score). This finding supports the fact that clinical evaluation considers specific vocal deviations, while patient's perception considers social and emotional effects caused by the vocal problem. Thus, the authors concluded that, in clinical practice, it is necessary to use assessment instruments centered on both clinicians and patients⁽¹⁷⁾.

There are no perfect strategies of auditory-perceptual evaluation⁽²⁾, since there will always be error and confusion factors in the analyses. Therefore, possible interference factors must be considered. However, despite this fact, there is no evidence that this type of analysis is going to lose its importance in the future. The use of specific protocols that include perceptual parameters frequently used in clinical practice is also recommended, with the aim to reduce the potential differences between judges. Nevertheless, the patient's self-assessment must be valued in clinical routine.

Hence, it is important for clinical practice to gather information from both perspectives (clinician's and patient's) during voice assessment, using specific instruments, in order to accurately and reliably measure the severity of the problem and to contribute to the direction of intervention and therapeutic planning.

CONCLUSION

The clinician's perception does correspond to the individual's self-perception of his/her vocal quality and the impact of the voice deviation on their quality of life, but not directly. The individual's perception about his/her vocal quality and voice-related quality of life complements the clinician's perception about the overall degree of voice deviation.

REFERÊNCIAS

1. Behlau M, Madazio G, Feijó D, Pontes P. Avaliação de voz. In: Behlau M. *Voz: o livro do especialista*. Vol.1. Rio de Janeiro: Revinter; 2004. Capítulo 3; p. 85-245.
2. Oates J. Auditory-perceptual evaluation of disordered voice quality: pros, cons and future directions. *Folia Phoniatr Logop*. 2009;61(1):49-56.
3. Colton RH, Casper JK, Leonard R. Compreendendo os problemas da voz: uma perspectiva fisiológica no diagnóstico e tratamento das disfonias. 3a ed. Rio de Janeiro: Revinter; 2010. p.195-251.
4. Shrivastav R, Sapienza CM. Objective measures of breathy voice quality obtained using an auditory model. *J Acoust Soc Am*. 2003;114(4 Pt 1):2217-24.
5. Shrivastav R. Multidimensional scaling of breathy voice quality: individual differences in perception. *J Voice*. 2006;20(2):211-22.
6. Bele IV. Reliability in perceptual analysis of voice quality. *J Voice*. 2005;19(4):555-73.
7. Shrivastav R, Sapienza CM, Nandur V. Application of psychometric theory to the measurement of voice quality using rating scales. *J Speech Lang Hear Res*. 2005;48(2):323-35.
8. World Health Organization. Measuring quality of life. The World Health Organization quality of life instruments (The WHOQOL-100 and the WHOQOL-Bref) [Internet]. 1997 [cited 2012 May 5]. Available from: http://whqlibdoc.who.int/hq/1997/WHO_MSA_MNH_PSF_97.4.pdf
9. Hogikyan ND, Sethuraman G. Validation of an instrument to measure voice-related quality of life (V-RQOL). *J Voice*. 1999;13(4):557-69.
10. Kasama ST, Brasolotto AG. Percepção vocal e qualidade de vida. *Pró-Fono*. 2007;19(1):19-28.
11. Gasparini G, Behlau M. Quality of life: validation of the Brazilian version of the voice-related quality of life (V-RQOL) measure. *J Voice*. 2009;23(1):76-81.
12. Woisard V, Bodin S, Yardeni E, Puech M. The voice handicap index: correlation between subjective patient response and quantitative assessment of voice. *J Voice*. 2007;21(5):623-31.
13. Krischke S, Weigelt S, Hoppe U, Köllner V, Klotz M, Eysholdt U, et al. Quality of life in dysphonic patients. *J Voice*. 2005;19(1):132-7.
14. Spina AL, Maunsell R, Sandalo K, Gusmão R, Crespo A. Correlação da qualidade de vida e voz com atividade profissional. *Rev Bras Otorrinolaringol*. 2009;75(2):275-9.
15. Ma EP, Yiu EM. Voice activity and participation profile: assessing the impact of voice disorders on daily activities. *J Speech Hear Res*. 2001;44(3):511-24.
16. Jacobson BH, Johnson A, Grywalski C, Silbergleit A, Jacobson G, Benninger MS, et al. The Voice Handicap Index (VHI): development and validation. *Am J Speech Lang Pathol*. 1997;6:66-70.
17. Karnell MP, Melton SD, Childes JM, Coleman TC, Dailey AS, Hoffman HT. Reliability of clinician-based (GRBAS and CAPE-V) and patient-based (V-RQOL and IPVI) documentation of voice disorders. *J Voice*. 2007;21(5):576-90.
18. Vannuci MG. Relação entre autoavaliação vocal, escores do protocolo QVV e desvios vocais em professores de educação física [monografia]. São Paulo: Centro de Estudos da Voz; 2003.
19. Deary IJ, Wilson JA, Carding PN, Mackenzie K. The dysphonic voice heard me, you and it: differential associations with personality and psychological distress. *Clin Otolaryngol Allied Sci*. 2003;28(4): 374-8.
20. Behrman A, Sulica L, He T. Factors predicting patient perception of dysphonia caused by benign vocal fold lesions. *Laryngoscope*. 2004;114(10):1693-700.
21. Behlau M, Oliveira G, dos Santos LM, Ricarte A. Validação no Brasil de protocolos de auto-avaliação do impacto de uma disfonia. *Pró-Fono*. 2009;21(4):326-32.
22. Jones SM, Carding PN, Drinnan MJ. Exploring the relationship between severity of dysphonia and voice-related quality of life. *Clin Otolaryngol*. 2006;31(5):411-7.

23. Deary IJ, Wilson JA, Carding PN, Mackenzie K. VoiSS: a patient-derived Voice Symptom Scale. *J Psychosom Res.* 2003;54(5):483-9.
24. Yamasaki R, Leão SH, Madazio G, Padovani M, Azevedo R, Behlau M. Correspondência entre escala analógico-visual e a escala numérica na avaliação perceptivo-auditiva de vozes. In: XVI Congresso Brasileiro de Fonoaudiologia; 2008 Set 24-27; Campos de Jordão – SP.
25. Wilson JA, Deary IJ, Millar A, Mackenzie K. The quality of life impact of dysphonia. *Clin Otolaryngol.* 2002;27(3):179-82.
26. Putnoki DS, Hara F, Oliveira G, Behlau M. Qualidade de vida em voz: o impacto de uma disfonia de acordo com o gênero, idade e uso de voz profissional. *Rev Soc Bras Fonoaudiol.* 2010;15(4):485-90.