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Vocal symptoms reported by teachers with dysphonia and associated factors

Sintomas vocais relatados por professoras com disfonia e fatores associados

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ABSTRACT

Purpose: Check the number of vocal symptoms reported by teachers and the relationship with the self-perception of the limitations of daily activities associated to the voice, personal, occupational and clinical aspects. **Methods:** Refers to a study performed by the analysis of secondary data from medical records of teachers attended at the voice ambulatory of a teaching hospital. The informations of interest were: age, number of taught shifts, parallel activities to teaching, fan use, conversational noise, dust, construction noise, external noise, screaming, smoking habit, hydration, pellet use, physical activity associated with speech, type and degree of dysphonia, proprioceptive vocal symptoms and responses to the Protocol of the Profile of Participation and Vocal Activities (PPVA). It was realized a descriptive and inferential analysis. **Results:** Were collected informations of 103 medical records, where it was found high prevalence of vocal symptoms, with the most frequent: fatigue after prolonged use of the voice, dry throat, throat clearing and burning. It was observed an association between the number of vocal symptoms and the scream habit, conversational noise and perception of the impact of dysphonia by teachers. The number of self-reported vocal symptoms was positively correlated with all parameters evaluated by PPVA. **Conclusion:** There is high frequency of proprioceptive vocal symptoms among the teachers. The noise of conversation and scream habit are associated with the number of vocal symptoms, as well as the parameters of self-perception of the impact of dysphonia contained in the PPVA.

Keywords: Voice disorders; Quality of life; Faculty; Occupational health; Speech, language and hearing sciences

RESUMO

Objetivo: Verificar o número de sintomas vocais relatados por professoras e a relação com a autopercepção das limitações das atividades diárias associadas à voz, aspectos pessoais, ocupacionais e clínicos. **Métodos:** Trata-se de estudo realizado por meio da análise de dados secundários dos prontuários das professoras atendidas no ambulatório de voz de um hospital de ensino. As informações de interesse foram: idade, número de turnos lecionados, atividades paralelas à docência, uso de ventilador, ruído de conversação, poeira, ruído de obras, ruído externo, hábito de gritar, tabagismo, hidratação, uso de pastilha, prática de atividade física associada à fala, tipo e grau da disfonia, sintomas vocais proprioceptivos e respostas ao Protocolo do Perfil de Participação e Atividades Vocais (PPAV). Foi realizada análise descritiva e inferencial. **Resultados:** Foram coletadas informações de 103 prontuários, nos quais se verificou elevada prevalência de sintomas vocais, sendo os mais frequentes: fadiga após o uso prolongado da voz, garganta seca, pigarro e ardência. Observou-se associação entre o número de sintomas vocais e o hábito de gritar, ruído de conversação e percepção do impacto da disfonia pelas docentes. O número de sintomas vocais autorrelatados foi positivamente correlacionado com todos os parâmetros avaliados pelo PPAV. **Conclusão:** Há elevada frequência de sintomas vocais proprioceptivos entre as professoras. O ruído por conversação e o hábito de gritar estão associados ao número de sintomas vocais, assim como os parâmetros de autopercepção do impacto da disfonia, segundo o PPAV.

Descritores: Distúrbios da voz; Qualidade de vida; Docentes; Saúde do trabalhador; Fonoaudiologia

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INTRODUCTION

Dysphonia can manifest in proprioceptive and auditory vocal symptoms, which occur in different degrees of intensity, depending on the clinical picture[1]. The professional who uses the voice to develop his own work needs a certain production and / or vocal quality to keep the exercise of his activity[2].

Research indicates that teachers are a high risk group for dysphonia[3,4] and they have a high frequency of these vocal symptoms[5,6,7,8,9]. There are controversies with reference to factors related to the self-perception of voice problem, by the teacher. Discusses the difficulty of perception of the health / disease process, because even with high frequency of reported symptoms, the teachers are satisfied with their voices[6,10]. It is noted, also, situations where there is adequate perception of vocal alteration, but without effective measures[1].

Studies show that the quality of teachers' life is related to the vocal self-perception of dysphonia[2,6,10,11], which may be associated with vocal symptoms mentioned[12]. According to study[2], teachers who said to realize the vocal alteration were the same that presented the greatest limitations in daily activities related to the voice, including work. There was no evidence in the study, a positive correlation between these limitations and the degree and type of dysphonia and otolaryngology evaluation[2].

The intensification in work of the teachers because of the increase of activities related to teaching and parallel to it, under time pressure, generate operational strategies that result in increased physical demand, and may justify the physical, vocal and mental fatigue[13].

Considering the excessive vocal demand at work as a triggering factor of voice disorders and aggravation, the evaluation of the number of vocal symptoms reported by teachers deserves emphasis and attention. Concerning the presence of the causal link between the vocal disorder and the work, despite the renowned professional effort in the area to be considered a hazard to workers' health, there is still no legal recognition[14,15,16].

The purpose of this study was to verify the number of vocal symptoms reported by teachers and the relationship with self--awareness of the limitations of daily activities associated with voice, personal, occupational and clinical aspects.

METHODS

Refers to a study performed by the analysis of secondary data, collected in the medical records of teachers attended at the voice ambulatory of Clinical Hospital of *Universidade Federal de Minas Gerais* (UFMG), from January 2012 to December 2013.

The research was approved by the Ethics Committee of *Universidade Federal de Minas Gerais* (UFMG), under number 482/08.

Teachers of the public school system of Belo Horizonte are submitted to periodic reviews at the Occupational Health Service of the City Hall. After otolaryngology and speech therapy evaluation, when there is a diagnosis of dysphonia, teachers are referred to vocal therapy in the Teaching Hospital, or can opt for external service.

The Occupational Health Service of the City Hall conducts periodic evaluations of teachers to monitoring, identification and medical referral for vocal therapy and other activities of prevention and promotion of vocal health. As there are disagreements on clinical criteria to define the normality of the voice, occurs, possibly, difficulty to provide the time which the individual is considered dysphonic[17], mainly in the absence of laryngeal alteration.

The information of interest obtained from medical records were: age, number of taught shifts, parallel activities to teaching, fan use in the classroom, conversational noise, dust, construction noise, external noise, habit of shouting, smoking, hydration, use of pastille, physical activity associated with speech, type and degree of dysphonia, vocal self-reported symptoms, general degree of vocal alteration, according to the perceptual assessment and responses to the Protocol of the Profile of Participation and Vocal Activities (PPVA)[18].

The investigated vocal symptoms were proprioceptive, and other words, those that refer to feelings that the individual experiences when produces the voice. These were characterized by coughing report, dry throat, throat clearing, burning, choking, shortness of breath, foreign body, fatigue for prolonged use and/or brief use of the voice, irritation, laryngeal constriction and pain when speaking. There were included in this study, evaluations of auditory vocal symptoms.

Despite all the assessed population has been considered with dysphonia by the Occupational Health Service, the voice problem, for this study, was analyzed according to the number of symptoms perceived by teachers referred for speech therapy, and other words, the self-perceived vocal alteration. Through a list of previously mentioned symptoms, teachers reported the presence or absence of each one (answers: yes/no). After counting the number of perceived symptoms, were considered cases those with three or more symptoms. The study shows that teachers with vocal alteration had at least three symptoms of vocal discomfort[12], consisting of proprioceptive symptoms. In the analysis, two groups were formed: the group with three or more symptoms of vocal discomfort was compared to the other group with less than three symptoms.

The evaluation of the patient ahead to a vocal alteration and the impact of vocal disorders daily can influence the motivation and the adherence for treatment[2] and have been studied through validated questionnaires.

The PPVA is a self-assessment questionnaire validated in Brazil[18], used to measure the impact of the voice on quality of life in patients with dysphonia. It consists of 28 questions on five themes: self-perception of the intensity of the vocal problem (one question); effects at work (four questions); effects

on daily communication (12 questions); effects on media (four questions) and effects on emotion (seven questions). For each of the 28 questions, the score varies from zero to ten, through a visual analog scale ten centimeters. The closer to the left side, represents "not affected" and, the closer to the right side, represents "very affected". The analysis is conducted according to the simple sum of the scores of responses. The maximum score of the protocol is 280 points. The protocol is self-explanatory, without any need for examiner interference. The higher the results, the greater is the difficulty imposed and the restriction on the participation of daily activities related to the voice[4,18,19].

To select the population of the study were used the following inclusion criteria: female teachers, of any race and age, active in the classroom in public schools, referred to vocal therapy in the Teaching Hospital by the Occupational Health Service of the City Hall, diagnosed with dysphonia, according to the criteria established by the responsible sector. In the study population were included active teachers in kindergarten, elementary school, high school, youth education or teenagers, pedagogical direction or coordination. Teachers who did not respond to the questions of the PPVA were excluded.

Descriptive analysis was performed in absolute numbers and percentages for categorical variables and measures of central tendency for continuous variables. Some totals described variables showed differences from the final population, due to the lack of information in the medical records. The Qui square test of Pearson and The Exact test of Fischer were applied to verify the association between the number of vocal symptoms and factors desktop and vocal habits, and the Spearman correlation to analyze the relationship between the number of vocal symptoms and self-perception of the impact of dysphonia, considering the level of significance of 5% ($p<0.05$).

RESULTS

This study analyzed 103 medical records of teachers attended at the voice ambulatory. As for the number of proprioceptive vocal symptoms, most teachers had symptoms from 3 to 10 (56.7%) and the remaining, up to two symptoms (43.3%).

The most common vocal symptoms in this population were fatigue after prolonged use of the voice (64.4%), dry throat (50%), throat clearing (37.5%) and burning in the throat (35.6%) (Figure 1). It was observed that 7.6% of the sample did not report proprioceptive vocal symptoms.

Teachers who most mentioned the presence of dust, noise works, external noise to school and conversation in the classroom were those who realized three or more vocal symptoms. In the statistical analysis, the groups differed only in the number of symptoms associated with the presence of conversation in the classroom. Data on personal and occupational aspects of the teachers in speech therapy are shown in Table 1.

The speech therapy diagnosis of dysphonia was functional or organofunctional and was not verified the presence of dysphonia intense degree. He called attention to the fact that 7.7% of the teachers with neutral voice have done speech therapy. The groups have distinguished themselves in the association between the number of symptoms and the habit of shouting. Habits related to voice and clinical aspects of dysphonia in the studied population are described in Table 2.

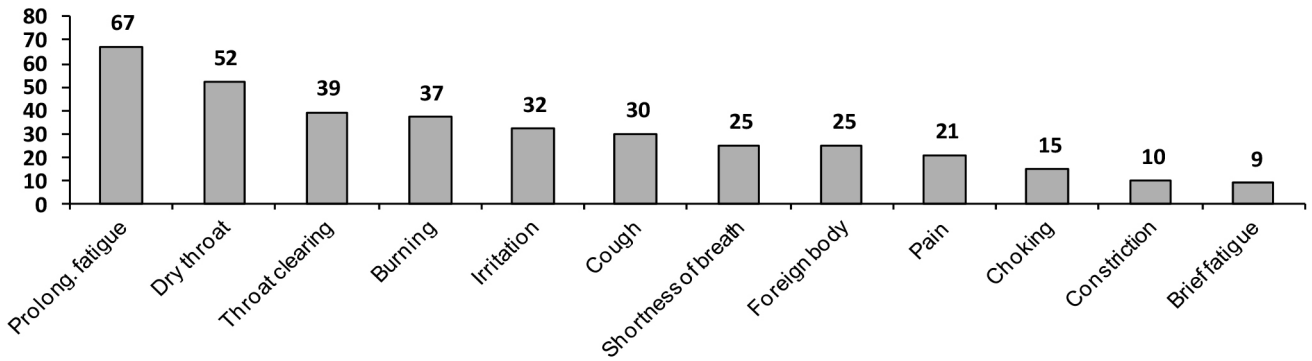
The scores of the parameters of vocal self-perception and limitations in daily activities related to the voice contained in Table 3.

The number of vocal symptoms reported by teachers was positively correlated with all parameters evaluated by PPVA. There was no correlation between the number of symptoms and age of the study population (Table 4).

DISCUSSION

The teachers analyzed in this study performed therapy voice after being routed by the Occupational Health Service of the City Hall (speech therapists and doctors), on the need identified during the evaluation and regular admission.

The results showed from the absence of vocal symptoms to the presence of all the investigated symptoms, and three to ten symptoms (56.7%) the perception of most of the teachers. It was not surprising the absence of symptoms reported by 7.6% of the teachers, because dysphonia related to intensive



Subtitle: Prolong. = extended

Figure 1. Absolute frequency of proprioceptive symptoms reported by teachers

Table 1. Personal and occupational aspects of the teachers in speech and association therapy with the number of reported symptoms

Personal and occupational aspects	Total	Number of symptoms		p-value
		0 to 2	3 to 10	
	n (%)	n (%)	n (%)	
Age (years)				
24-30	12 (11.5)	6 (13.3)	6 (10.2)	
31-40	15 (35.6)	15(33.3)	22 (37.3)	
41-50	45 (43.3)	20 (44.4)	25 (42.4)	
51-62	10 (9.6)	4 (8.9)	6 (10.1)	0.940
Work shifts				
One	24 (25)	13 (29.6)	11 (21.1)	
Two or three	72 (75)	31(70.4)	41 (78.9)	0.344
Another activity with the use of voice				
No	77 (88.5)	33(86.8)	44 (89.8)	
Yes	10 (11.5)	5 (13.2)	5 (10.2)	0.519
Fan use				
No	55 (53.9)	20 (46.5)	35 (59.3)	
Yes	47 (46.1)	23 (53.5)	24 (40.7)	0.200
Conversation noise in the classroom				
No	48 (47.1)	31 (72.1)	17 (28.8)	
Yes	54 (52.9)	12 (27.9)	42 (71.2)	<0.001*
Dust				
No	90 (88.2)	41 (95.3)	49 (83)	
Yes	12 (11.8)	2 (4.7)	10 (17)	0.068
Construction noise				
No	94 (92.2)	41 (95.3)	53 (90)	
Yes	8 (7.8)	2 (4.7)	6 (10)	0.462
External noise to school				
No	87 (86.1)	40 (93)	47 (81.1)	
Yes	14 (13.9)	3 (7)	11 (18.9)	0.144

* Significant values (p≤0.05) – Qui-square test of Pearson and Exact test of Fisher

use of voice can not manifest the symptoms investigated, especially in the early stage. It is known that most of the teachers identifies the voice problem before impairment in quality of life[2].

The account of the high number of proprioceptive symptoms by the majority of the assessed population testifies other research with teachers[5,6,7,8,9,12,20,21]. The most common symptoms observed in this study are similar to those seen in other analysis, with 110 teachers in the city of Maceió (AL), which were dry throat (54.5%) throat clearing (42.7%) and burning in the throat (42.7%)[21]. Noteworthy is the fact that the prevalence of symptoms was higher in that study: the most vocal symptoms reported by 82 university professors were: clearing throat (47%), cough (66%) and dry throat (60%)[9].

Studies argue about the difficulty of perception of health / disease process of teachers and notice the first signs of voice alteration[6,10,22]. There are, also, teachers with adequate perception of their voice changes, but without effective initiatives, indicating that the combination of vocal speech therapy evaluation with the evaluation made by the teacher contributes to more comprehensive view of the teacher's voice[1].

Despite the high prevalence of vocal symptoms, teachers can not recognize the need to deal with dysphonia, considering it inherent to the profession. Besides the difficulty of performing the speech therapy without compromising the school routine and teaching career[1,23], can, also, relate the symptoms to other health problems. The approach adopted, in the presence of vocal symptoms, the majority of teachers of a study, did not look for specialized care[24]. Such scientific evidence reinforces the importance of speech therapy in the health surveillance of the teaching work.

The average age, 41 years (SD = 8.2), was similar to other studies with teachers[2,3,6,25,26]. Most teachers (75%) (Table 1) works in two shifts day or more, which shows a high vocal demand in the profession, confirming other reviews[3,6,10,20]. A study that evaluated 349 teachers found that 72.8% worked

Table 2. Voice-related habits, clinical aspects of dysphonia of the study and teachers association with the number of reported symptoms

Vocal habits and aspects of dysphonia	Total	Number symptoms		p-value
		0 to 2	3 to 10	
	n (%)	n (%)	n (%)	
Shout				
No	47 (46.1)	31 (70.4)	16 (27.6)	
Sometimes	42 (41.2)	9 (20.4)	33 (56.9)	
Always	13 (12.7)	4 (9.2)	9 (15.5)	<0.001*
Smoke				
No	96 (96)	40 (93)	56 (98.3)	
Yes	4 (4)	3 (7)	1 (1.7)	0.312
Hydration				
Yes	82 (85.4)	37 (88.1)	45 (83.3)	
No	14 (14.6)	5 (11.9)	9 (16.7)	0.512
Tablet use				
No	92 (93.9)	40 (95.2)	52 (92.9)	
Yes	6 (6.1)	2 (4.8)	4 (7.1)	0.698
Physical activity associated with speech				
No	95 (95)	41 (95.3)	54 (94.7)	
Yes	5 (5)	2 (4.7)	3 (5.3)	1.000
Type of dysphonia				
No dysphonia	8 (8.1)	4 (9.1)	4 (7.3)	
Functional	42 (42.4)	19 (43.2)	23 (41.8)	
organofunctional	49 (49.5)	21 (47.7)	28 (50.9)	0.878
Degree of dysphonia				
Neutral	8 (7.7)	4 (8.9)	4 (6.8)	
Light	55 (52.9)	22 (48.9)	33 (55.9)	
Moderate	41 (39.4)	19 (42.2)	22 (37.3)	0.817

* Significant values (p≤0.05) - Qui-square test of Pearson and Exact test of Fisher

Table 3. Scores of the parameters of self-perception and vocal limitations in daily activities related to voice

Scores of PPVA	n	Medium	Minimum	Maximum	Possible variation
Self-perceived vocal	102	3.74	0	9.9	0 to 10
Effect on work	103	11.52	0	39.1	0 to 40
Effect on social communications	103	5	0	30.4	0 to 40
Effect on daily communication	103	26.4	0	104.3	0 to 120
Effect on emotion	103	15	0	66	0 to 70
Total	103	60.1	0	215.3	280

Subtitle: PPVA = Profile Protocol Participation and Vocal Activities

40 or more hours per week in school[26]. The high workload in teaching, with the presence of excessive vocal demand, may be related to the mentioned symptoms: fatigue after prolonged use of the voice.

Concerning to the environment in schools, more than half of the teachers in this study mentioned working with conversational noise and most of them make use of fans, which usually generates higher noise level in the classroom. The noise by conversation was appointed, mainly, by teachers who presented three to ten proprioceptive vocal symptoms, compared to those with up to two symptoms, and a relevant factor, that contributes to the vocal overload before an inappropriate voice adjustment.

Working conditions not suitable for vocal health, as dust, construction noise and external noise to school were also more cited by teachers with more than three symptoms present. Another study, with 2,133 primary school teachers, found that the high / unbearable noise in the classroom (reported by 51% of the sample) increases the prevalence of poorer quality of

Table 4. Correlation between the number of vocal symptoms, PPVA parameters and age

Pair of variables	Spearman – R	p-value
Number of symptoms / self-perception	0.37	<0.001*
Number of symptoms / work	0.46	<0.001*
Number of symptoms / daily communication	0.50	<0.001*
Number of symptoms / social communications	0.43	<0.001*
Number of symptoms / emotion	0.44	<0.001*
Number of symptoms / age	0.12	0.223

* Significant values (p≤0.05) – Spearman correlation

life related to the voice of teachers[27]. The unfavorable environmental conditions generate exaggerated voice effort, may intensify the aggravation of the disease itself and therefore absenteeism-disease[23].

Teachers may or may not be conscience of the negative influences of working conditions about voice and how to minimize its effects. It is common to observe, in noisy environments, the teacher's effort to override the intensity of his voice to noise[13], or even choose for changes in their tasks, to minimize the vocal effort[22].

In relation to vocal abuse, the obtained results indicated a high number of teachers with the habit of shouting, which was prevalent in the group with three to ten reported symptoms. The shout is known as an aggravating factor of vocal alteration in teachers and can be used as a resource to keep order and rule in the classroom[28]. Shout or speak loudly was a practice referred to by 721 of the 747 teachers of another research, and these inadequate vocal habits were strongly associated with voice alteration of investigated complaints[5].

It was possible to observe the occurrence only behavioral dysphonia, with predominance of slight degree in perceptual auditory voice evaluation. The slight degree of dysphonia does not prevent the teacher to perform his usual activities and can manifest itself in any way or almost imperceptible, making it difficult the recognition of voice problem.

There were no cases of organic dysphonia, as well as the results obtained in another study[20]. The absence of intense degree of dysphonia can be justified due to the occurrence called healthy worker effect, that is, teachers with greater voice commitment are not in the classroom.

The mean scores of PPVA in this study indicate that the quality of life of the population studied is little affected by their voices in agreement with findings from other research[4], which used the same protocol. The quality of life parameters most affected by dysphonia were the work, emotion and daily communication, respectively. The average values were low in relation to the maximum score for each test parameter, however, go beyond the expected for healthy voices[18]. It was observed that there was great variation in all parameters, as the minimum and maximum scores. This finding confirms that, despite the homogeneity of the study group as the occupation and vocal characteristics, not all teachers had limitations in usual activities because of the voice problem.

Results of the association between the number of symptoms and PPVA parameters allow us to state that the greater the number of reported proprioceptive vocal symptoms, the greater the perception of dysphonia and the impact on all parameters. Therefore, teachers who perceived greater change in voice quality and greater impact on quality of life were the ones mentioned more vocal symptoms.

This result shows the number of proprioceptive vocal symptoms reported as an indicator of the negative impact on the quality of life of teachers, reinforcing findings of other studies[22,29].

The inserted speech therapy practice in schools with health promotion activities would be possibly a strategy to numerically reduce cases of dysphonia in the studied group. In health promotion actions must be addressed, not only personal health of workers, but also the physical and psychosocial work environment. Actions are needed involving the community, through health education programs that go beyond the increased awareness and include the development of attitudes and behavior changes[30]. Reinforce, also, the need for speech therapy actions in higher education of these professionals and for teaching in order to make them aware of the early signs of dysphonia and voice care.

When there is a relationship between voice and work, dysphonia is recognized as Voice Disorders Related to Work (VDRW). There is a protocol related to VDRW for public consultation, which was submitted to the Ministry of Health and is awaiting the completion of the process and publication, in order to be included in the Disease Manual related to work and become a protocol to be inserted into the National System Notification (*Sistema Nacional de Notificação* - SINAN)[14]. The advancement of this process is essential for the expansion and strengthening of actions in occupational health.

The results found in this study can not be generalized because it was studied the population attended at the Teaching Hospital of the clinic, which is the reference of Belo Horizonte. No data, not even about teachers that, even referred for treatment, not sought speech therapy assistance and not even those who were treated elsewhere. However, the correlation of findings with other national and international studies allows to enlarge and better understand the vocal aspects and the work of the teachers.

CONCLUSION

There are high frequency proprioceptive vocal symptoms among teachers with dysphonia, and the most reported are fatigue after prolonged use of the voice, dry throat, throat

clearing and burning. The noise of conversation in the classroom and shouting habit are associated with the number of vocal symptoms, which reinforces these factors as aggravating the dysphonia in teachers.

The parameters of self-perception of the impact of dysphonia contained in PPVA correlate the number of vocal symptoms. Thus, the higher the number of vocal symptoms, the greater the perception of the intensity of dysphonia and the impact on quality of life of teachers.

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