

Risk Factors for Voice Disorders in University Professors in Cyprus

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Summary: Aims. The purpose of this study was to investigate risk factors for voice pathologies in university professors to determine the need for a preventative vocal hygiene education program that could improve the quality of life of university faculty.

Methods. An online questionnaire was completed by 196 professors from 12 universities in Cyprus. The questionnaire elicited data regarding risk factors that may lead to voice disorders on parameters including general health, voice use, lifestyle, and environment and the self-perceived severity of a subject's voice problem. Subjects were divided into two groups based on their Voice Disorder Index (VDI) score: professors with VDI ≤ 5 and professors with VDI > 5 . The chi-square test was used to examine the differences in responses for each voice risk factor between the VDI ≤ 5 and the VDI > 5 groups.

Results. The VDI > 5 group was more likely to frequently or sometimes experience respiratory infections, coughing, throat clearing, and stress, teach above students talking, and speak over their natural breath cycle than the VDI ≤ 5 group. Professors in the VDI > 5 category were also more likely to have taught in very or moderately noisy environments than the VDI ≤ 5 group.

Conclusions. Health, voice use, lifestyle, and environmental factors may contribute to the development of voice disorders in university professors in Cyprus. Therefore, a preventative vocal hygiene education program is recommended.

Key Words: Risk factors–Voice disorders–University professors–Cyprus–Vocal hygiene.

INTRODUCTION AND LITERATURE REVIEW

Certain occupational groups, who experience job-related voice overuse (i.e., repeatedly use their voice or require heavy voice use), have a higher prevalence of voice disorders than others. These occupations include teachers, factory workers, preachers, professional singers, counselors, lawyers, and others.^{1,2}

Teachers are among the occupational groups that report a higher prevalence of voice problems in comparison with the general population worldwide. Converging evidence demonstrates a higher prevalence of voice problems in teachers.^{3–5} Nelson et al³ investigated the prevalence of voice disorders (VD) in teachers and the general population in the United States. Teachers reported a significantly higher prevalence of having a current voice problem than nonteachers (11.0% for teachers vs 6.2% for nonteachers). In addition, Behlau et al⁵ compared the frequency of VD in Brazilian teachers and nonteachers, which was found to be 11.6% for teachers and 7.5% for nonteachers.

Teachers are also considered a higher risk profession for developing VD. Numerous studies identified risk factors that place teachers at risk for developing VD. Research by Helidoni et al⁶ identified risk factors for VD in kindergarten teachers and nurses. The findings pinpointed that risk factors for VD in kindergarten teachers are primarily related to vocal load (e.g., kindergarten teachers sang more often, spoke loudly more often, etc) in comparison with nurses. Kooijman et al⁷ distinguished risk factors that are associated with voice disorders in teachers who reported voice-related absenteeism from their job. Findings

particularly identified that physical (e.g., neck and shoulder problems) and psycho-emotional factors (e.g., stress) appear to be the most important risk factors in the development of voice complaints than voice load (e.g., number of teaching years and number of students in the classroom) and environment (e.g., classroom acoustics). Chen et al⁸ examined risk factors for voice problems in Taiwanese teachers with VD compared with teachers with no voice disorder (NVD). Results revealed that subjects in the VD group were more likely to experience risk factors for developing voice problems (e.g., using loud voice, having upper respiratory infections, stress, and anxiety) than the subjects in the NVD group.

In contrast to the numerous studies that identified risk factors that may lead to VD in teachers, minimal literature examined risk factors for VD in university professors, a population who may teach under similar conditions (e.g., talking for long periods of time, teaching in environments with background noise, and often increasing their volume) but also different conditions (e.g., teaching in large rooms and teaching to large audiences) than teachers.⁹ Korn et al¹⁰ investigated the correlation between the presence of hoarseness and risk factors for voice disorders in university professors in Brazil. Outcomes pinpointed that the percentage of those reporting hoarseness is lower when the time of teaching is shorter or equal to 1 year, when the workload is one to three class hours per day, when the maximum number of students per classroom is less than 30, when professors work in a silent environment, etc. Higgins⁹ examined risk factors for VD in university teaching faculty with VD and NVD. Findings indicated that there were no significant differences in health and behavioral risk factors for VD (e.g., respiratory allergies, acid reflux, medications, tobacco, and alcohol) in teaching faculty with VD, as compared with faculty with NVD.

In addition to the minimal literature in investigating risk factors for VD in university professors, a sparse literature exists in examining the prevalence of VD in university faculty. Higgins⁹

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reported that 45% of the university teaching faculty surveyed stated having a voice disorder. Korn et al¹⁰ stated that the prevalence of hoarseness in 846 university professors surveyed was 39.6%.

Moreover, some literature exists in exploring the impact of a voice disorder on an individual's quality of life. Ma and Yiu¹¹ examined the impact of VD on the individual's quality of life in subjects with VD and NVD, and revealed that "the VD group reported significantly more limitations in daily voice activities involving daily communication, social communication, and occupational performance"¹² (e.g., diminished productivity) than the NVD group. Additionally, Higgins⁹ reported that 7% of the teaching faculty with VD reported missing days of work and thus diminished productivity because of voice disorder symptoms (e.g., hoarseness, decreased loudness, and pitch changes).

Taking into consideration the existing data on the prevalence of VD in university faculty and the impact that VD can have on a professor's quality of life, as well as the minimum data on examining risk factors for developing voice pathologies in university professors worldwide, the aim of this study is to investigate risk factors for VD related to general health, voice use, lifestyle, and environment in university professors in Cyprus to determine the need for vocal hygiene education, which could improve the quality of life (e.g., daily communication and occupational performance) of this population.

MATERIALS AND METHODS

Participants

An email with a link to an online questionnaire was sent to about 1000 professors in 12 universities in Cyprus. One hundred and ninety-six questionnaires were completed, yielding about a 20% response rate. Participants were 25–67 years old and they had excellent ($n = 172$) or good ($n = 24$) English proficiency. They consisted of 102 females and 94 males who were divided into two groups (i.e., group 1: $VDI \leq 5$; $n = 99$ and group 2: $VDI > 5$; $n = 97$) based on their VDI score. The participants' mean and range score on VDI were 6.64 and 26, respectively.

Design of the questionnaire

The questionnaire was placed online via a Survey Monkey website and was set up to not allow multiple completions from the same participant (see Appendix A). It consisted of 36 questions, which were designed based on the investigators' clinical experience and other questionnaires that exist in the voice disorder literature.^{6,8,10} It entailed two parts. One part was the "Risk Factors for Voice Disorders", which consisted of questions 1–35. Questions 1–35 were divided into five sections, which included (1) demographic information such as age, gender, and level of English proficiency, (2) risk factors related to general health such as nasal allergies, gastroesophageal reflex, and upper respiratory infections, (3) risk factors related to voice use such as years of teaching, teaching hours per week, etc, (4) risk factors related to lifestyle such as smoking, alcohol consumption, stress, etc, and (5) risk factors related to the environment such as the physical size of the classroom, etc.

The other part of the online questionnaire was the "Voice Disorder Index," which consisted of question 36. The VDI is a reliable tool that describes the participant's perceived severity of his or her voice problem as it relates to his or her quality of life.¹³ It consists of 12 statements that are used in the Voice Handicap Index-30, four of those statements are also included on the Voice Handicap Index-10.^{13,14} The VDI's range of scores is 0–48. A score of 0–7 indicates normal voice, whereas a score of 8–48 designates a voice that is slightly (i.e., scores 8–14), moderately (i.e., scores 15–22), or profoundly disordered (i.e., scores 23–48) (13, F. Ingolf, personal communication, June 26, 2017).

Procedures

The following procedures were followed. In step one, an email with a link to the online questionnaire was sent to about 1000 professors in 12 universities in Cyprus. In step two, each participant was asked to complete question 1, which elicited information about his or her level of English proficiency. Participants who had excellent ($n = 172$) and good ($n = 24$) English proficiency were able to continue with completing the survey, whereas participants who had poor English proficiency were prohibited from continuing the survey because their poor English proficiency may have threatened the validity of their responses. In step three, each participant was asked to complete questions 2–35 of the questionnaire that elicited information on demographic information and risk factors related to general health, voice use, lifestyle, and environment. In step four, every participant was inquired to complete question 36, which was the VDI. Participants' answers on question 36 were then transferred to the VDI module of the lingWAVES program,¹⁵ which scored them and provided a self-perceived severity of their voice problem (i.e., normal, slightly, moderately or profoundly disordered) as it relates to their quality of life. Subjects whose VDI score was normal were placed into the $VDI \leq 5$ group, which is defined as the group of professors who sense that voice difficulties do not impact their quality of life. Subjects whose VDI score was borderline normal or slightly, moderately, or profoundly disordered were assigned to the $VDI > 5$ group, which is defined as the group of professors who sense that they are at greater risk of having voice difficulties that impact their quality of life.

Data analysis

The chi-square test of goodness of fit was used to examine the differences in responses between the professors with $VDI \leq 5$ and those with $VDI > 5$ with respect to risk factors related to general health, voice use, lifestyle, and environment. The significance level was set to 0.05 throughout. An adjusted residual analysis was further used to identify categories (i.e., never, infrequently, sometimes, frequently, or always) for each voice risk factor that were responsible for the significant chi-square statistic.^{16,17} A residual value greater than 1.96 or lower than -1.96 indicated that the category made a significant contribution to the chi-square statistic for a voice risk factor. *SPSS Statistics* version 22 (SPSS Inc, Chicago, IL) was used for all statistical analyses.

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