

Prevalence of Voice Disorders and Associated Risk Factors in Teachers and Nonteachers in Iran

*Sadegh Seifpanahi, †Farzad Izadi, ‡Ali-Ashraf Jamshidi, *Farhad Torabinezhad, ‡Javad Sarrafzadeh, §Davood Sobhani-Rad, and ||Majid Ganjuie, *†‡||Tehran, §Mashhad, Iran

Summary: Objectives. Teachers are at increased risk for development of voice disorders. Because there is no published study on Iranian teachers, the aim of this study was to compare the prevalence of voice disorders among teachers and nonteachers in Iran and define the causing risk factors.

Methods. In the present study, 104 teachers and 41 nonteacher participants, whose jobs did not involve vocal effort, completed a questionnaire regarding to vocal complaint and four relevant risk factors.

Results. According to our gained data, 54.6% of teachers experienced vocal complaints during their work, although this value was 21.1% for the nonteacher group ($P < 0.001$). Moreover, investigating the prevalence of voice disorders during other periods of life was performed. Analyzing the questionnaire data indicated a significant higher vocal load risk factor for teachers (70.77%; standard deviation [SD], 29.48), in comparison with their nonteacher counterparts (27.44%; SD, 37.83; $P < 0.001$). In addition, our study revealed the significance of vocal load, as well as physical and environmental risk factors in the development of voice disorders in teachers with voice complaints.

Conclusions. Present findings indicated a higher epidemiology of voice problems among teachers in comparison with nonteacher individuals and introduced vocal load as the most important risk factor in development of voice disorder in Iranian teachers. Accordingly, it is recommended to pay special attention to negative effects of vocal load, although environmental and physical factors are also of importance.

Key Words: Teachers–Prevalence–Voice disorder–Risk factors–Ergonomy.

INTRODUCTION

In one-third of the jobs, employees use their voice as a primary instrument.¹ Previous studies suggest that professional voice users, especially teachers, are at more risk of voice disorders due to the extra use of voice.^{2,3} Voice disorders negatively affect professional voice users as they decrease their quality of life^{3–5} and increase health care expenses that would be imposed on the society.⁶ To mention, it has been reported that almost 20% of the teachers have been forced to stay away from work because of their voice problems.³

Recently, awareness about the relationship between voice disorders and work conditions has increased, and such impairments have been introduced as occupational disorders in some European countries.⁷ However, the responsibility to prevent voice disorders is very restricted and only imposed on the employees,⁷ and as a result, it is necessary to study the impact of voice usage on occurrence of voice disorders.^{7,8} The prevalence of voice problems among teachers varies from 7% up to 80%, and such variation has been addressed to factors including sample size, the methodology of the studies, style of phrasing the questions, definition of voice disorders and

voice problems, study populations, and the response rate.^{9–13}

The prevalence of voice disorders among teachers has been evaluated in four periods of time; point (currently occurred), 1 year ago, lifetime (any time in the past), and unspecified period (no specific time reported).¹⁴ To note, both point and lifetime prevalence in teachers were higher than those in nonteachers, which were 11% versus 6.2% and 57.7% versus 28.8%, respectively.¹⁵ The yearly incidence of voice problems has been reported as 3.9 cases per 1000 teachers.¹⁶ A variety of definitions have been proposed for voice disorders in the literatures; however, Roy et al offered a comprehensive self-reported voice disorder definition which was “any time the voice does not work, perform, or sound as it normally should, so that it interferes with communication.”¹⁵

Although there are differences in questionnaires used by researchers, results are in agreement with the self-reported vocal symptoms, including weak voice and lower pitch, voice tiring, hoarseness, sensations of pain, or discomfort in the throat.^{3,17} In addition, most studies have referred the self-reported vocal symptoms by teachers as dysphonia prevalence.^{3,5,11,15,18} The prime risk factors for dysphonia among teachers are lack of pedagogic equipments, excessive noise, chalk, hours of work, years of work, teacher-pupil relationship problems, crowded classrooms, stressful workplace, allergies, smoking, poor hydration, overload of voice usage, and dust exposure.^{10,11,18–22} Although most risk factors of voice disorders among teachers have been determined, their exact importance is not clearly understood.²³ Because of different cultural, pedagogic, socioeconomic, and environmental factors around the world, it is necessary to assess the variety of risk factors of voice disorder among teachers in each country. Because there is no published study on Iranian teachers, we aimed to study dysphonia prevalence and risk factors of voice disorders among teachers in Iran.

Accepted for publication May 29, 2015.

From the *Department of Speech and Language Pathology, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran; †Laryngology Fellowship Program, Division of Laryngology, Rasoul Akram Medical Center, Iran University of Medical Sciences (IUMS), Tehran, Iran; ‡Department of Physical therapy, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran; §Department of Speech Therapy, School of Paramedical Sciences, Mashhad University of Medical Sciences, Mashhad, Iran; and the ||Department of Physical therapy, School of Rehabilitation Sciences, Tehran University of Medical Sciences, Tehran, Iran.

Address correspondence and reprint requests to Farzad Izadi, Laryngology fellowship program, Division of Laryngology, Rasoul Akram Medical Center, Iran University of Medical Sciences (IUMS), Tehran, Iran. E-mail: panahi29@yahoo.com

Journal of Voice, Vol. 30, No. 4, pp. 506.e19–506.e23
0892-1997/\$36.00

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<http://dx.doi.org/10.1016/j.jvoice.2015.05.019>

MATERIALS AND METHODS

Subjects

Our subjects were teachers of elementary, secondary, and high schools. According to the list of schools in the State Education Office, 18 schools (six schools from each educational level), as well as their teachers, were randomly selected, although everyone was free to accept or reject to participate in the study. To mention, 104 teachers were assigned as the subject group, and 41 participants, from agriculture administration employees, who worked at a same place, were studied as our nonteacher control group. All subjects and control participants were instructed to complete the questionnaire precisely.

Questionnaire design

Our questionnaire was basically designed according to Kooijman's questionnaire²²; however, some cultural and lingual adaptations were applied. The final version of our questionnaire, including six sections, was prepared after applying voice therapist's and teacher's comments. In the first section, general questions were asked, whereas the second part was devoted to self voice complaints at the present moment (point prevalence), 1 year ago, during their job, before their job, and during their life (not specified time or life prevalence); answers to this category were determined as "Yes," "No," and "I don't know" that the first answer confirmed self voice complaint, whereas the other two choices were negative. The other four categories were about perceived risk factors for voice problems including vocal load and physical, psycho-emotional, and environmental factors.

Vocal load part of our questions assessed negative impacts of the teaching field, number of pupils, number of teaching years, and number of teaching hours per week, on teachers' voice and also their habitual loudness at class. Physical factor section included questions about neck and shoulders pain and stiffness, general weakness, loss or respiration during speaking, throat fatigue, heartburn, coughing and clearing throat, and presence of other ear, nose, and throat disorders. Psycho-emotional questions were the vocal impacts of pupil's sex and race, high-pressure work, job dissatisfaction, stress and anxiety. The last risk factor, environmental situation, evaluated participants' workplace acoustics, air humidity, existence of air dust, negative vocal impact of heater, chiller, ventilator, and teaching instrument (chalk or marker), and also chemical and smoke exposure. To note, the answers of risk factor questions were determined as "never," "almost never," "sometimes," "almost every time," and "every time." Responses to the first two were interpreted as negative, whereas the other three answers were interpreted as positive. Our questionnaire included of 43 questions; however, questions which specifically addressed teaching issues were modified or excluded for the control group, who were asked to answer 35 questions. After gathering the questionnaires, answers were analyzed for each participant at their workplace.

Statistics methods

All data were analyzed by statistical software *SPSS* (Version 17). To compare prevalence of voice complaints between

teacher and nonteacher groups and also the relationship between participant's gender and prevalence of voice complaints, chi-square test was used. Furthermore, independent sample *t* test was applied to compare (1) the effects of four voice risk factor categories on prevalence of voice complaints during teacher's job period and (2) the risk factors and MPT between teacher and nonteacher groups.

RESULTS

From the total 104 teachers participated in present study, 33.7% ($n = 35$) were male, 66.3% ($n = 69$) were female, and the average age of all teachers was 37.22 ± 5.36 years (ranged from 24 to 52 years). Furthermore, most teachers (44.2%, $n = 46$) worked at elementary school, 35.6% ($n = 37$) worked at high school, and 20.2% ($n = 21$) were secondary school teachers. In addition, 41 individuals, randomly selected from agriculture administration employees, participated in this research as the control group, and their average age was 42.98 ± 7.24 years (ranged from 22 to 57 years).

According to the data presented in [Table 1](#), prevalence of variety of voice complaints was evaluated in participants at different periods of their life. The number of teachers who reported voice complaints during their job years (54.6%) was significantly ($P < 0.001$) higher than nonteachers (21.1%). Furthermore, in comparison with nonteachers (31.7%), significant ($P < 0.001$) higher voice problems were reported by teachers (61.5%) at a time during their life. It means that 1800 per 10 000 teachers suffer from voice problems during their life. However, the prevalence of vocal problem experience, at the point of assessment, was not significantly ($P = 0.22$) different for teachers and nonteachers, which were 33.6% and 23%, respectively. Similarly, no significant ($P = 0.36$) difference was observed in the subject's voice disorder self-reports during the past year and before beginning their job between teachers and nonteachers.

As it is summarized in [Table 2](#), self-perceived risk factors for voice problem occurrence were categorized into four sets. Comparing vocal load risk factor between teachers (70.77%; standard deviation [SD], 29.48) and nonteachers (27.44%; SD, 37.83) indicated a significant ($P < 0.001$) difference, whereas the other three risk factors were not significantly different between our two groups. Moreover, we compared

TABLE 1.
Frequency of Voice Complaints During Teachers and Nonteachers' Periods of Life

Voice Complaint Prevalence	Teacher (%)	Nonteacher (%)	χ^2	<i>df</i>	<i>P</i> Value
Point prevalence	33.6	23	1.47	1	0.225
Past year prevalence	44.8	28.2	3.23	1	0.07
Job prevalence	54.6	21.1	12.43	1	<0.001
Before job prevalence	4.1	7.9	0.81	1	0.36
Life prevalence	61.5	31.7	10.5	1	<0.001

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