Risk Factors and Effects of Voice Problems for Teachers

*Sheng Hwa Chen, †Shu-Chiung Chiang, ‡Yuh-Mei Chung, §Li-Chun Hsiao, and ||Tzu-Yu Hsiao, *Taipei, Taiwan*

Summary: The objective of this study was to investigate risk factors of voice problems for teachers with voice disorders as compared to teachers without voice disorders. Many studies have reported risk factors and effects of teachers' voice problems from different professions. Few researchers have investigated these phenomena among people of the same occupation. The purposes of the study are (1) to investigate risk factors of voice problems for Taiwanese teachers with voice disorders as compared to teachers without voice disorders; and (2) to investigate effects of voice problems on daily life in the two groups. A prospective study was designed for this research. One hundred and seventeen questionnaires were collected from schoolteachers. The subjects were divided into a voice disorder group (VD group) and a no voice disorder group (NVD group) from questionnaires. The Chi-square test was used to examine the significant differences of VD and NVD groups in demographic characteristics, living habits, teaching characteristics, health condition, voice symptoms, physical discomfort, and daily life. Logistic regression was used to find risk factors and effects of voice problems for teachers. Subjects in the VD group were at significantly higher risk of using a loud voice in teaching than the subjects in the NVD group. Subjects in the VD group had significantly greater effects in changing overall job opinions, reduction of overall communicative ability, decreasing phone calls, reduction of overall social ability, influence on overall emotional state, and the frequency of being upset than subjects in the NVD group. These results imply the need for a preventive voice care program for teachers.

Key Words: Teachers–Voice problems–Voice disorders–Questionnaires–Risk factors–Effects.

INTRODUCTION

Almost 300,000 schoolteachers in Taiwan use their voice as a primary tool of employment.[1] Teachers are the most likely to develop voice problems of any professional group.[2,3] Eleven to 89% of teachers have been reportedly experienced a variety of vocal symptoms such as vocal fatigue, dysphonia, increased phonation effort, dry throat, tightness, sore throat, etc.[4–12] This is due to the fact that teachers often spend long periods of time talking loudly in noisy environments and in stressful situations.[7,10,13–15] Also, they are reported to speak with increased vocal effort and incorrect phonation techniques, and often show a psychological predisposition to voice disorders.[4,10–12] These factors lead to vocal fatigue and eventually vocal fold tissue damage.[4,10,16] Voice problems have adverse effects on teaching activities, teaching performance, communicative ability, and emotion. These lead to a lesser quality of teaching and increased absenteeism.[5,8,11,17] Teachers may even be forced to end their career because of vocal difficulties.[5,18] Many researchers have been trying to develop prevention programs for teachers with risk factors and ones that have already experienced voice difficulties. However, these research findings were mostly based on comparisons between teachers and nonteachers.[4,5,10,18–20] Only a few of them were from within teachers' groups.[11,12,17] The inherently different vocal loading between teaching and nonteaching groups makes their respective voice-related problems fundamentally different. The use of this method allows us to analyze the influence of different teaching characteristics, such as years in occupation, courses taught, vocal loudness in the classroom, etc on voice problems for teachers. Also, previous studies did not seek to include the influence of demography, living habits, and health condition on voice problems for people of the same occupation. Moreover, it is difficult to determine the job-related effects of voice problems on psychosocial aspects for teachers.

The objectives of the study are (1) to investigate risk factors of voice problems for teachers with voice disorders as compared to teachers without voice disorders, and (2) to investigate the effects of voice problems on daily life in the two groups. These results could help to develop preventive voice care programs in schools to reduce the frequency and severity of voice problems, the impact of voice disorders, and overall intervention cost.

METHODS

Subjects

Five elementary, middle, and high schools in Taipei City were randomly selected for the study. All 254 teachers in these schools were given a self-reporting questionnaire. One hundred and fifty-two questionnaires were returned, of which only 117 questionnaires were correctly filled out, creating a response rate of 46%. The investigators divided the subjects into two groups based on the frequency of voice problems in the questionnaires. A four-point scale was used to rate the answer by the subjects, where "0 = never," "1 = sometimes," "2 = often," and "3 = always." Subjects whose score was equal to or higher than "2" in the questions were placed into a voice disorder group (VD group); the others were placed into the no voice disorder group (NVD group). The VD group consisted of 59 subjects with a mean age of 40.5 years. The

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From the *Department of Speech and Hearing Disorders and Sciences, National Taipei College of Nursing, Taipei, Taiwan; †Department of Informatics, Veterans General Hospital-Taipei, Taipei, Taiwan; ‡Division of Speech Pathology, Department of Rehabilitation Medicine, Veterans General Hospital-Taipei, Taipei, Taiwan; §Department of Otolaryngology, Tri-Service General Hospital, Taipei, Taiwan; and the ||Department of Otolaryngology, National Taiwan University, Taipei, Taiwan.

Address correspondence and reprint requests to Sheng Hwa Chen, PhD, CCC-SLP, Department of Speech and Hearing Disorders and Sciences, National Taipei College of Nursing, 7F, #31, Alley52, Lane117, Tien-Mu West Road, Peitou, Taipei 112, Taiwan. E-mail: shchen@ntcn.edu.tw

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NVD group consisted of 58 subjects with a mean age of 42.2 years.

Questionnaire

The questionnaire in the study was designed based on the investigators' clinical experiences and other reports in professional voice disorder literature (Appendix).[5,8,10,18,19,21,22] The information elicited in the questionnaire was (1) demographic characteristics of gender and age, (2) living habits such as smoking, consumption of alcohol and caffeine, etc, (3) teaching characteristics such as years in occupation, grades taught, self-reported vocal loudness, etc, (4) health condition associated with voice problems such as upper respiratory infection, nasal allergy, gastrointestinal reflux, etc, (5) experience voice symptoms such as hoarseness, breathiness, tired voice, etc, (6) experience physical discomfort associated with voice problems such as dryness, strain, ache, etc, and (7) adverse effects of voice problems on daily life. Demographics, living habits, teaching characteristics, and health condition in the questionnaires may represent risk factors for voice problems of the subjects. Adverse effects of voice problems on daily life may determine functional impact of voice problems on teaching aspects, job opinions, communicative ability, social ability, and emotion.

Statistical analysis

The Pearson chi-square test was used to examine the significant differences of VD and NVD groups with respect to demographic characteristics, living habits, teaching characteristics, health condition, voice symptoms, physical discomfort, and daily life. Multivariate logistic regression was used to evaluate the odds ratios (ORs) and 95% confidence intervals (CIs) between VD and NVD groups, and demographic characteristics, living habits, teaching characteristics, and health condition to find risk factors for voice problems. The NVD group was considered the reference, or low risk group, compared to the VD group. Univariate logistic regression was used to evaluate the effects of voice problems between teaching style, job opinions, communicative ability, social ability, and emotion, and VD and NVD groups. The negative findings in teaching style, job opinions, communicative ability, and emotion are considered the reference group, compared to the positive findings of these variables. All calculations were conducted using the *SPSS 12.0* (SPSS Inc., Chicago, IL).

RESULTS

Demographic characteristics and living habits

More females than males participated in the study, of which 98 were females and 19 were males. Demography, living habits, and chi-square test of the VD and NVD groups are reported in Table 1. Although no significant difference was found in age groups between VD and NVD, the subjects in the 20–29-year range had a higher rate of being in the NVD group than the VD group. VD and NVD groups had approximately equal numbers of subjects in alcohol and caffeine consumption, and number of vices. However, the VD group had significantly more subjects taking medicine than the NVD group (χ^2 (1) = 9.01, $P = 0.001$).

TABLE 1.
Demography and Living Habits of the VD (Voice Disorder) and NVD (No Voice Disorder) Groups

	VD (n = 59)		NVD (n = 58)		
	%	N	%	N	*P*
Age (yr)					0.369
20–29	5.4	2	17.2	10	
30–39	54.1	20	37.9	22	
40–49	29.7	11	31.0	18	
50–59	8.1	3	12.1	7	
≥60	2.7	1	1.7	1	
Smoking	1.7	1	3.4	2	0.549
Alcohol	6.8	4	8.6	5	0.709
Caffeinated drinks	66.1	37	74.1	43	0.347
Medication	33.3	18	8.6	5	0.001*
No. of bad habits					0.840
0	27.1	16	22.4	13	
1–2	69.5	41	74.1	43	
≥3	3.4	2	3.4	2	

*$P < 0.05$.

Teaching characteristics

Teaching characteristics and chi-square test of the VD and NVD groups are reported in Table 2. There were no significant differences between the VD and NVD groups in years of teaching, grades taught, and courses taught. A significantly higher rate of subjects in the VD group reported to use a loud voice in teaching than those in the NVD group (χ^2 (1) = 9.76, $P = 0.001$). The VD group had significantly more subjects using amplification in the classroom, such as a microphone, after they began experiencing voice problems than the NVD group (χ^2 (1) = 6.17, $P = 0.007$).

Health condition

Health condition and chi-square test of the VD and NVD groups are reported in Table 3. Significantly more subjects in the VD group had experienced upper respiratory infection, stress, and anxiety than those in the NVD group (χ^2 (1) = 7.82 < 0.05; χ^2 (1) = 3.30, $P = 0.002$; χ^2 (1) = 4.19, $P = 0.039$; and χ^2 (1) = 9.76, $P = 0.019$, respectively). Among them, no subjects in the NVD group complained of anxiety, whereas 31.1% of the subjects in the VD group had this problem. The relative frequency distributions of numbers of diseases significantly differ for the two groups (χ^2 (1) = 6.70, $P = 0.035$). Subjects in the VD group were more likely to experience greater than or equal to three diseases, whereas subjects in the NVD group were more likely to experience two or fewer diseases. These health issues could have either contributed to or been the result of voice disorders.

Voice symptoms and physical discomfort

Voice symptoms, physical discomfort, and chi-square test of the VD and NVD groups are shown in Table 4. More subjects in the VD group reported having voice symptoms such as hoarseness and low-pitched speaking voice than those in the

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