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RESEARCH

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Teachers' Self-Referred Chronic Dysphonia Associated Factors

Fatores Associados à Disfonia Crônica Autorreferida por Professoras

Factores Asociados a la Disfonía Crónica Autoreferida por Profesoras

Luiza Augusta Rosa Rossi-Barbosa^{1*}; Dandara Hemanuely Ferreira Guimarães²; Emanuely de Souza Arantes³; Joyce Elen Murça de Souza⁴; Ana Cristina Côrtes Gama⁵; Antônio Prates Caldeira⁶

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ABSTRACT

Objective: The study's purpose has been to characterize the socio-demographic, organizational, lifestyle, health-disease and vocal aspects of teachers. **Methods:** It is both a cross-sectional and an analytical study that has involved 146 participating teachers. A bivariate analysis was performed through the Pearson's Chi-squared Test. **Results:** The prevalence of chronic vocal alteration was 39.7%. The main self-referred complaints were, as follows: dry throat, hoarseness, vocal fatigue, throat clearing and voice failure. A statistically significant difference was observed for the following variables: regency time, out-of-school noise, either none or one glass of juice per day, more than one alcoholic dose at a time, talks a lot on a daily basis, absences and work leave because of vocal issues, perception of respiratory problem, medical diagnosis of respiratory allergy, medical consultation for voice and speech-language therapy. **Conclusion:** Knowing both the prevalence and the profile of the chronic dysphonia bearing teachers are held as important factors for ongoing activities towards health promotion.

Descriptors: Voice, Teacher, Occupational Health, Dysphonia, Working Conditions.

¹ Speech Therapy Graduate, PhD in Health Science by the UNIMONTES, Professor of the Primary Health Care Postgraduate Program at UNIMONTES. Universidade Estadual de Montes Claros (UNIMONTES), Brazil.

² Speech Therapy Graduate by the FUNORTE. Faculdades Unidas do Norte de Minas (FUNORTE), Brazil.

³ Speech Therapy Graduate by the FUNORTE. Faculdades Unidas do Norte de Minas (FUNORTE), Brazil.

⁴ Speech Therapy Graduate by the FUNORTE, Specialist's Degree in Family Health by the Universidade de Brasília. Faculdades Unidas do Norte de Minas (FUNORTE), Brazil.

⁵ Speech Therapy Graduate, PhD in Human Communication Disorders by the Universidade Federal de São Paulo, Professor of both the Speech-Language Science Postgraduate Program and the Health Science Postgraduate Program at UFMG. Universidade Federal de Minas Gerais (UFMG), Brazil.

⁶ Medicine Graduate, PhD in Health Science by the UFMG, Professor of both the Primary Health Care Postgraduate Program and the Health Science Postgraduate Program at UNIMONTES. Universidade Estadual de Montes Claros (UNIMONTES), Brazil.

RESUMO

Objetivo: Caracterizar os aspectos sociodemográficos, organizacionais, estilo de vida, saúde-doença e vocais de professoras. **Métodos:** Estudo transversal e analítico envolvendo 146 docentes. Realizou-se análise bivariada por meio do teste qui-quadrado de Pearson. **Resultados:** A prevalência de alteração vocal crônica foi de 39,7%. As principais queixas autorreferidas foram: garganta seca, rouquidão, cansaço vocal, pigarro e falha na voz. Observou-se diferença estatisticamente significativa para as variáveis: tempo de regência, ruído fora da escola, nenhum ou 1 copo de suco por dia, mais de uma dose alcoólica por vez, fala muito a demais no dia-a-dia, faltas e afastamento do trabalho por problema vocal, percepção de problema respiratório, diagnóstico médico de alergia respiratória, consulta médica para a voz e tratamento fonoaudiológico. **Conclusão:** Conhecer a prevalência e o perfil dos docentes com disfonia crônica são fatores importantes para atividades contínuas de promoção da saúde.

Descritores: Voz, Docente, Saúde Ocupacional, Disfonia, Condições de Trabalho.

RESUMEN

Objetivo: Caracterizar los aspectos socio-demográficos, de organización, estilo de vida, salud-dolencia y vocales de las profesoras. **Métodos:** Estudio transversal y analítico involucrando 146 docentes. Se realizó un análisis bivariable por medio del test qui-cuadrado de Pearson. **Resultados:** Alteración vocal crónica 39,7%. Quejas autoreferidas: sequedad en la garganta, ronquera, cansancio vocal, irritación y fallo de la voz. Se observó una diferencia estadística significativa para las variables: tiempo de desempeño, ruido fuera de la escuela, ningún ó 1 vaso de jugo diariamente, más de una dosis alcohólica al beber, hablar demasiado cotidianamente, faltas de descanso laboral por problema vocal, percepción del problema respiratorio, diagnóstico médico de alergia respiratoria, consulta médica para la voz y tratamiento fono-audiológico. **Conclusión:** Conocer el predominio y el perfil de docentes que padecen de disfonia crónica son factores importantes para las actividades continuadas de promoción de la salud.

Descriptor: Voz, Instructor, Salud Ocupacional, Disfonia, Condiciones de trabajo.

INTRODUCTION

Professionals who use voice daily as a work tool are more likely to develop vocal changes. Among the likely professions are singers, salespeople, telemarketers, receptionists, actors, broadcasters, journalists and teachers.¹

Among teachers who use the voice professionally, teachers have a higher incidence of vocal changes when compared to other professional categories.² Often such changes are due to the combination of several factors, such as prolonged voice use and adverse environmental conditions in schools (physical, chemical and ergonomic), as well as the organizational dynamics of work itself, then resulting in situations of remoteness and inability to perform their functions.³

It is possible to affirm that the general labor conditions and the material resources offered to the teachers favor the misuse of the voice.⁴ Generally the educational institutions include precarious conditions for the development of the teachers' work. In addition to occupational issues, the

influence of hereditary, behavioral, and lifestyle factors also increases the incidence of vocal disorders.⁴ Furthermore, there is no concern for vocal health of teachers, and there is no program to promote, prevent and intervene towards those disorders.⁵

Knowing the aspects related to the problems of teachers' voices, especially regarding the chronic dysphonia, is the first step to put into practice a health education program, focused on the promotion of vocal health and also focused on the reality of teachers from the municipal network under study. This article aimed to verify the factors associated with teachers' self-reported chronic dysphonia. The participating teachers are from the municipal schools of *Montes Claros* city, *Minas Gerais (MG)* State.

METHODS

It is both a cross-sectional and an analytical study that has involved 146 participating teachers. The database from a larger study was used in which teachers, from the first five years of elementary school in the municipal schools of the urban area of *Montes Claros-MG*, have participated.

As inclusion criterion was adopted to be a teacher of the first five years of elementary school in the municipal schools of the urban area of *Montes Claros-MG* who was in the regency. Exclusion criteria were physical education and sign language teachers because they presented a demand for voice use different from the target population; and males due to the small number of individuals and the anatomic-functional differences of the larynx. For this study, we also excluded those with a voice change of less than 21 days, because, according to the Guideline from the American Academy of Otolaryngology-Head and Neck Surgery Foundation, the symptoms of viral laryngitis usually last up to three weeks.⁶

The dependent variable of this study was either existence or not existence of vocal alteration, with dichotomous response yes and no. The answer to the question about how much time has been altered was taken into consideration, including those with more than 21 days of vocal complaint. The teachers also reported the signs and symptoms they either have or perceived.

The teachers also answered a questionnaire containing the independent variables, involving socio-demographic, economic, organizational, environmental, lifestyle, health-disease process and data about their own voices.

Descriptive analyses were performed whose categorical variables were summarized by absolute and relative frequency and the numerical variables by measures of central tendency and variability.

Pearson's Chi-square Test (X^2) was performed for the bivariate analysis and the variables that were associated with the outcome studied up to the level of 20% ($p \leq 0.20$) were selected for the multiple-analysis, remaining in the model the variables that presented $p \leq 0.05$. The association

magnitude was evaluated by the Prevalence Ratio (PR) with its respective confidence intervals through the Poisson regression with robust variance. Data interpretation was performed by the statistical software Predictive Analytics Software (PASW® STATISTIC) version 18.0.

The study was approved by the Research Ethics Committee from the *Universidade Estadual de Montes Claros (UNIMONTES)*, under the Legal Opinion No. 2889. The research was performed in accordance with the norms established by the Resolution No. 466/12.⁷ It was requested the authorization of the schools and all participants signed the Free and Informed Consent Term.

RESULTS AND DISCUSSION

Considering the total of 226 participating teachers, 80 were excluded because they reported voice alteration within less than 21 days. Therefore, the sample for the present study involved 146 teachers, within the age group from 24 to 59 years, average of 41.2 years old (SD±6.78). The number of children ranged from 0 to 9, with the median being 2 (P25=1 and P75=2). As for the number of people in the household, this ranged from 1 to 11, median of 4 (P25=1 and P75=4). The time of regency had a variation between 1 year and two months to 29 years, and average of 15 years and 11 months. The number of students in the classroom varied between 16 and 40 students, median 25 (P25=24 and P75=28).

The prevalence of chronic voice alterations, in other words, for more than 21 days straight was 39.7% (n=58). Out of these, 51.7% self-reported having four or more vocal complaints and the main ones were: dry throat, hoarseness, vocal fatigue, throat clearing and voice failure. The other vocal complaints with their respective absolute and relative values are in **Table 1**.

Of the 88 (60.3%) teachers who stated that they did not have vocal alterations, some showed signs and/or symptoms: 11.4% (n=10) had one change; 4.5% (n=4), two changes; 3.4% (n=3) three changes; and 1.1%, four changes.

Table 1 – Absolute and relative values of the vocal signs and symptoms from the research participating teachers who were allocated in the municipal network. *Montes Claros-MG*, 2013.

Variable	n	%
Dry throat		
No	105	71.9
Yes	41	28.1
Hoarseness		
No	108	74
Yes	38	26
Vocal fatigue		
No	111	76
Yes	35	24
Throat clearing		

No	111	76
Yes	35	24
Voice failure		
No	115	78.8
Yes	31	21.2
Burning		
No	123	84.2
Yes	23	15.8
Vocal effort		
No	124	84.9
Yes	22	15.1
Soreness		
No	137	93.8
Yes	9	6.2
Ball in the throat		
No	139	95.2
Yes	7	4.8
Sting in the throat		
No	142	97.3
Yes	4	2.7

It was observed in the bivariate analysis that the self-reported chronic vocal alteration was associated with age equal to or greater than 40 years old, having children, regency time over 15 years, weekly hours of 40 hours or more, annoying and intolerable noise inside the school and out of school, water for consumption far away from the classroom (**Table 2**), not eating fruit juices per day and drinking up to a glass, lack of exercise, talking too much in the day-to-day practice (**Table 3**), absences and work leave because of vocal issues, medical diagnosis of respiratory allergy, perception of respiratory problem, medical consultation for voice, speech-language therapy (**Table 4**).

Table 2 – Socio-demographic and organizational data of the participating female teachers allocated in the municipal network. *Montes Claros-MG*, 2013.

Variable	Without alteration		With alteration		p-value
	n	%	n	%	
Age					0.121*
39 years old or younger	37	67.3	18	32.7	
40 years old or more	51	56	40	44	
Schooling					0.487
Postgraduate degree	39	60.9	25	39.1	
High school to college	48	59.3	33	40.7	
Marital status					0.541
With partner	56	60.2	37	39.8	
Without partner	31	59.6	21	40.4	
Number of children					0.114*
None	22	71	9	29	
One or more	65	57	49	43	
Regency time					0.008*

Regency time					0.008*
Up to 15 years	36	75	12	25	
Above 15 years	52	53.1	46	46.9	
Hours/lessons per week					0.057*
20	68	64.8	37	35.2	
40 or 60	20	48.8	21	51.2	
Number of students					0.515
Up to 25	48	60.8	31	39.2	
26 or more	40	59.7	27	40.3	
Noise inside the classroom					0.436
Negligible to tolerable	63	61.2	40	38.8	
Unpleasant to intolerable	25	58.1	18	41.9	
Noise inside the school					0.088*
Negligible to tolerable	61	64.9	33	35.1	
Unpleasant to intolerable	27	51.9	25	48.1	
Noise out of school					0.044*
Negligible to tolerable	81	63.3	47	36.7	
Unpleasant to intolerable	7	38.9	11	61.1	
Ventilation in the classroom					0.218
Satisfactory to reasonable	54	63.5	31	36.5	
Precarious to very precarious	34	55.7	27	44.3	
Water close for consumption					0.072*
Always or almost always	56	65.9	29	34.1	
Never or almost never	32	52.5	29	47.5	

*Significant difference between the sample groups for $p \leq 0.20$ (Pearson's Chi-square Test).

Table 3 – Lifestyle data of the research participating teachers allocated to the municipal network. *Montes Claros-MG*, 2013.

Variable	Without alteration		With alteration		p-value
	n	%	n	%	
Drink water during class					0.553
Yes	61	60.4	40	39.6	
No	27	60	18	40	
How much water/day					0.382
4 or more glasses	58	61.7	36	38.3	
1 to 3 glasses	30	57.7	22	42.3	
Intake of fruit juice/day					0.054*
Yes	45	68.2	21	31.8	
No	43	53.8	37	46.3	
Amount of juice/day					0.025*
2 or more cups	38	71.7	15	28.3	
None or 1 glass	50	53.8	43	46.2	
Alcohol consumption					0.568
Never or monthly	71	60.2	47	39.8	
Twice per month or more	17	60.7	11	39.3	
Smoking					0.212
Non-smoking	82	61.7	51	38.3	
Smoker/former smoker	6	46.2	7	53.8	
Physical exercise					0.070*
Yes	36	69.2	16	30.8	
No	52	55.3	42	44.7	
The day-to-day voice usage					0.003*
Speak little to moderately	27	81.8	6	18.2	
Speak more than moderately to speak too much	61	54	52	46	

*Significant difference between the sample groups for $p \leq 0.20$ (Pearson's Chi-square Test).

Table 4 – Health-disease data of the research participating teachers allocated to the municipal network. *Montes Claros-MG*, 2013.

Variable	Without alteration		With alteration		p-value
	n	%	n	%	
Work leave because of vocal issues					0.003*
No	81	65.3	43	34.7	
Yes	7	31.8	15	68.2	
Missed the work because of vocal issues					0.001*
No	78	67.2	38	32.8	
Yes	10	33.3	20	66.7	
Treatment for gastroesophageal reflux					0.356
No	83	61	53	39	
Yes	5	50	5	50	
Medical diagnosis of respiratory allergy					0.003*
No	71	67.6	34	32.4	
Yes	17	41.5	24	58.5	
Perception of respiratory problem					0.001*
No	67	69.8	29	30.2	
Yes	21	42	29	58	
Use of medicines					0.337
No	58	58.6	41	41.4	
Yes	30	63.8	17	36.2	
Hypertension					0.595
No	79	60.3	52	39.7	
Yes	9	60	6	40	
Diabetes					0.653
No	86	60.1	57	39.9	
Yes	2	66.7	1	33.3	
Depression					0.229
No	81	59.1	56	40.9	
Yes	7	77.8	2	22.2	
Sleep disturbance					0.488
No	82	59.9	55	40.1	
Yes	6	66.7	3	33.3	
Rheumatism					
No	88	60.3	58	39.7	
Yes	-	-	-	-	
Medical consultation for the voice					0.000*
No	77	76.2	24	23.8	
Yes	11	24.4	34	75.6	
Speech-language therapy					0.000*
No	83	66.4	42	33.6	
Yes	5	23.8	16	76.2	

*Significant difference between the sample groups for $p \leq 0.20$ (Pearson's Chi-square Test).

The variables that remained associated with the self-reported chronic vocal alteration after the multiple-analysis were as follows: annoying to intolerable noise outside school, absence of physical exercise, medical consultation for the voice (**Table 5**).

Table 5 – Prevalence ratio for the association between the teachers' self-reported chronic vocal alterations and the independent variables that remained in the final model. *Montes Claros-MG*, 2013.

Variable	p-value	PR (95% CI)
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Noise outside school	0.003	
Negligible to tolerable		
Unpleasant to intolerable		1.22 (1.07-1.39)
Physical exercise	0.040	
Yes		
No		1.11 (1.01-1.23)
Medical consultation for the voice	0.000	
No		
Yes		1.33 (1.14-1.54)

PR = Prevalence Ratio; CI = Confidence Interval.

The prevalence of chronic self-reported problems was above the 30.0% found in public school teachers in Spain.⁸ Vocal alterations for more than three weeks may be a sign of laryngeal dysfunction, in which case the medical diagnosis through video-laryngoscopy is a adequate measure.+

The search for medical consultation was associated with chronic alteration. A study carried out with 1,980 teachers also found an association between perceived worsening of vocal quality and the search for medical care.¹⁰ Teachers seek medical evaluation when compared to other professionals, but lower than expected when considering the high prevalence of vocal problems in this category.¹¹ A study carried out in *Cuité* city, *Paraíba* State, Brazil, found that most teachers seek help when the situation becomes unsustainable.¹²

It can be observed that a large proportion of the teachers bearing chronic alterations did not consult the physician (41.4%), although most of them had four or more vocal signs and symptoms. This fact probably shows the erroneous view that vocal changes are common and are part of the vocational profile of this professional category.¹³⁻⁵ There is also, for some teachers, the fear of the physician suggesting the readjustment of the functions, which is a condition that the teachers considered a discredit.¹⁵ A survey of 2,133 teachers showed that 12% reported daily vocal symptoms in the last two weeks, but only 7% sought a doctor or speech pathologist for the vocal problem.¹³

The noise produced outside the school was more noticeable among those with a vocal problem, classifying it as annoying to intolerable. It is known that in such a situation the teacher competes to overcome the noise, making an effort beyond what is necessary to make itself heard.¹⁶ The physical conditions of the schools need improvements, especially with regard to noise, since noise is directly related to dysphonia.¹⁷ Nevertheless, there is no concern in the planning of constructions for acoustic comfort, nor are there actions to overcome this problem when detecting it. For schools in operation, an acoustic treatment must be carried out, such as the placement of porous material on the walls.¹⁸

Another factor associated with chronic voice alterations was the lack of physical exercise. It is known that good physical conditioning and adequate respiratory capacity are needed to improve voice efficiency, especially for those individuals who use it as a work tool.¹⁹ Regular physical exercise

is beneficial to general health, and probably to the vocal musculature. A study performed with teachers from *Belo Horizonte* city, *MG*, showed that the lack of regular physical exercises was associated with an increase in the prevalence of dysphonia. The benefit of this habit in life may be either directly or indirectly related to the voice.²⁰

Herein, the vocal complaints were dry throat, hoarseness, vocal fatigue and voice failures. It is curious to note that among those who reported not having vocal problems, some signs and symptoms were listed. This fact reinforces that there are still teachers who consider the voice change something normal, proper to the profession. The literature presents the occurrence of altered voice in teachers who evaluated their voices favorably.¹³⁻¹⁴

Finally, it should be emphasized that the study presented here has its limitations, the first one because it is cross-sectional, which makes it impossible to establish causal relations; another limitation refers to being the sample restricted to municipal schools in a single city. Nonetheless, these data have their relevance, since they allowed a better understanding regarding the teachers' profile and the factors associated with chronic dysphonia, then demonstrating the importance of continuous activities of health promotion for the teachers of the city, emphasizing the voice to both sensitize and guide them.

CONCLUSIONS

The prevalence of chronic vocal alteration was 39.7%. The most commonly reported signs and symptoms were dry throat, hoarseness, vocal fatigue, throat clearing, and voice failure.

The variables that remained associated with the self-reported chronic vocal alteration were the following: annoying to intolerable noise outside school, absence of physical exercise and medical consultation for the voice.

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***Corresponding Author:**

Luiza Augusta Rosa Rossi-Barbosa

Rua Irmã Beata ,65

Centro, Montes Claros, Minas Gerais, Brazil

E-mail address: luiza.rossi@funorte.edu.br

Telephone number:+55 38 3221-0097

Zip Code: 39.400-110

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