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Original articles

Vocal symptoms and self-reported causes in teachers

Sintomas vocais e causas autorreferidas em professores

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ABSTRACT

Purpose: to associate the vocal symptoms and their possible self-reported causes by teachers from public schools in the city of João Pessoa, PB.

Methods: 121 teachers from four primary schools and secondary public schools answered the self-perception questionnaire Teacher's Vocal Production Condition. In this questionnaire were analyzed personal data (age, sex, marital status, education); functional status (workload and teaching time) and vocal aspects, mainly related to the symptoms and causes. Data analysis was performed using the chi-square test.

Results: the most frequent vocal symptoms were hoarseness, cracks in voice, deep voice, weak voice and breathlessness. The most frequent causes were heavy use of voice, stress, allergy and exposure to noise. In teachers' opinion, the hoarseness is associated with the intensive use of voice and respiratory infection; the loss of voice to the heavy use of voice; breathlessness to allergy; voice failure to the heavy use of voice; the weak voice is associated to respiratory infection, exposure to noise and the heavy use of voice.

Conclusion: therefore, data indicate that the teachers who participated of this research realize that external factors (exposure to noise) interfere with vocal production, as well as those related to the health and voice (allergies, respiratory infections and intensive use of voice).

Keywords: Speech, Language and Hearing Sciences; Voice; Faculty; Epidemiology; Symptoms; Causality

RESUMO

Objetivo: associar os sintomas vocais e suas possíveis causas autorreferidas por professores de escolas públicas do município de João Pessoa-PB.

Métodos: 121 professores de quatro escolas de ensino fundamental e médio da rede pública responderam ao questionário de autopercepção Condição de Produção Vocal do Professor. Neste questionário foram analisados dados pessoais (idade, sexo, estado civil, escolaridade); situação funcional (carga horária e tempo de magistério) e aspectos vocais, principalmente relacionados aos sintomas e causas. A análise dos dados foi realizada por meio do teste de associação Qui-Quadrado.

Resultados: os sintomas vocais mais referidos foram rouquidão, falha na voz, voz grossa, voz fraca e falta de ar. As causas mais citadas foram uso intensivo da voz, estresse, alergia e exposição ao barulho. Foi possível constatar que, na opinião dos professores, a rouquidão está associada ao uso intensivo da voz e à infecção respiratória; a perda da voz ao uso intensivo da voz; a falta de ar à alergia; a falha na voz ao uso intensivo da voz; e a voz fraca está associada à infecção respiratória, à exposição ao barulho e ao uso intensivo da voz.

Conclusão: os dados indicam, portanto, que os professores participantes desta pesquisa percebem que tanto os fatores externos (exposição ao barulho) interferem na produção vocal, assim como os relacionados à saúde e a voz (alergia, infecções respiratórias e o uso intensivo da voz).

Descritores: Fonoaudiologia; Voz; Docentes; Epidemiologia; Sintomas; Causalidade

INTRODUCTION

The teacher is the most investigated voice professional in the voice area, and the most susceptible to voice disorders, due to the multifactorial feature of its work context trabalho[1-3]. There is a high number of teachers that have reported voice disorders at some point in their lives, whether being casual or frequent[4]. Studies indicate that one out of two teachers who are active have complaints and/or symptoms of some kind of voice disorder[5].

The literature[3-11] reports that the most common vocal symptoms found in this category are hoarseness, vocal fatigue, weak voice, voice failure, pain or discomfort when speaking, dry throat, throat clearing, persistent cough, and difficulty in projecting the voice. These symptoms are signs of vocal abuse or intensive use of voice in inappropriate working conditions, what may contribute to an occupational disease emergence[3].

In this sense, the main causes reported by teachers, which can lead to vocal symptoms and also to voice disorders (with or without laryngeal lesion) are, as follows: intensive use of voice, stress, respiratory infections and allergies, effort when speaking, gastroesophageal reflux, poor environmental conditions (acoustics, internal noise, external noise, humidity, dust), lack of preparation or vocal training, and inappropriate vocal habits[6,12-15].

Thus, many Brazilian teachers face such adverse external factors every day in their working environment. Frequently, these external factors work in line with individual predisposing factors, leading to temporary retirement situations and inability to carry out their activities due to work-related voice disorder presence, implying financial and social costs for the country.

In this perspective, recent research with João Pessoa teachers related the teachers' voice with biopsychosocial and occupational factors. This study found voice disorders prevalence in 86% of teachers in the city of João Pessoa, finding that voice disorders in teachers not only affect them professionally, but also in personal life, causing anguish and anxiety[16,17].

The comparison between teachers' vocal symptoms self-references and possible causes is relevant to assist in health promotion planning and developing activities, such as teachers' vocal screening in schools, aimed at meeting different demands and developing closer steps to the teacher's reality. Absence of studies that propose the association of voice disorders vocal symptoms and possible causes in teachers also justifies the interest in this topic. In the literature, only a few studies that seek to associate vocal symptoms and their causes were found, but with other populations[18-20].

Thus, the aim of this study is to associate vocal symptoms and their possible causes, which were self-reported by teachers from public schools in the city of João Pessoa – PB state.

METHODS

This study is characterized by being descriptive, observational, cross-sectional and quantitative. It had the approval of the Ethics Committee for Research with Human Beings, Federal University of Paraíba, case number 091/13. All participants involved in the research signed the Term of Free and Informed Consent-TCLE, thus allowinh the realization and dissemination of this research and its results, according to *MS/CNS/CNEP* Resolution No. 466/12, 12 December 2012.

Four primary and secondary schools were selected. School selection succeeded according to the following criteria: large schools that served elementary and secondary education students full-time and that were located in different points, with two in the city periphery and two in the center.

After these schools principals' acceptance, all teachers (150) were invited to participate. After research presentation, 29 teachers were excluded due to the following conditions: they were not willing to participate of all research stages (17) or were on vacation (12). In the end, 121 teachers equally belonging to the four schools took part in this study.

The research consisted of applying the self-perception questionnaire, called the Teacher Vocal Production Condition (CPV-P) [21]. The CPV-P questionnaire consists of 81 questions related to: questionnaire identification; interviewee identification; functional status; health general aspects; vocal habits and vocal aspects. All questions have been documented. However, for this research, data related to sociodemographic variables (age, gender, education, marital status, and workload); voice disorder presence in the past or present; if they missed work due to voice disorder; if they received guidance on voice care; the type of performed treatment; alteration presence time; the value set for the vocal problem; how the beginning and the evolution of this problem were characterized; vocal symptoms (hoarseness, voice failure, voice loss, breath shortness, thin voice, deep voice, voice ranging between thick/thin voice, weak voice); and causes that led to these symptoms (intensive use of voice,

respiratory infections, allergies, stress, constant flu, cold exposure and noise exposure).

CPV-P questionnaire vocal symptom answers are presented on a four-point *Likert* scale (never, rarely, sometimes, always). For database registration, these questionnaire questions which had "I do not know, never and rarely" as answer were considered as "absence", and "sometimes and always" answer as "presence."

Data obtained by the questionnaire were tabulated in *Microsoft Office Excel 2010* program. These data were entered twice to minimize errors. Afterwards, all variables descriptive statistical analysis was performed, with the association between vocal symptoms and causes being subsequently analyzed, using the chi-square association test in *the Statical Package for the Social Sciences - SPSS* (20.0 version). For the chi-square test, 5% significance level was adopted (p-value ≤ 0.05).

RESULTS

Among the 121 studied teachers, there were females (76%), married (47.1%), complete higher education level (75.2%) and 10 to 20 hours weekly working hours (Table 1) predominance. Teachers' average age was of 41.7 years old, with standard deviation of 10.7; and profession time was of 15.3 years, with standard deviation of 10.3.

Table 1. Teachers' sociodemographic and organizational features

VARIABLE	CATEGORIES	n	%
Gender	Female	93	76.9
	Male	28	23.1
Marital status	Single	46	38.0
	Married	57	47.1
	Divorced	11	9.1
	Widower	7	5.8
Education	Higher education	91	75.2
	Undergraduate student	6	5.0
	Incomplete higher education	1	0.8
	High School	20	16.5
	Others	3	2.5
Workload	Less than 10 hours	12	9.9
	from 10 to 20 hours	39	32.2
	from 20 to 30 hours	35	28.9
	from 30 to 40 hours	27	22.3
	More than 40 hours	8	6.6

Of 121 teachers, 106 (87.6%) reported speech disorder now or in the past. Of these, 40 (33.1%) missed work due to voice disorder and 44 (36.4%) received some guidance on voice care (Table 2).

Among teachers who reported voice disorder, the most sought treatment type was medical (10.7%), followed by speech therapy (8.3%) and surgery (1.7%). The majority of teachers voice disorder presence time was of five months (33.1%), and the stipulated value for such problem was moderate (43.8%) and discrete (32.2%). Teachers reported that the beginning of the problem was progressive (38.0%), though many participants characterized the change as back and forth type (35.5%) and sharp (26%). Regarding vocal problem evolution, most teachers said that it has remained the same (43%), and others said that it has improved (35.5%).

The most frequent vocal symptoms found among teachers were hoarseness (62%), voice failure (43.8%), deep voice (42.1%), weak voice (33.9%) and shortness of breath (28.9%) (Table 3). Of 121 teachers, the most frequently reported causes were intensive voice use (70.2%), stress (39.7%), allergy (37.2%) and noise exposure (33.9 %) (Table 4). Moreover, associations between teachers' self-reported symptoms and causes were found, as outlined in Table 5.

Table 2. Teachers' self-reported voice change, work absence and vocal orientation

VARIABLE		YES	
		n	%
Self-reported voice change	YES	106	87.6
	NO	15	12.4
Total		121	100.0
Work absence due to voice change	YES	81	66.9
	NO	40	33.1
Total		121	100.0
Orientation about voice care	YES	44	36.4
	NO	77	63.6
Total		121	100.0

Table 3. Teachers' self-reported voice symptoms number and percentage distribution

VARIABLE	CATEGORIES	n	%
VOCAL SYMPTOMS	Hoarseness	75	62.0
	Voice failure	53	43.8
	Deep voice	51	42.1
	Weak voice	41	33.9
	Breathlessness	35	28.9
	Deep/thin voice	28	23.1
	Voice loss	21	17.4
	Thin voice	18	14.9
	Others	4	3.3
Total occurrences		326	100

Table 4. Teachers' self-reported voice symptom causes number and percentage distribution

VARIABLE	CATEGORIES	n	%
SYMPTOM CAUSES	Intensive voice use	85	70.2
	Stress	48	39.7
	Allergies	45	37.2
	Noise exposure	41	33.9
	Cold exposure	25	20.7
	Constant flu	23	19.0
	Respiratory infection	21	17.4
Total occurrences		288	100

Table 5. Teachers' self-reported voice symptoms and probable causes association

SYMPTON	CAUSE		OCCURRENCE				TOTAL		P VALUE
			No		Yes				
			n	%	n	%	n	%	
Hoarseness	Intensive voice use	No	22	61.1	14	38.9	36	29.8	0.001
		Yes	24	28.2	61	71.8	85	70.2	
	Respiratory infection	No	42	42.0	58	58.0	100	82.6	0.049
		Yes	4	19.0	17	81.0	21	17.4	
Voice loss	Intensive voice use	No	34	94.4	2	5.6	36	29.8	0.026
		Yes	66	77.6	19	22.4	85	70.2	
Breathlessness	Allergies	No	61	80.3	15	19.7	76	62.8	0.004
		Yes	25	55.6	20	44.4	45	37.2	
Voice failure	Intensive voice use	No	29	80.6	7	19.4	36	29.8	0.000
		Yes	39	45.9	46	54.1	85	70.2	
Weak voice	Intensive voice use	No	30	83.3	6	16.7	36	29.8	0.009
		Yes	6	16.7	35	41.2	85	70.2	
	Respiratory infection	No	70	70.0	30	30.0	100	82.6	0.004
		Yes	10	47.6	11	52.4	21	17.4	
	Noise exposure	No	63	78.8	17	21.2	80	66.1	0.000
		Yes	17	41.5	24	58.5	41	33.9	

Chi-square test ($p \leq 0.05$ value)

DISCUSSION

This research included the CPV-P[21] questionnaire application on 121 teachers from four primary and secondary public schools in João Pessoa. Based on these data, the association between vocal symptoms and their possible causes cited by studied teachers was noticed.

This study sample composition is similar to other related researches, which also had more female teachers, what was already expected, since, in this profession, the number of women is still higher than that of men[3,10,17] .

A study[22] points out that change occurrence in women glottic configuration during prolonged phonation and high loudness, possibly due to anatomical differences, favor voice disorders appearance. The authors of that study also said that more women in the pedagogical area are due to the fact that the profession is still seen as traditionally feminine[22].

The average age of the surveyed teachers was near the end of the vocal efficiency period, and these figures are similar to those found in other estudies[3,17]. This research, compared with a study by UNESCO[23] with 500 teachers from public and private schools of several states of Brazil, showed that the average age of these professionals are 37.8 years old, i.e., a lower number than that found in this study.

Researchers found that teachers were more likely to refer to vocal problems as age increases, the same way they found that teachers who did not have voice disorders are younger than those with voice changes[11,22].

Regarding working time, there are researches with less time and higher time compared[17,24] to this research. The reasons for such differences may be because they are cross-sectional studies, with specific sample characteristics and different realities.

In results related to education, there was high percentage of teachers with complete higher education. This finding was higher than those found in other estudies[17,25]. Possibly, the highest rate of teachers with higher education is an indication of compliance with the Law of Directives and Bases of Education (Law No. 9.394, of 20/12/1996), which began to determine that teachers have to have education at the college level to operate in education levels, from basic education[3]. Thus, in recent decades, teachers have sought to significantly specialize, in order to meet this law and also in order to accompany the labor market, which is increasingly demanding and competitive.

There was a higher working hours incidence from 10 to 20 hours, followed by the duration between 20-30 and 30-40 hours per week. Thus, the working hours amount in this study, was mostly lower than other

similar studies done with teachers[13,26]. This finding may be related to the fact that most teachers give classes in only one school and one shift daily.

Data found about teachers who made references to the vocal disorders, in the present or past, is similar to that of other studies with teachers[10,26,27], which shows that it is not the location that interferes with data change, but the profession characteristics.

Of 121 teachers who responded on voice alteration time, most (33.1%) reported up to five months, what was similar to other studies[21] that sought to know the time the vocal change lasted. Of teachers who have made reference to voice problems, only 14% mentioned seeking specialized treatment. These data imply disorders worsening, once symptoms appear for quite some time, and when specialized treatment is not sought, one reaches even to the teacher's removal of its function.

The majority of teachers held medication treatment, as well as in other estudies[25,28], what does not mean that these teachers sought a doctor - many made use of self-medication, what is worrying regarding the risks that this fact can cause[3].

As to absence from work due to voice disorder, most teachers mentioned that missed work for this reason, and this figure was higher than other survey with teachers[3]. This finding is a warning to managers (city and state) to the financial and social costs arising from these absences, and the need for the development of vocal health promotion activities for teachers within schools, in order to reduce these situations.

In this study, less than half the teachers received prior guidance on voice care, which was lower than other studies[3,29] and higher than another research in the area[8]. Voice guidance is essential to decrease the rates of absenteeism as a result of voice disorder. Researches emphasize vocal health promotion actions importance to minimize teachers' vocal problems, what could be inserted both in undergraduate courses (Education, Literature, etc.), before the start of working life, or throughout their career, in training courses promoted by municipal governments and also within schools, with the proposal to strengthen awareness-raising with all the school community[3,24,30].

Among the most common vocal symptoms, there was prevalence of hoarseness, voice failure, weak voice, and breathlessness. Hoarseness is a very common symptom in studies with teachers[3,10,31], and often suggests larynx and vocal cords abuse and overloading, resulting from heavy voice use. Similarly, voice failure, weak voice and breathlessness may be secondary to vocal efforts made by teachers while working[32].

In most researches, it was observed that between voice disorder symptoms, hoarseness is considered a likely factor of a functional nature voice disorder. Hoarseness is still the most publicized symptom by audiologists and otolaryngologists in voice campaigns, in order to alert the public about the importance of preventing vocal changes[19]. The weak voice symptom, which is the second in reports prevalence by teachers of this research, is also found in other studies[19,33].

The most often cited symptom causes, in teachers' opinion, were intensive voice, stress and allergy, which were also confirmed, although with different values in other studies[3,17,28]. Another research reported intensive voice use and exposure to noise as causes[8].

Voice intensive use is the most reported cause in studies[8,28]. It is considered that intensive voice use presence only does not determine a voice disorder, but rather this behavior associated with continuous vocal effort and lack of vocal technique[34]. Guidance is essential for these professionals to be advised to use their voice properly, without vocal effort, because its misuse can cause a disorder. Work-related stress is one of the factors that contribute to voice disorder prevalence in teachers[14,21]. However, stress is not only seen as a result of intrinsic factors or factors related to the job[35], but as a product of the dynamics between the individual, the social, the physical working environment, the personality, the behavior and life characteristics[36]. The relation between emotional and vocal aspects directly interfere in the vocal behavior, self-assessment and the number of complaints mentioned by teachers[16,37]. Factors such as almost daily disagreements between students, customarily short rest and food breaks, and generally not consistent wages with the amount of hours devoted to work can lead teachers to major stressful situations, and even to other emotional problems.

Among mentioned symptoms, statistically significant relation between hoarseness presence and intense voice use, as well as respiratory infections, was found. Hoarseness symptom is common in voice disorder situations due to vocal abuse, voice misuse of voice and respiratory infections[38].

Voice loss symptom had a significant relation with intensive voice use, what can happen in situations in which teachers use their voice frequently without necessary care. In a study conducted to know the

importance of a possible voice loss, it was found that voice loss considerably affects teachers' lives, since the voice is their work tool[39].

In the data analysis, significant relation between breathlessness and allergies was also found. Nasal mucosa allergic inflammation, better known as allergic rhinitis, repeatedly occurs, with inhalant allergies, cause by dust mites and dust, being their main cause. Authors[12,22,25] emphasized that allergic rhinitis is a predisposing or aggravating factor for voice disorder contexts.

There was a statistically significant association between voice failure symptom and voice intensive use. This may be associated with an incomplete glottal closure, which may be related to voice failure and weak voice, without phonation power. There was also a significant association between weak voice symptom and intensive voice use.

Statistically significant association between weak voice and respiratory infections, as well as weak voice and noise exposure, were found. Authors[11] reported that teachers show higher possibilities of having allergies and respiratory problems.

Noise exposure is a concern because, due to the high noise level, teachers must speak louder, what can be a vocal health risk[40]. An important issue is to think of the teacher's working environment, because sound competition within the school can provide their own voice auditory feedback reduction. Subsequently, the teacher increases vocal intensity, causing vocal effort[17]. In these situations, microphone use would be the ideal, as it would prevent this effort, especially in very noisy environments or with a high number of students in the classroom, thus protecting the professional vocal health.

It is observed that teachers perceive the factors that cause or maintain voice disorders. However, they need help in order to be aware to an immediate change in behavior, aiming at a better vocal health.

From the discussion above, the importance of this study in aiding the planning and development of actions that promote vocal health, such as teachers' vocal screening, voice workshops, and voice campaigns within schools is highlighted. In addition, it is important to managers to have a focused look on the school physical structure, since rooms without any acoustic treatment and with fans were found in the four participating schools, what can be related to that noise reported by teachers as one of the causes of voice problems. External and/or unrelated to the classroom dynamics noises, in addition to harming the teaching-learning process, can interfere with the school environment, disrupting other students, teachers and staff activities.

CONCLUSION

Data indicate, therefore, that teachers who participated of this survey perceive that both external factors (noise exposure) and factors related to health and voice (allergies, respiratory diseases, voice intensive use) interfere in vocal production.

The importance of this study to aid in the planning of actions and programs to increase teachers' vocal health, with consequent improvement of the teaching-learning process is highlighted.

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