Voice Disorders (Dysphonia) in Public School Female Teachers Working in Belo Horizonte: Prevalence and Associated Factors

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Summary. The objective of this study is to establish the prevalence of dysphonia and associated factors in public school female teachers working in Belo Horizonte. This cross-sectional study was conducted on a random sample of schools between May 2004 and July 2005. There were 2103 elementary education daytime teachers from 83 schools included in the study. Self-applied questionnaires were used for data collection. These included questions on social and demographic matters, general health and mental health (General Health Questionnaire-12 [GHQ-12]), the environment and organization of work, and voice-related aspects. The variable dysphonia was classified as absent, possible, or probable based on the association between frequency of fatigue when speaking and worsened voice quality during the past 15 days. Multinomial logistic regression was used to analyze factors independently associated with dysphonia in each response subgroup and in total. One third of the female teachers did not report voice symptoms during the past 15 days (33%). The prevalence of probable dysphonia was 15%, and the prevalence for possible dysphonia was 52%. Factors associated with probable dysphonia were presence of recent upper airway problems (odds ratio [OR] = 5.95, 95% confidence interval [CI] = 4.06−8.71), problems at work because of voice (OR = 65.30, 95% CI = 19.33−220.59), other activities with intense voice use (OR = 1.71, 95% CI = 1.08−2.71), high noise levels (OR = 2.55, 95% CI = 1.72−3.76), poor ventilation in the classroom (OR = 2.00, 95% CI = 1.24−3.22), current mental disorder (OR = 3.20, 95% CI = 2.18−4.70), sedentary life style (OR = 1.94, 95% CI = 1.21−3.09), and marriage (OR = 1.70, 95% CI = 1.16−2.47). Associations between probable dysphonia, poor working conditions, health-related aspects, and professional jeopardy indicate the complexity of dysphonia in female teachers and the need for collective intervention strategies.

Key Words: Voice disorder–Associated factors–Occupational health–Working conditions–Teaching profession.

INTRODUCTION

There has been growing interest during recent years in studying the relation between dysphonia and teaching work. A few case-control studies have found an increased risk of voice-related symptoms among teachers, compared with those in other occupations.[1–4] Studies comparing teachers with the general population have also suggested that teachers have a high risk of developing dysphonia.[5,6]

Dysphonia may be defined as a disorder of voice communication, in which voice is unable to fulfill its basic role of conveying an individual's oral and emotional message. Dysphonia is expressed as any difficulty or change in voice emission that interferes with natural voice.[7] Fawcus[8] considers the level of discomfort experienced by an individual as a sign that indicates the state of the larynx and the use of voice.

In most papers, the number of voice symptoms reported by a teacher—frequently measured by questionnaires—is used to define the prevalence of dysphonia.[1,2,5,6,9–16] Perceptive voice analysis and/or a clinical assessment of the larynx are used to evaluate the presence of dysphonia in teachers and future teachers.[4,17–19] Prevalence is lower when the indicator of dysphonia is the presence of vocal fold disease compared with when the studies are based solely on symptom assessment.

Voice fatigue is the most common symptom reported by teachers and may indicate poor use or abuse of voice. It is defined as the inability to maintain stable voice quality during a specific time period, and may start after minutes, hours, or days of voice use.[20] According to Gotaas and Starr,[21] voice fatigue is characterized by changes in voice quality, voice effort, changes in voice intensity and frequency, or a combination of these factors.

Studies done in Spain, the USA, and Finland have shown that the prevalence of voice fatigue in teachers varies from 18% to 32%.[2,4,9,14,15,17,19] The prevalence in Brazil and China ranges from 50% to 88%.[11,12,18] Results vary in these papers due to differences in defining duration of the condition and frequency of symptoms.

The main reported complaints of worsened voice quality are hoarseness, low or weak voice, or difficulty in being heard[1,2,9,18,22,23] and failing voice.[4,14,15]

The etiology of dysphonia is multidimensional; occupational risk factors among teachers include intensive use of voice, excessive noise, large number of students, overwork, presence of chalk dust, poor teacher-student relationship, stressful environment, and lack of didactic materials and equipment.[3,15,24–26] Other factors that induce dysphonia are allergies, smoking, and poor hydration.[27–29]

The severity of dysphonia is estimated indirectly through loss of performance at work.[4,11] Teachers encounter difficulties

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in performing their work and seek leave due to voice problems.[1–3,6,17,30,31]

The aims of this paper are to establish the prevalence of dysphonia in public school female teachers working in the city of Belo Horizonte, and to investigate possible associations with environmental and the organizational aspects of work, and voice-related behaviors.

METHOD AND PROCEDURES

Design

The research project was approved by the UFMG Research Ethics Committee (COEP) on October 5, 2004 (Decision No. 240).

A cohort cross-sectional study was used to investigate the prevalence of dysphonia and associated factors among basic education female teachers in public schools belonging to the Belo Horizonte Municipal Education Network (RMEBH). The RMEBH includes 181 schools distributed in nine city districts. At the time of the study, there were 13 child education schools, three special teaching schools, one middle education school, and 164 elementary education schools.

Sampling. A simple random sample was taken from municipal schools in Belo Horizonte that were open in 2004. Seventy percent of the municipal schools in the Northwest, East, and West districts were chosen randomly; the Central-South, Pampulha, North, and Northeast districts were investigated fully. The sample calculation was based on the most conservative method, which considers a 50% prevalence of dysphonia in that population, as data in literature diverge widely. A complete list of teachers working in each school was unavailable, as lists include only the job number. Thus, teachers could appear more than once in a school list.

The aim was to include in each chosen school at least 80% of the teachers who were active during the period of interest, for sample representativeness. Further visits were made to recover losses in schools where the response rate was below 80%. Districts in which the required response rate was not reached after return visits to the schools were not included in this study.

Sites and study population. The epidemiological investigation included 2103 basic education daytime teachers from 83 schools in six administrative districts in Belo Horizonte: the Central-South, Northeast, Northwest, Pampulha, North, and East districts. The Venda Nova, Barreiro, and the West districts were excluded due to low response rates in each (74%, 68%, and 76%, respectively). The lower questionnaire response rate probably occurred because data collection in these districts took place mostly toward the end of the school semester, when teachers tend to be more tired.

Physical education teachers were not included as their pedagogical activities are significantly different from traditional teaching. Male teachers were not included due to gender differences in the prevalence of dysphonia and the fact that there are few basic education male teachers in the RMEBH.

Data collection tool

Data from literature and the results of interviews done with members of the Teachers' Union and the Belo Horizonte Civil Servant Health Management and Medical Auditing Department during the exploratory phase were used to write a self-applied questionnaire. The questionnaire included questions on social and demographic themes, voice health, general and mental health, and work environment and organization.

The *General Health Questionnaire-12* (GHQ-12), a 12-question questionnaire that has been validated in Brazilian Portuguese,[32] was used to assess mental disorders. A score equal to or over 4 is considered positive for a psychical disorder, [33,34]

The GHQ-12 as used in this survey does not detect severe psychiatric diseases such as schizophrenia or psychotic depression, and is not intended for the detection of all mental disorders. It is aimed at screening common mental disorders such as depression and anxiety.

Meetings were held to clarify doubts about procedures, to standardize the teamwork, and to assure adequate standardization for data collection.

Data collection procedures

Data collection took place between May 2004 and July 2005 in nonconsecutive months. Visits were made to the selected schools in intervals between classes or during pedagogical meetings that occur weekly for each period. When these visits were not possible, questionnaires were left in schools and collected at a later date.

Before applying the questionnaire, the teachers were informed about the aims of the survey, the institute responsible for the investigation, and the voluntary and confidential nature of participation. An invitation letter was offered, followed by a free informed consent form and the questionnaire.

The questionnaire was provided in an individual envelope, and the respondent was not asked to identify herself to avoid resistance or embarrassment for teachers and to increase adherence.

Dependent variable. The dependent variable "dysphonia" was generated from the combination of answers to questions 53 and 54 of the questionnaire, which were "Have you felt too tired to speak during the past two weeks?" and "Have you perceived any loss of voice quality during the past two weeks?" These questions had three possible answers: "no," "sometimes," and "daily."

Voice disorders are multidimensional, involving not only the abovementioned symptoms, but also their frequency and duration. We therefore chose to define three answers for the variable: complete absence of symptoms, infrequent symptoms, and frequent symptoms.

The dependent variable "dysphonia" was thus classified as absent, possible, and probable.

Absence of dysphonia was defined when teachers answered "no" to the two questions.

Possible dysphonia was defined when teachers answered "no" to one of the questions or "sometimes" to both questions.

Probable dysphonia was defined when teachers answered "daily" to one or both questions.