Risk Factors for the Incidence of Perceived Voice Disorders in Elementary and Middle School Teachers

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Summary: Objective/Hypothesis. This study aimed to identify risk factors for the incidence of perceived voice disorders in teachers, specifically related to the influence of common mental disorders.
Design. This is a longitudinal quantitative study conducted in municipal schools.
Method. We performed a data analysis of 469 teachers, reassessed 3 years after an initial study. The Voice Handicap Index was used to measure the impact of a probable voice problem with a cutoff value of 19 points. Mental disorder symptomatology was measured by the Self-Reporting Questionnaire (20 items), with a cutoff value of eight points. Bivariate analysis was conducted through Poisson regression to verify proportion differences in the occurrence of perceived voice disorders among the study's different categories of independent variables. The same technique of Poisson regression was used to assess risk factors for perceived voice disorder incidence in a specific hierarchic model.
Results. The incidence of a perceived voice disorder was 17.1%. Teachers who lectured in fourth grade and below presented a risk of 20% less than those who lectured from the fifth grade up ($P = 0.046$). Teachers who reported taking a leave of absence because of their voice had a 32% more chance of a probable perceived voice disorder ($P = 0.024$). Teachers who presented a common mental disorder had twice the risk of perceived voice disorder ($P > 0.001$).
Conclusions. This study concluded that teachers presented a higher risk of developing a perceived voice disorder when they have the following features: lectured from fifth grade up, have gone on leave because of their voice, and showed behavior indicative of common mental disorder.
Key Words: longitudinal studies–voice disorders–faculty–mental disorders–voice disturbance.

INTRODUCTION

Deviant voice quality has been recognized as important and limiting of the health and the life quality since the ancient Greeks.[1] However, despite the historical recognition of the importance of voice quality in daily, social, and professional life, only in the last decades have studies been concerned with obtaining population occurrence data, associated factors, and illness course among different populations with reliable and validated measurement instruments. Regarding the area of human voice, professional voice users have gained special interest not only because they use their voice in their work but also because of the physical, emotional, and professional onus that a chronic dysphonia places on the individual. A voice disorder in a professional, besides all the communicative limitations due to voice symptoms, may result in anguish in relation to career maintenance and development. This makes intervention even more important in professional voice users.[2–4] Better understanding of the course of voice changes and associated factors allows for the creation of prevention options and voice health assistance.[5–7] Aside from contributing to the efficacy of the work place voice use, understanding of the voice changes can also result in savings for the public coffers by reducing expenses with the illness.[8] Although many professionals use their voice as an integral part of their work, teachers[7] find themselves in the group with the most risk of voice disorders, leading to illness, leave from work, and incapacity of performing their functions. This results in financial and social costs.[9]

As public domain, clinical consensus, and literature suggest, emotional factors have a direct relation with voice disorders. A historical analysis study regarding voice quality from the classical period to the 20th century provides evidence of the relation of voice to emotional states.[10] Concerning teachers, the complexity of the work context is known and shared in many countries. There is an excessive demand for activities involving the use of voice, lack of training for professional communication, inadequate work organization, daily pressure, and few rest pauses.[11] This scenario demands that not only functional aspects but also psycho-emotional questions be considered when assessing the voice demands and the voice disorders of an individual. A teacher's voice has a very important role in the success of the professional activity, because it can facilitate or compromise the message and maximize or not the efficacy and credibility of its expression and the outcomes of education. National and international literature affirms that teachers present a higher prevalence of voice symptoms than other professions.[2,3] Epidemiological research from teachers in Brazil shows that the relationship among health, work, voice, and identified vocal complaints ranges from 54% to 79%.[7,8,12] Studies suggest that voice-related techniques, such as incorrect or intensive use, do not solely contribute to the development of a voice problem; a voice problem may also be related to emotional factors.[7,12–14]

Teachers with voice disorders present higher prevalence of major depressive episodes and generalized anxiety disorders.[14] Furthermore, there is a strong association between functional dysphonia and psychosocial symptoms, such as those present in depressive episodes.[15] In this sense, the concept of common mental disorders (CMD) was created to improve ways of measuring the

Accepted for publication May 26, 2016.
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Journal of Voice, Vol. ■■, No. ■■, pp. ■■-■■
0892-1997

http://dx.doi.org/10.1016/j.jvoice.2016.05.018

presence of most common mental health conditions. CMD is considered as the presence of anxiety, depression, or somatoform disorders. They include symptoms of insomnia, irritability, fatigue, difficulty concentrating, forgetfulness, and somatic complaints.[16] A previous study shows that CMD is associated with higher levels of vocal handicap index in elementary professors.[4] Increase of dysphonia symptoms can eventually result in absenteeism, leave from work, and even permanent change of profession.[2,5,7,8,11,12,17,18]

Nevertheless, although there are studies that report the relationship of voice problems and mental health, there is a great need for longitudinal analyses exploring the nature of this relationship. Research conducted in the Netherlands with 90 future teachers indicated an association of dysphonia with psychosomatic aspects during 4 years before the future teachers' educational development.[19] Results suggest emotional difficulties even before formal entry in the job market. Results from research in six states of Malaysia also aimed at exploring this relation with the participation of 10,000 teachers, with a period of 1 year between the acquisitions of data, but no expressive preliminary results were obtained.[20] We aim to address the lack of controlled longitudinal analyses studies with teachers in the exercise of their functions and the deficit of consensus regarding the emotional effects of a voice disorder. This longitudinal study with a representative sample of teachers examined the incidence of perceived voice disorders and their risk factors, over 3 years, with special interest in CMD.

METHOD

This project was approved by the Committee of Ethics and Research of the Universidade Católica de Pelotas (protocols # 2011/29 and 18713613.6.0000.5339).

An observational longitudinal study was conducted. Sampling design was made through reassessment of the teachers who participated in a previous study.[4] Initially, between August and December 2011, 633 teachers were invited to participate, with 575 being effectively interviewed.[4] Approximately 3 years later, between August and December 2014, these same teachers were contacted for reassessment. The second assessment included 469 teachers (81.56%). Of the 106 lost to follow-up, 60 were not found, 15 refused to participate, 11 were in leave of absence because of health or interest, 10 were retired, 5 were exonerated, 4 changed their occupation, and 1 was excluded.

The statistical power was calculated based on the proportion of new cases of perceived voice disorders at the second period compared with the first period with and without a mental disorder. Considering the confidence interval as 95%, we found the statistical power to be 99%.

The research team included two academics from the Center of Life and Health Sciences of the Universidade Católica de Pelotas, graduate students, and two volunteers trained in the interviewing technique. As in the first stage of this research, 3 years later, a self-report questionnaire was administered to the participants to obtain the current data. Questions asked were related to the sociodemographic, environmental, behavioral, emotional, and voice factors of the teachers.

The socioeconomic status was measured by the Economic Indicator for Brazil, an instrument based on the demographic census of 2000—Indicador Econômico Nacional (IEN).[21] The sample was divided in tertiles and classified into lesser, intermediate, and higher socioeconomic conditions.

The index of vocal disadvantage was measured by a questionnaire, the Voice Handicap Index (VHI),[22] validated for Brazilian Portuguese.[23] It contains 30 questions that describe vocal experiences and the impact of a possible voice problem in daily life (eg, *"My voice varies throughout the day"* and *"I make a lot of effort to speak"*). The maximum score is 120; the higher the score, the greater the perceived handicap. To determine a perceived voice disorder, a cutoff value of 19 or more points was used.[24] None of the participants underwent an otorhinolaryngology evaluation to confirm the presence and the type of dysphonia. We chose to cautiously use perceived voice disorder to determine the vocal injury.

The mental disorder symptomatology was evaluated by the Self-Reporting Questionnaire (20 items). This scale measures anxiety, mood, and somatoform symptoms through 20 items (eg, *"Do you feel nervous, tense, or worried?"* and *"Do you feel any pleasure during your daily activities?"*). This instrument is recommended by the World Health Organization and was validated for the Brazilian population by Mari and Williams.[25] In the present study, participants with a score of eight or higher were considered as positive, that is, indicative of common psychiatric disorders.[26]

The teachers received information regarding the objectives of the study and signed a "term of free and informed consent." Participants who presented with a vocal and/or psychological compromise were referred for treatment at the Reference Centers in Workers' Health (CEREST Macrosul), associated with the Municipal Health secretary of Pelotas.

For the processing of data, we used *SPSS Statistics* 21.0 (IBM, USA) program with the execution of double typing of data, whereas the automatic verification of information consistency was conducted in *EpiData* software (The EpiData Association, Denmark). Statistical analyses were done with *Stata* 9.0 (StataCorp, USA) and *SPSS Statistics* 21.0 programs. In the second assessment, 29 participants failed to fill in some items of the VHI. For statistical basis, those items were given a score equal to the mean of the entire score. Univariate analysis was done using the description of simple frequencies, means, and standard deviations of the investigated variables. Next, bivariate analysis was done using Poisson regression to determine the difference in incidence proportion of perceived voice disorder among different categories of each independent variables in this study.

Afterward, the same technique of Poisson regression was used to assess risk factors for the incidence of a perceived voice disorder in a specific hierarchic model. Variables that obtained a $P \leq 0.20$ in the bivariate analyses were included in the multivariate analyses. Significance levels were kept at $P < 0.05$. This statistical technique was chosen because of the high incidence found by the outcome.[27]

RESULTS

Table 1 describes the sample in relation to sociodemographic, socioeconomic, work conditions, perceived voice disorder, and presence of common data indicative of a mental disorder. The sample is characterized as being essentially female, over 40 years