

Musculoskeletal Pain and Occupational Variables in Teachers With Voice Disorders and in Those With Healthy Voices—A Pilot Study

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Summary: Purpose. This study aimed to compare musculoskeletal pain perception in teachers with voice disorders and in those with healthy voices, and to investigate the relationship between musculoskeletal pain and occupational variables (ie, work journey per week and working period).

Method. Forty-three classroom teachers were divided into two groups: dysphonic group (DG), 32 classroom teachers with voice complaints and voice disorders; and non-DG, 11 classroom teachers without voice complaints and who are vocally healthy. The musculoskeletal pain investigation survey was used to investigate the frequency and intensity of the pain. Occupational variables, such as work journey per week and working period, were investigated by the Voice Production Condition—Teacher questionnaire. The statistical tests used were the Spearman correlation ($P \leq 0.05$) and the Mann-Whitney U test ($P \leq 0.05$).

Results. There was no difference between the frequency and the intensity of musculoskeletal pain regarding dysphonia. Work journey per week was positively related to the frequency and the intensity of laryngeal pain in the DG. The working period had a negative relationship to the frequency and the intensity of musculoskeletal pain in the submandibular region in the DG.

Conclusion. Classroom teachers with voice disorders and those with healthy voices do not have differences regarding the frequency and the intensity of musculoskeletal pain. Besides dysphonia the pain is an important symptom to be considered in classroom teachers. The occupational variables contributed to the presence of musculoskeletal pain in the region near the larynx, which appears to be directly proportional to work journey per week and inversely proportional to the working period.

Key Words: Voice–Dysphonia–Musculoskeletal pain–Evaluation–Occupational health.

INTRODUCTION

Classroom teachers are exhaustively studied in literature because these workers are exposed to many occupational factors^{1–4} and mainly to voice problems.^{1,2} In this context, a literature revision study² highlighted work environment factors (eg acoustic conditions, ventilation, lighting, temperature, and humidity), organization factors, and work conditions (work journey per week and annual income, low salary,⁵ lack of educational resources, high number of students in the classroom⁵) as possible factors causing voice disorders^{2,6} and voice and laryngeal symptoms.^{1,7,8}

Other studies also related some occupational factors to musculoskeletal pain in teachers.^{5,9,10} Long exposure to risk factors, either by aging or by situational wear, like working in excess of 40 hours per week,^{5,11} excessive physical and vocal effort because of a big number of students in the classroom, and many job demands,¹⁰ may increase the overhead taxation of the musculoskeletal system of classroom teachers. These factors could cause the rise of muscle symptoms¹² or increase muscle pain⁵ aside from dysphonia. Furthermore, inappropriate working conditions can lead to personal loss regarding well-being in the

workplace¹² and stress and dissatisfaction,¹³ leading to the experience of pain.

A study¹² analyzed the factors related to the presence of musculoskeletal pain in classroom teachers, and the authors pointed out that depression or anxiety can emphasize the pain and increase the number of health complaints. However, because of multidimensional sources of musculoskeletal pain, the authors report that it is not possible to state whether these factors are the usual causes of pain, either in intensity or in frequency.

The literature points out that the prevalence of 39%–95% of musculoskeletal pain reported in teachers^{5,9,10,14} is mostly in the neck, chest, and lower back regions.^{5,10,11,15} Studies developed in other voice professions, such as telemarketers,¹⁶ actors, receptionists, translators, consultants, and teachers,¹⁷ pointed to the relationship between musculoskeletal pain and voice deviation, with the highest occurrence of pain in individuals with dysphonia.^{16,17} The authors¹⁶ found more instances of pain reported near the larynx (neck and shoulders) in telemarketers than in the general population. There was an observed correlation between pain near the larynx and the self-assessment of voice: the worse vocal assessment is, the worse is the pain near the larynx, as observed only in telemarketers. The study that compared professionals of voice and nonprofessionals of voice in relation to the presence, frequency, and intensity of pain during speech found the occurrence, intensity, and frequency of pain in the larynx, neck, shoulders, head, and back to be greater in professionals of voice than in nonprofessionals of voice.¹⁷ This study evidences the necessity of musculoskeletal pain evaluation on the vocal clinic conducted by professionals of voice.

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Research shows the relationship between the occurrence of musculoskeletal pain in teachers and professionals with experience exceeding 11 years,¹³ a working period of more than 14 years,¹¹ increased daily work journey,^{11,13} excessive physical effort,¹⁰ high demands at work,¹⁰ teaching levels,¹⁴ stress levels, and dissatisfaction with the job.¹³

Among the effects of musculoskeletal pain in teachers are difficulty in performing labor and social activities, decrease in performance, emotional injuries, and absenteeism.^{10,18,19} These factors cause economic consequences because of the need to seek health services and the loss of productivity in work, creating a large economic burden that reaches 37% of teachers' monthly income.^{5,6}

By exploring the relationship between voice disorders, musculoskeletal pain, and occupational variables (ie, work journey and the working period in the classroom) in teachers, we can contribute to a better understanding of the peculiarity of this profession, which has the most instances of voice disorders¹¹ and of musculoskeletal disorders.^{5,11} Therefore, it is possible to search for a relation regarding the clinical conditions and the possible occupational factors. These factors maybe which may guide a healthy promotion of actions in the work environment.

The present study seeks to compare the self-perception of musculoskeletal pain between classroom teachers with voice disorders and teachers with healthy voices, and to investigate the relationship between musculoskeletal pain and occupational variables, work journey per week and working period, in this population.

METHODS

Study design

This is an observational, cross-sectional, and prospective study.

Sample

Classroom teachers, aged from 18 to 49 years old, were invited to join the study via contact with the schools in the countryside of São Paulo state, Brazil. The data were collected between April 2014 and July 2014 from classroom teachers interested in participating in the study.

Exclusion criteria were the following:

- teachers reporting neurologic, psychiatric, endocrinologic, rheumatic, fibromyalgia, physical traumas, orthopedic diseases, or temporomandibular joint dysfunction;
- teachers who have had orthodontic treatment in the last 12 months;
- teachers who were on menopause;
- teachers who have had previous speech and language or otolaryngology treatment because of voice or laryngeal disorders;
- teachers who were in physical therapy or had a follow-up with a physician because of musculoskeletal pain of any kind;
- teachers who have cold or flu; teachers who were in an allergy crisis or gastric distress on the collection day; and
- teachers who were smokers.

The identification questionnaire ([Appendix](#)) was made by the authors of the present study and was administered to the teachers to screen for eligibility and to obtain personal, general, and voice health data.

At first, 70 classroom teachers had an interest in participating in the study, but after the exclusion criteria were applied, 27 classroom teachers were eliminated.

Therefore, a sample of 43 classroom teachers was divided into two groups:

- dysphonic group (DG)—included 32 teachers (29 women and 3 men) with voice disorders, aged from 22 to 49 years (mean = 36.84 ± 9.74 years). We considered as dysphonic individuals presenting with voice complaints as well as those with vocal alterations in the auditory-perceptual assessment (voices classified with mild, moderate, and severe deviations concerning the overall degree of the vocal quality—G from the GRBAS scale).²⁰
- non-dysphonic group (NDG)—included 11 teachers (nine women and two men) with no vocal alterations, with healthy voices, and aged from 27 to 48 years (mean = 34.45 ± 6.29 years). Those classified in the NDG were those not presenting with vocal alterations and with an absence of vocal complaints and an absence of alterations in the auditory-perceptual assessment (voices assessed with an absence of deviation or a mild deviation regarding the overall degree of vocal quality—G from the G-GRBAS scale),²⁰ as well as no history of permanent dysphonia or vocal treatment or laryngeal surgery.

The participants were classified in the NDG by the researcher when they have no clear vocal alterations and report no voice complaints. After that, the tests were conducted. All voices went through an auditory-perceptual analysis carried out by three judges, all speech-language pathologists, to confirm the absence of vocal quality deviation in the NDG, and the presence of vocal quality deviation in the DG. The kappa test was applied to verify intra- and inter-judge reliability. The values found for inter-judge reliability were between 0.4 and 0.71; the values found for intra-judge reliability were between 0.4 and 1.0.²¹

Voice recording was performed in an acoustic room at the speech-language school clinic at the institution. The Sony Sound Forge Pro 10 software (Sony Creative Software Inc, USA) was used in a sample rate of 44,100 Hz, 16-bit mono channel, installed on an Intel Pentium 4, 2.040 GHz computer with Creative Sound Blaster Audigy 2 (Creative Technology, Ltd., Singapore) and AKG C444 PP microphone (AKG Acoustics GmbH, Vienna, Austria) plugged in. After placement of the microphone, each volunteer sat on a chair facing the examiner and was instructed to perform the following speech situations: vowel /a/ sustained, isolated, and after deep inspiration in comfortable pitch and usual loudness; and counting numbers from 1 to 10 using habitual frequency, intensity, and rhythm.

Procedure

The research was approved by the Ethics in Research Committee of the university (protocol: 606720). All of the classroom

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