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Brief communication

Relationship between glottic function and voice handicap in public school teachers

Relação entre a função glótica e a desvantagem vocal em professores da rede pública de ensino

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ABSTRACT

Purpose: to understand the self-perception of the glottic function and of the voice handicap in teachers and to identify if there is correlation and association between these two variables.

Methods: a total of 78 teachers of both genders from the public school system, aged between 30 and 45, participated in the study. Voice Handicap Index - 10 (VHI-10) and Glottal Function Index (GFI) were used to collect data on school teachers. Chi-squared test and Spearman's correlation test were applied to analyze the results, with a significance level of 5%.

Results: a total of 78 teachers, average age of 40 years (standard deviation ± 8 years) participated in the study, twenty-five subjects (32%) being males and 53 (68%), females. The results of both questionnaires were significantly associated ($p < 0.01$) and were strongly correlated ($R = 0.76$; $p < 0.01$).

Conclusion: the teachers of the study perceived voice handicap, mainly related to the difficulty of speaking in noisy environments, the sensation of voice break and the effort to speak. There was a statistically significant association and a strong correlation between the results of voice handicap and glottic function perceptions.

Keywords: Faculty; Voice; Voice Disorders; Voice Quality; Teaching

RESUMO

Objetivo: conhecer a autopercepção sobre a função glótica e desvantagem vocal de professores e identificar se há correlação e associação entre essas duas variáveis.

Métodos: participaram do estudo 78 professores da rede pública de ensino, de ambos os sexos, com idade entre 30 a 45 anos. Foram utilizados os questionários de Índice de Desvantagem Vocal-10 (IDV-10) e o Índice de Função Glótica (IFG). Para análise dos resultados foi utilizado o teste Qui-quadrado e o teste de correlação de *Spearman*, com nível de significância adotado de 5%.

Resultados: Participaram do estudo 78 professores, com idade média de 40 anos (desvio padrão ±8 anos). Vinte e cinco pessoas (32%) são do sexo masculino e 53 (68%) do feminino. Os resultados de ambos os questionários apresentaram-se significantemente associados ($p<0,01$) e com forte correlação ($R=0,76$; $p<0,01$).

Conclusão: os professores do estudo percebem as desvantagens vocais, principalmente relacionadas à dificuldade para falar em ambientes ruidosos, sensação de quebra de voz e força para fazer a voz sair. Evidenciou-se associação estatisticamente significante e forte correlação entre os resultados da percepção da desvantagem vocal e a função glótica.

Descritores: Docentes; Voz; Distúrbios da Voz; Qualidade da Voz; Ensino

INTRODUCTION

When it comes to professional voice, the teachers' vocal health is a constant theme in Brazilian and international research[1]. Several approaches are presented by researchers, whether observational or interventional studies, all of them are related to the teachers' vocal health.

The publications in the professional voice field present a great number of studies that establish the voice disorder related to work as one of the most prevalent health disease in certain professional categories, among them teachers[2].

The teachers' quality of life is known to be influenced by vocal problems[3], thus making necessary to seek strategies to prevent vocal illness in this population. As a contribution to study vocal problems among teachers, self-assessment questionnaires can be used to provide necessary subsidies for implementing health promotion programs and strategies, with emphasis on teachers' voice.

The evaluation of physical risks associated with vocal self-perception is one of the main concerns of researchers as can be seen in recent scientific articles[1]. Studies in this perspective collaborate in the conception of effective instruments, contributing to the functional diagnosis of vocal production. The northeast region is still unexplored when it comes to teachers' working conditions, thereby this study can contribute to the mapping of the diversity of teachers' performance in Brazil, focusing on the above mentioned region.

In this sense, the purpose of this study is to relate the subjects' perception on the glottic function during speech with the voice handicap. The hypothesis is that impairments perceived by subjects in glottic function have a repercussion on their voice handicap. Studying the correlation between an uncomfortable sensation in glottic function and its influence on voice handicap can support in the elaboration of self-care systems that minimize impairments in communication presented as voice handicap, promoting modifications in glottal configuration which foster teachers' vocal well-being and quality of life.

PURPOSE

Understand the self-perception of the glottic function and of the voice handicap in teachers and to identify if there is correlation and association between these two variables.

METHODS

This transversal research with quantitative data analysis was performed in municipal schools of Lagarto, Sergipe.

Cluster sampling was chosen because all teachers of five public schools were invited to participate. Invitations were made through individual invitations and posters fixed on notice boards of schools visited for this purpose. All participants were informed about the ethical principles that guide a scientific research as established by Resolution No. 466/2012 and signed the Written Informed Consent Form. This study is part of a research project entitled "Voice in teaching: a question of workers' health", approved by the Research Ethics Committee from the University Hospital of Aracaju/ Federal University of Sergipe under number CAAE 17167413.3.0000.5546.

The population of this study consisted of 78 teachers of both genders (54 women and 24 men) who teach in five schools of different levels (from Preschool to the Brazilian Youth and Adult Education Program), aged between 30 and 45 years. As an exclusion criterion, teachers who were diagnosed with voice disorder did not participate in this study. Due to possible variations in voice disorders in a small number of teachers with a diagnosis, in this study it was decided to restrict the analysis to only those who did not present the medical diagnosis. The entire sample at some point presented vocal complaint in the work period, even though it was not an inclusion criterion.

For the data collection two instruments of vocal self-perception were used, namely: Voice Handicap Index-10 (VHI-10), a shorter version of the Voice Handicap Index (VHI) and the Glottal Function Index (GFI).

The VHI-10 is easy to apply; it consists of ten statements with possible handicaps related to vocal problems and the answers are oriented to the frequency of voice related problems with the respective score: 0 - never, 1 - almost never, 2 - sometimes, 3 - almost always and 4 - always. This instrument is a validated protocol for Brazilian Portuguese with proven reliability and sensitivity for the application in individuals with voice complaints[4]; being the cut-off value calculated as a simple sum of the response scores, with a reference value of 7.5 in the overall score.

The GFI consists of four questions related to problems that affect the glottic function, with six alternative scores from zero to five that determine the frequency of the problem, having as reference scores:

zero is not a problem and five is a severe problem[5]. The proposed score for validation was equal to or greater than four[5], albeit in recent studies the established score is equal to or greater than three [6,7]. In this study a score equal or greater than three shall be considered as impairment in glottic function. The questionnaire was translated to Brazilian Portuguese and is on stage of linguistic and cultural adaptation by Centro de Estudos da Voz (Center for the Study of Voice) - CEV

The teachers answered the questionnaires at the end of the working shift, with the support of the researcher when necessary to explain unknown terms or how to fill them.

Statistical analysis was performed using the Statistical Package for the Social Sciences - IBM SPSS® version 16.0 for Windows (SPSS Inc., from 1989 to 2006, Chicago, Illinois, USA). To verify the presence of correlation between the findings, the Spearman's Correlation Test has been used. Values of r = 0.10 to 0.30 were considered as weak correlation; R = 0.40 to 0.6 as moderate correlation and r = 0.70 to 1 as indicative of a strong correlation[8]. The qui-squared test was used to verify association between results. Rejection threshold for null hypothesis was set at $p<0.05$.

RESULTS

A total of 78 teachers, average age of 40 years (standard deviation ± 8 years) participated in the study. Twenty-five subjects (32%) are males and 53 (68%) are females.

It was identified through the GFI that more than half of the teachers presented some degree of complaint regarding voice use, of whom 55.1% reported some complaint about effort to speak, 53.8% reported discomfort or pain after speaking, 61.5% reported vocal fatigue and 64.1% perceived cracked or changed voice after voice use. In the VHI-10 the most frequent complaints were regarding people having difficulty being understood in noisy places and the feeling of strain to produce voice. The detailed results obtained after applying the GFI and VHI-10 questionnaires to participating teachers are shown in Tables 1 and 2.

Table 3 shows the results of the participants' total score on the GFI and VHI-10 questionnaires. The qui-squared test revealed a statistically significant association ($p<0.01$) between observed results.

Spearmans' correlation test identified a strong (R = 0.76) and significant correlation between results of the GFI and VHI-10 questionnaires ($p<0.001$).

Table 1. Relative and absolute frequency of participants' responses in the items of the Glottal Function Index (GFI) questionnaire

Situation	Response					
	0	1	2	3	4	5
Speaking took extra effort	35(44.9%)	16(20.5%)	9(11.5%)	9(11.5%)	4(5.1%)	5(6.4%)
Throat discomfort or pain after using your voice	36(46.2%)	13(16.7%)	13(16.7%)	10(12.8%)	3(3.8%)	3(3.8%)
Vocal fatigue (voice weakened as you talked)	30(38.5%)	12(15.4%)	13(16.7%)	15(19.2%)	4(5.1%)	4(5.1%)
Voice cracks or sounds different	28(35.9%)	19(24.4%)	9(11.5%)	12(15.4%)	7(9.0%)	3(3.8%)

Legend: GFI: Glottal Function Index. The results change gradually over a range from 0 to 5; 0 means no problem and 5 means a severe problem.

Table 2. Relative and absolute frequency of participants' responses in the items of the voice handicap index 10 (VHI-10) questionnaire

Situation	Response				
	0	1	2	3	4
My voice makes it difficult for people to hear me	46(69.0%)	14(17.9%)	16(20.5%)	2(2.6%)	0(0%)
People have difficulty understanding me in a noisy room	21(26.9%)	25(32.1%)	26(33.3%)	5(6.4%)	1(1.3%)
People ask: "what's wrong with your voice?"	48(61.5%)	16(20.5%)	13(16.7%)	1(1.3%)	0(0%)
I feel as though I have to strain to produce voice	29(37.2%)	17(21.8%)	24(30.8%)	5(6.4%)	3(3.8%)
My voice difficulties restrict my personal and social life	55(70.5%)	11(14.1%)	11(14.1%)	1(1.3%)	0(0%)
The clarity of my voice is unpredictable	44(56.4%)	17(21.8%)	12(15.4%)	4(5.1%)	1(1.3%)
I feel left out of the conversations because of my voice	63(80.8%)	11(14.1%)	4(5.1%)	0(0%)	0(0%)
My voice problem causes me to lose income	59(75.6%)	8(10.3%)	8(10.3%)	1(1.3%)	1(1.3%)
My voice problem upsets me	51(65.4%)	5(6.4%)	10(12.8%)	7(9.0%)	5(6.4%)
My voice makes me feel handicapped	54(69.2%)	8(10.3%)	12(15.4%)	3(3.8%)	1(1.3%)

Legend: VHI-10: Voice Handicap Index-10. The results range from 0 to 5: 0 means never; 1 almost never; 2 sometimes; 3 almost always; 4 always.

Table 3. Comparison between results of GFI and VHI-10 questionnaires

		IDV-10		p-value
		Normal	Modified	
GFI	Normal	31(39.7)	2(2.6%)	<0.001*
	Modified	19(24.4%)	26(33.3%)	

Legend: *p<0.01; chi-squared test for association.

DISCUSSION

The study presented some limitations regarding its population, such as the number of participants, in which the initial expectation would be 140 teachers (according to information given by the Municipal Department of Education) and withdrawal due to the report of congenital changes in vocal fold.

One of the symptoms most reported by the participants was the sensation of vocal fatigue, as it was also found in another study[9]. Vocal fatigue is commonly associated with voice disorders in voice professionals, being part of the "Bogart-Bacall Syndrome"[10], which has as main symptoms fluctuating vocal quality, worsening after vocal strain and is associated with inadequate respiratory support[11]. Vocal fatigue has also a statistically significant relationship with stress[12]. Studies suggest that most teachers of regular education are stressed[13]; however, more studies should be conducted relating stress levels to voice disorders in this population.

Cracked voice or the feeling of different voice was remembered by most of participants in this study. Cracked voice is one of the main acoustic measures used in voice laboratories[14]. It can vary according to the unique characteristics of the subject and is related to the interruption of vocal production by several factors[15].

Still regarding the voice handicap, many teachers have difficulty communicating in noisy environments, which may deepen the emotional impact of dysphonia, possibly leading to the difficulty in projecting the voice in certain environments[16].

In this study, the perception of glottic function according to GFI and the voice handicap according to VHI-10 presented a significant association. That is, when comparing the qualitative final result (normal or altered) of both tests it was noticeable that they were related.

Still, there is a strong correlation between the quantitative results of both questionnaires, as evidenced by Spearman's correlation. In addition to the association between tests, it was important to measure the degree of correlation between them in order to highlight the relation of quantitative and ordinal scores between both evaluations.

Thus, in this study, the greater the impairment in glottic function, the greater the voice handicap perceived by teachers. This finding is justified by the close relationship between the perception of the glottic

function and the social impairments caused by imbalances of these functions.

A study that correlated VHI and GFI in patients with mass lesions before and after one month of surgical treatment presented significant correlations between total scores of the two questionnaires[5].

No correlation studies between the questionnaires used in this study were found, so that comparisons could be made.

CONCLUSION

According to VHI-10 responses, teachers perceive voice handicaps, mainly related to the difficulty of speaking in noisy environments, the sensation of cracked voice and the strain to produce voice.

There is an association and strong correlation between the results of perception of voice handicap and glottic function according to the VHI-10 and GFI questionnaire responses, respectively.

It is important that further studies in this direction be performed, since their data can be used to optimize teachers' adherence to health strategies with the aim of promoting vocal well-being and, consequently, impacting their quality of life.

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