Original articles

Glottal function self-perception and auditory-perceptual analysis of municipal school teachers

Autopercepção da função glótica e análise perceptivoauditiva de professores de escolas municipais

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ABSTRACT

Purpose: to correlate data from the self-perception analysis and vocal teacher perception.

Methods: the study included 52 teachers of both genders (39 women and 13 men) from municipal schools in Lagarto, aged between 24 and 54. Data collection was carried out in schools in two steps: application of self-assessment protocol function index glótica and the perceptual voice evaluation protocol Consensus Auditory- Perceptual Evaluation of Voice. Data were analyzed quantitatively and organized into a database to be treated statistically.

Results: the study revealed 80% of voice alteration second teachers voice perceptual evaluation and 59.6% in the vocal change self-reported by the teacher. It has been found that the main complaints of teacher refer to items "vocal fatigue" and "voice breaks or is different" and vocal symptoms more checked by experts includes "tension" and "hoarseness". There was no statistically significant correlation between protocol.

Conclusion: no correlation between the protocols can be justified as a teacher desensitization as the vocal problem and also by adapting the new voice. With this becomes extremely important speech therapy care to ensure self-perception and vocal health.

Keywords: Faculty; Occupation Health; Voice

RESUMO

Objetivo: correlacionar dados da análise perceptivoauditiva e da autopercepção da função glótica de professores de escolas municipais.

Métodos: participaram deste estudo 52 professores de ambos os sexos, sendo 39 mulheres (75%) e 13 homens (25%) de escolas municipais da cidade de Lagarto, na faixa etária compreendida entre 24 e 54 anos. A coleta de dados foi realizada nas escolas em duas etapas: aplicação do questionário de autoavaliação Índice de Função Glótica e do protocolo de avaliação fonoaudiológica perceptivoauditiva da voz. Os dados foram analisados quantitativamente e organizados em um banco de dados e receberam tratamento estatístico.

Resultados: o estudo apontou 80% de alteração vocal em professores segundo avaliação perceptivoauditiva da voz e 59,6% de alteração vocal autorreferida pelos professores na função glótica. Foi constatada que as principais queixas dos professores são referentes aos itens "fadiga vocal" e "voz quebra ou está diferente" e os sinais vocais mais observados pelos especialistas são "tensão" e "rouquidão". Não houve correlação estatisticamente significante entre os instrumentos utilizados.

Conclusão: a ausência de correlação entre os instrumentos pode ser justificada como uma dessensibilização do professor quanto ao problema vocal, ocasionada pela adaptação à nova voz alterada. Com isto, torna-se de extrema importância a atuação fonoaudiológica para garantir a autopercepção e saúde vocal.

Descritores: Docentes; Saúde do Trabalhador; Voz

INTRODUCTION

Professionals who use their voices as the main working tool are susceptible to develop vocal disorders. This way, the teacher has been the focus of several studies in the Speech-Language Pathology field, since this category deals with greater unsanitary work conditions [1,2] related to voice disorders [3].

Through the intrinsic relationship between voice and quality of life [4] is understood as of paramount importance that the research on the impact of voice changes in teachers use self- assessment tools [5], so that we can understand the perspective of these professionals with respect to voice disorders and its influence in their daily life [6].

A study showed that teachers are satisfied with the quality of life and with their voice, which may reveal an issue in understanding the health-disease process and aspects relating to work, quality of life and health that may relate to voice disorders [7]. In addition, other research on self-perception, which involved 29 teachers with vocal complaints, pointed out that the teachers realize changes in their voices; however, the impact on their quality of life is poorly understood or undervalued [8].

The voice auditory-perceptual evaluation performed by speech-language pathologists represents a low-cost tool that can assist in the identification of the professionals that need to be referred to specific examinations and possibly, voice therapy, as well as offer the necessary and sufficient allowances to conduct the vocal cords screening with teachers in school environments [9].

Among the vocal evaluation tools, the CAPE-V protocol provides data to speech-language pathologist on the degree of severity of a vocal disorder through the auditory-perceptual evaluation. In a study that verified the relation between the otorhinolaryngological evaluation and the CAPE-V in the voice of teachers with vocal complaints, the findings brought a significant association between the two evaluations [10]. A research that aimed to learn about the working conditions and the level of information about the voice of higher education professionals found that 77.7% of the respondents had a self-perception which coincided with the findings of the auditory-perceptual evaluation [11].

The lack of awareness of teachers regarding voice disorders suggests the need for activities related to the promotion of vocal health that can be conducted in schools through lectures and specific guidelines [12].

The workers' health is a field of practices and knowledge that emerges from the collective health, aiming to understand and intervene in the relationship between work and health-disease process, as well as the promotion and protection of workers' health [13,14].

In this perspective, the work-related voice disorder (WRVD) is defined as any form of change in voice that is directly related to its use during the professional activity by reducing or preventing the communication of the worker [14]. In 1997, the Brazilian Federal Council of Speech-Language Pathology referred a report to speech-language pathologists where they state that changes in the vocal tract could be a part of an occupational disease. However, the correlations between voice and work need to be defined and consolidated so that the diseases can be notified as disease work [15,16].

In view of the exposed, the present research aimed to correlate the data from the auditory-perceptual evaluation and the glottal function self-perception of municipal schools teachers

METHODS

This study is included in a research project entitled "Voice in teaching: a workers' health issue", which was approved by the Research Ethics Committee of the Federal University of Sergipe under the number CAAE 17167413.3.0000.5546.

52 teachers of both genders, of which 39 women (75%) and 13 men (25%) who teaches in different education levels (from early childhood education to the education of young people and adults) of municipal schools in Lagarto/SE, aged between 24 and 54 years. The research requested an authorization for schools and all teachers that participated, and they signed the Free and Informed Consent Term (FICT), according to Resolution No 466/2012 which deals on ethics in research. As inclusion criteria, the teacher should be enrolled on the Secretariat of Education in Lagarto-SE. The teachers in sick leave were not included in the study. Thus, the population of the research included 52 teachers participating in a total of 78 respondents.

Data collection was carried out in schools in two steps: application of the Glottal Function Index (GFI) self-assessment questionnaire and the Consensus Protocol of Voice Auditory-Perceptual Evaluation (CAPE-V).

The GFI self-assessment questionnaire consists of four questions related to issues affecting the glottal function and the degree of the disorder, namely: "I have to make an effort to speak", "I feel a sense of distress or

pain after speaking", "I feel vocal fatigue" (weak voice when I speak) and "my voice breaks or is different". The answers assess the degree or severity of the disorders, from 0 for 'this is not a problem' to 5 for 'this is a very big problem'[17]. The total score is calculated by the sum of the responses of the four questions and the value of three as a total is suggested as minimum score. This research tool was answered by the teachers participating in the research.

The CAPE-V is a voice auditory-perceptual evaluation tool, which was developed by a group of American speech-language pathologists who are voice specialists. The voice auditory-perceptual evaluation is performed by the speech-language pathologist, and it assesses six predetermined parameters, with the possibility of adding two additional parameters, in three different tasks: sustained vowels, specific phrases and spontaneous conversation. The six parameters included are the following: global severity of change, roughness, breathiness and tension. In addition to the parameters deviation reported, the speech-language pathologist should also indicate whether the change indicated is consistent (C) or intermittent (I). The assessment is represented by a linear analogue scale, of 10 centimeters in length (from 0 to 100mm), where the specific assessment of each parameter must be reported[18]. The degree of intensity is characterized as discrete, discretely moderate, moderate, moderate-severe and severe.

The main objective of this protocol is to identify the severity of a vocal problem through the human auditory-perceptual evaluation of a competent professional and to investigate the need for complementary examinations for the vocal evaluation.

Therefore, this instrument was applied in a second moment, in all teachers, in a school room, with controlled ambient noise. During the assessment, a sample of the voice was recorded in accordance with the specifications described in CAPE-V, in portable digital recorder COBY®. Subsequently, these samples were evaluated by a speech-language pathologist, a supervisor teacher, a specialist in the field of voice and five undergraduates in speech language pathology.

Data were analyzed quantitatively and organized into a database to be treated statistically. The Pearson correlation coefficient was used, which characterizes a measure of the degree of the linear relation between two quantitative variables. This coefficient ranges between -1 and 1. The value 0 (zero) means that there is no linear relationship, the value 1 indicates a perfect linear relationship and the -1 value also indicates a perfect linear relationship, but reversed, that is, when one of the variables increases, the other one decreases. The closer you are to 1 or -1 value, the stronger is the linear association between the two variables[19].

A comparison of the findings was conducted with the gender and the age range of the participants of this research.

Another test used was the Biserial Point Correlation Coefficient, which is derived from the Pearson Linear Correlation Coefficient. This method is indicated when one of the variables is a dichotomous (Y) ant the other one is a continuous (X). Dichotomous variables are the qualitative variables for which there are only two possible answers Yes/No, sick/not ill, death/alive, etc.[20].

The estimator of the Phi Coefficient Correlation was also included, which was obtained from the estimator of the Pearson Linear Coefficient, and which is applied in cases with dichotomous variables[21].

The Kendall correlation coefficient[22] was also applied, which is a correlation measure used when at least one of the variables being analyzed is ordinal, or presents a great deviation from the normal[23].

RESULTS

The results of the GFI questionnaire showed that 31 (59,6%) of the teachers self-reported the complaint in some level of this questionnaire, totaling a value greater than three, with was the minimum score established in the general degree. Women showed results in a higher frequency, since 24 (61%) of the women complained about a voice change. With respect to the men teachers, seven men (53%) reported a voice complaint.
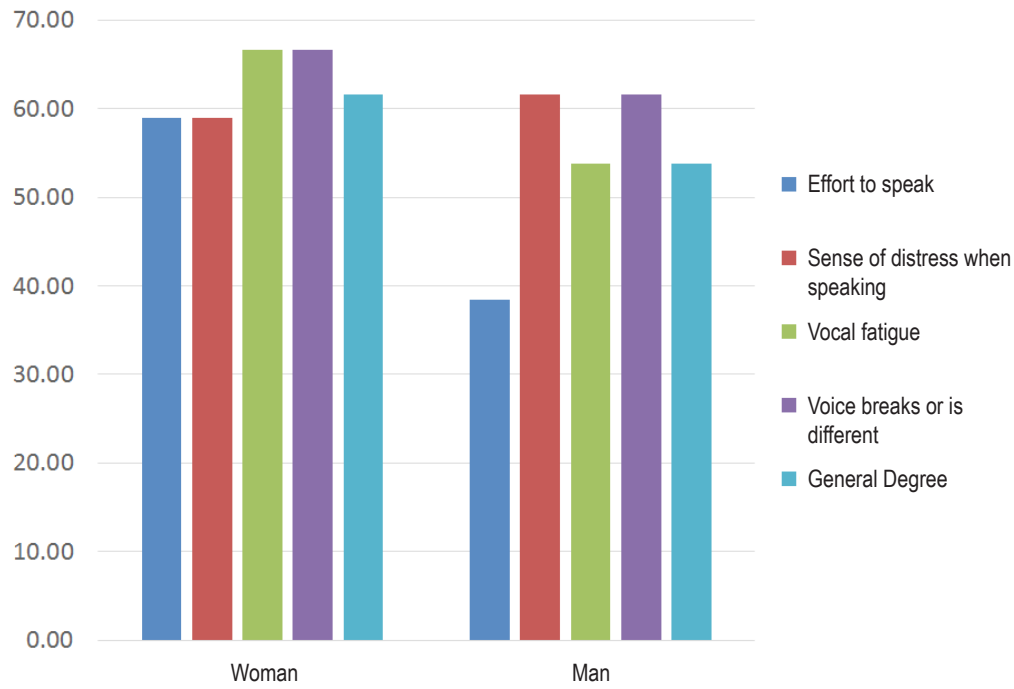
Figure 1. Frequency of responses to items of the Glottal Function index divided by gender
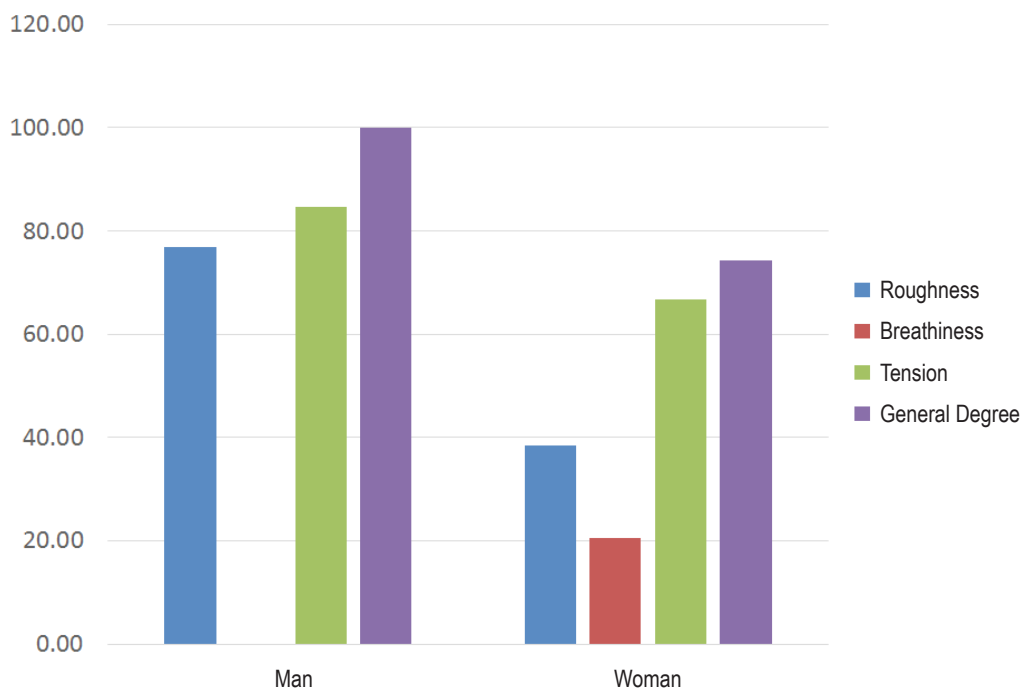

Figure 2. Frequency of responses to items of the CAPE-V distributed by sex
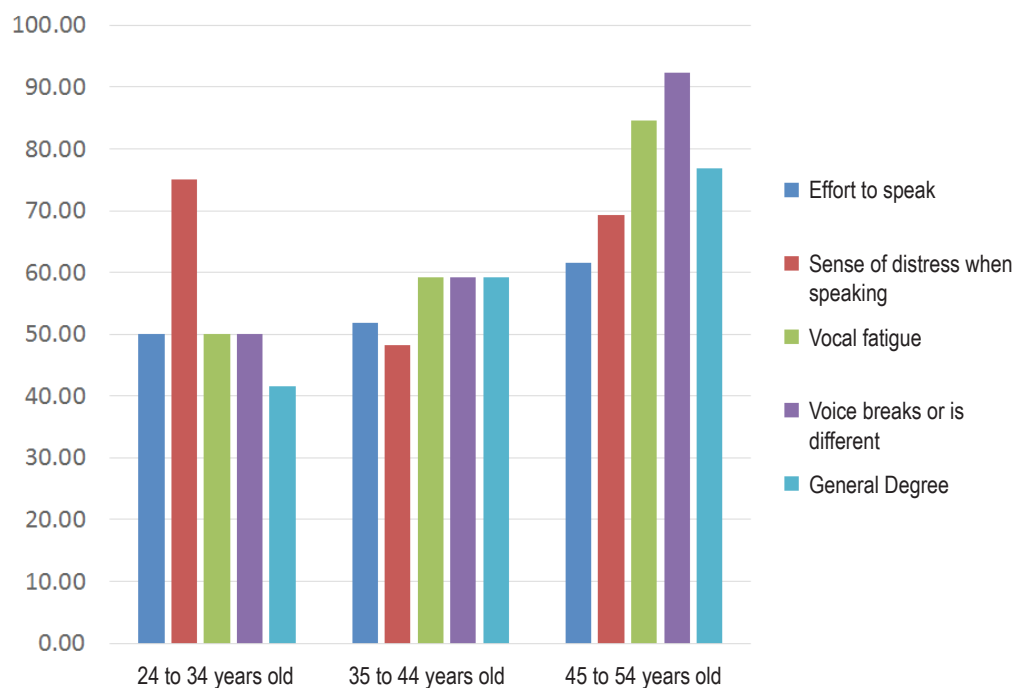
Figure 3. Frequency of responses to items of the Glottal Function index divided by age range
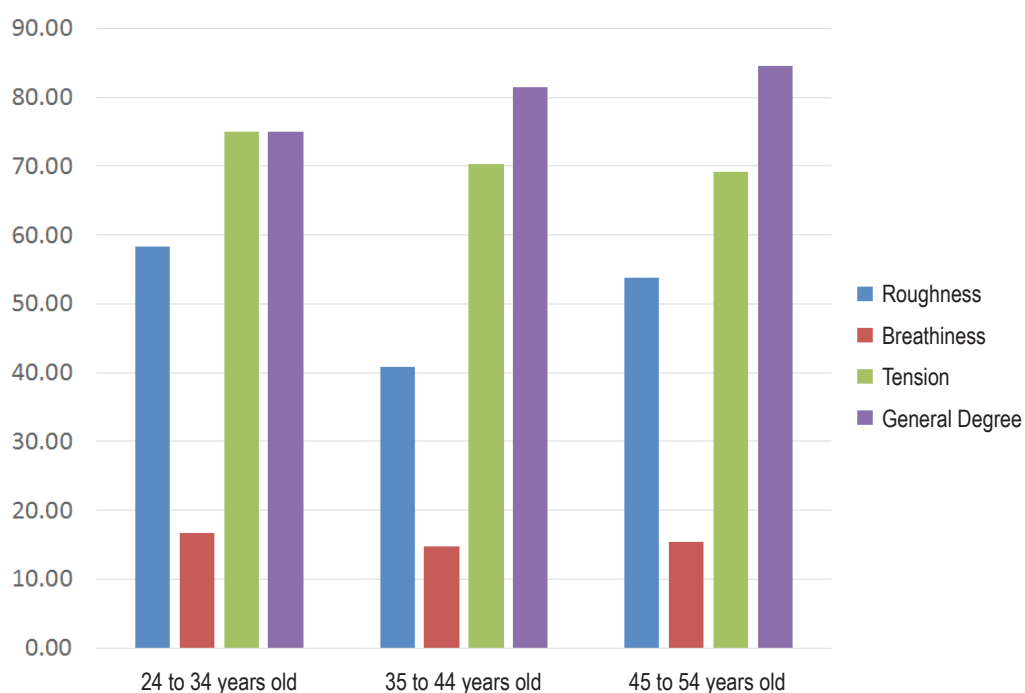

Figure 4. Frequency of responses to items of the CAPE-V distributed by age range
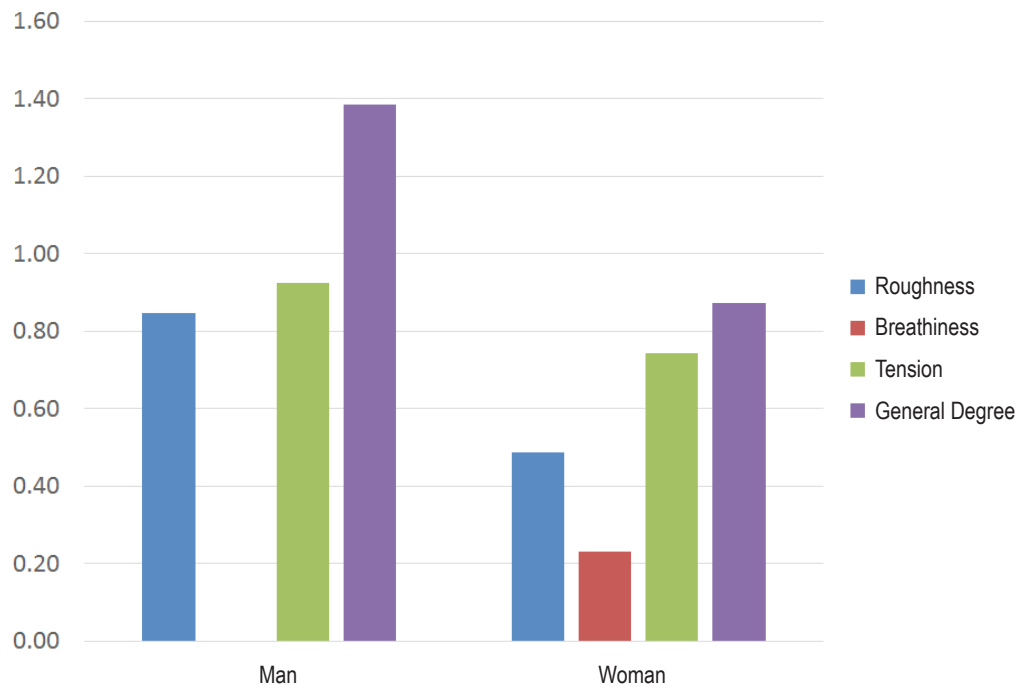
Figure 5. Average frequency of constant vocal changes in CAPE-V distributed according to the variable gender
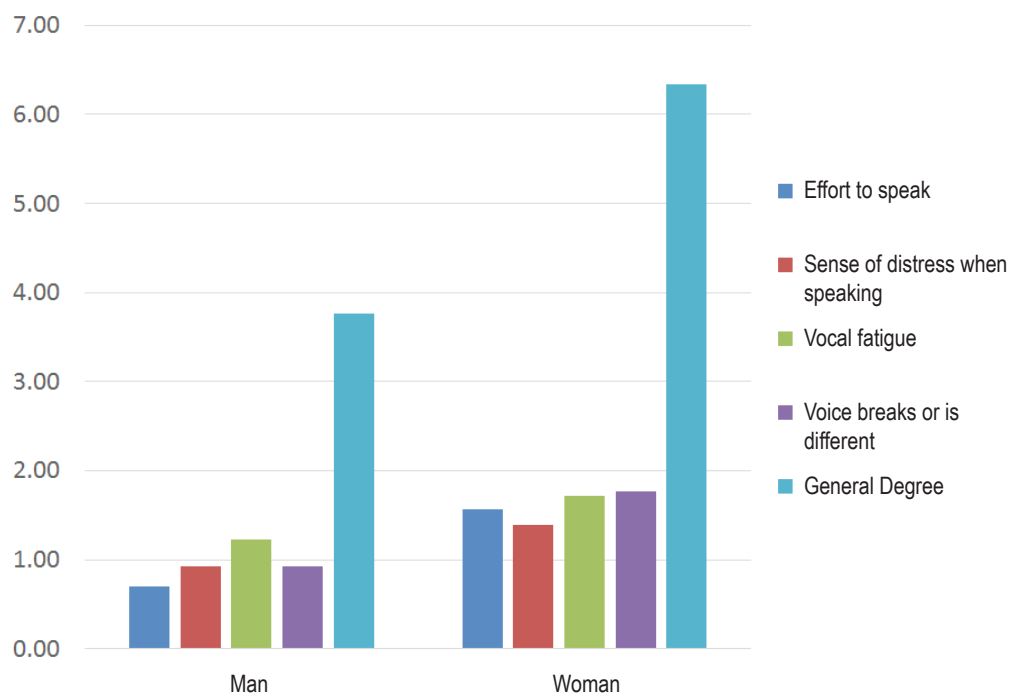

Figure 6. Average frequency of responses to items of the Glottal Function index according to the variable gender

Table 1. Correlation of the **Glottal Function Index** instruments with CAPE-V

		CAPEV			
		Roughness	**Breathiness**	**Tension**	**General Degree**
		r=-0.04	**r=0.29**	**r=- 0.16**	**r=0.04**
GFI	Effort to speak	[a] p-value= 0.78	p-value= 0.04*	p-value=0.26	p-value=0.78
		[b] p-value=0.09	p-value=0.13	p-value=0.29	p-value=0.00
	Sense of distress when speaking	[a] p-value=0.53	p-value=0.36	p-value=0.53	p-value=1.00
		[b] p-value=0.17	p-value=0.21	p-value=0.13	p-value=0.14
	Vocal fatigue	[a] p-value=0.23	p-value=0.14	p-value=0.36	p-value=0.32
		[b] p-value=-0.05	p-value=0.20	p-value=-0.11	p-value=0.16
	Voice breaks or is different	[a] p-value=0.72	p-value=0.16	p-value=0.44	p-value=0.26
		[b] p-value=0.01	p-value=0.13	p-value=-0.18	p-value=0.10
	General Degree	[a] p-value=0.94	p-value=0.36	p-value=0.20	p-value=0.48

[a] Phi Correlation Coefficient(YULE, 1912)
[b] Biserial Point Correlation(GUILFORD, 1950)
* indicates statistically significant values (p<0.05)

Table 2. Correlation of the **Glottal Function Index instruments** with CAPE-V by gender

	Variable	**Gender**	**p-value**
CAPEV[a] Degree	Roughness	0.29	0.04*
	Breathiness	-0.32	0.02*
	Tension	0.18	0.21
	CAPE-V General Degree	0.44	0.00*
CAPEV[b] Change	Roughness	0.33	0.02*
	Breathiness	-0.25	0.07
	Tension	0.17	0.23
	CAPE-V General Degree	0.28	0.04*
GFI Degree[a]	Effort to speak	-0.32	0.02*
	Sense of distress or pain when speaking	-0.20	0.16
	Vocal fatigue	-0.19	0.18
	Voice breaks or is different	-0.32	0.02*
	GFI General Degree	-0.20	0.04*
GFI Change[b]	Effort to speak	-0.19	0.20
	Sense of distress or pain when speaking	-0.32	0.89
	Vocal fatigue	-0.12	0.40
	Voice breaks or is different	-0.05	0.72
	GFI General Degree	-0.07	0.62

[a] Phi Correlation(YULE, 1912);
[b] Biserial Point Correlation(GUILFORD, 1950)
* indicates statistically significant values (p<0.05)

DISCUSSION

The predominance of women who participated in the sample coincides with the average cited in the literature about the profile of the teacher population [6]. This was also the gender with greater prevalence and severity of self-reported voice change. The role of women in society and the overloads of the work assigned to them can contribute to the occurrence of vocal problems[23].

However, the auditory-perceptual evaluation showed that the prevalence of vocal changes is greater in men, a data that was not found in other researches[2].

It was observed in the auditory-perceptual evaluation of teachers that here was a predominance of tension and roughness parameters in the analysis of gender and age range variables.

The symptoms related to the glottal function (GFI) of teachers showed that women presented a higher

level of vocal fatigue and voice breaks compared to men; however these symptoms were also present in the male sample in another study[4]. As regards the age, the teachers between 45 and 54 years old had higher levels of vocal complaints than the other age groups.

A color test was performed with respect to items of the two instruments and no significant relationship was found between age range and voice change, a study also points out that the age is not related to the vocal change in teachers[24].

Despite not presenting significant correlations between the values obtained in the two instruments, it was observed a higher frequency of vocal changes in the age range between 45 and 54 years old. The literature highlights that the age range variable deserves greater attention, since the higher the age, the lower the vocal efficiency, this is due to a series of laryngeal changes due to the aging process [25].

The present study showed a prevalence of vocal changes in teachers from the voice auditory-perceptual evaluation, which is similar to the results in other researches that have found 79.6% of changes in the voice characteristics of teachers [26]. In this research, roughness and tension were the most mentioned parameters, repeating the results obtained in another study that highlights the tension (81.9%) and roughness (71.5%) as the most observed vocal problems [27]. These symptoms may be related to the vocal misuse and abuse, usually found in this population, as well as the unhealthy water drinking habits and few hours of sleep[28].

In this study there was a prevalence of self-reported vocal problems when compared to the auditory-perceptual evaluation. The most frequent vocal complaints were "vocal fatigue" and "voice breaks or is different". A similar study also highlights the vocal fatigue as one of the most frequent complaints (72.6%), and this symptom is directly related to the lack of information of appropriate vocal techniques to teach, tension when speaking and unfavorable working conditions, among others[3].

No statistically significant correlation was found between the findings of the CAPE-V and the GFI. In order to obtain the correlation of the instruments, the numbers of agreements should be greater than the numbers of disagreement; however, the study obtained a similar number of both. Corroborating with this finding, a study also found an absence of correlation between both instruments used in the study[11].

This finding may be justified by the lack of awareness of teachers regarding their voice problems. It can be assumed that by living a long time with the voice change, the teachers adapt to it, thus losing the ability to feel a possible vocal problem, as observed in other studies[24]. Or the voice chance is not severe enough to interfere dramatically in the performance of the teaching work and, therefore, is considered not relevant.

The voice adapted, defined as a voice stable and resistant to specific use related to the work, can also be a justification to the findings of this research. It is possible to apply the 'voice adapted' term in all situations in which the voice is socially adaptable and is able to communicate the emotional message of the speech, with frequency, intensity, modulation and projection appropriate to the age and the gender of the speaker. Even in the presence of structural changes in the vocal cords, it is possible to have a phonation apparatus that produces an acceptable voice, since there is a significant percentage of workers who use the voice more intensively and that can present injuries without symptoms and with good chances to remain stable and asymptomatic along the months or years of their labor exercise [29].

Another aspect that should be considered in the findings of this research is that the teacher presents a difficulty to identify the tension symptom as a problem of voice, characterizing it as normal. The results of observation and examinations more easily interpreted as a vocal problem are related to the ones that generate significant sense of distress, such as: hoarseness, loss of voice, pain and a burning throat sensation when speaking [12].

The only item in which a statistically significant correlation was found is related to "breathiness" and "effort to talk". The "breathiness" parameter is related to the likely presence of incomplete closure of the glottis and, consequently, the teacher will require a greater effort to speak due to the air expelled in the phonatory process[28].

CONCLUSION

The study showed that many teachers self-reported a vocal change, a fact that was quite frequent, especially in women. The most mentioned vocal symptoms by the teachers were "vocal fatigue" and "voice breaks or is different", demonstrating that the GFI presents as a questionnaire that lists the specifically organic symptoms and, therefore, it does not directly address

the consequences of vocal changes in the social, psychological and professional areas.

Despite the low correlation between the GFI and CAPE-V instruments found in this study, the application of two protocols to investigate and understand the vocal disorders is significant. The teachers most likely didn't show any concern to their voice problems, by the fact they live for a long time with the disorder, adapting to their new and changed voice. In addition, the initial stage of vocal disorders usually does not cause work disability, and certain symptoms are often neglected as being understood as "normal" on teachers.

Given the findings, it is believed that the speech-language pathologist work is relevant for teachers, to work in programs that ensure the self-perception, and accelerate the development of actions that promote the vocal health and, consequently, reduces the high levels of voice disorders related to working conditions. To this end, in fact, it is necessary the approval of vocal health public policies aiming to the public addressed in this study, since that teachers belong to a professional category that is essential for the development of a society, despite the lack of attention from the public authorities and basic rights.

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