

Risk Factors of Voice Disorders and Impact of Vocal Hygiene Awareness Program Among Teachers in Public Schools in Egypt

*Sarah A. Bolbol, *Marwa M. Zalal, *Rehab A.M. Hammam, and †Nasser L. Elnakeb, *†Egypt

Summary: Objectives. Even though many studies have explored the problem of voice disorders among teachers worldwide, this problem is still not adequately studied in Egypt. The following study was conducted to investigate the risk factors of voice disorders among an Egyptian sample of school teachers, to measure the effect of a vocal hygiene awareness program on them, and to investigate their vocal cord lesions.

Methods. One hundred fifty-six teachers working in public schools and 180 administrative workers in the Faculty of Medicine in the same city participated in this study. They completed a self-administered questionnaire investigating voice disorders, and were subjected to a voice awareness program and a clinical examination.

Results. Voice-related symptoms and Voice Handicap Index were statistically significantly higher among teachers compared with the control subjects. Work duration and high frequency of classes per week of ≥ 15 were the most statistically significant indicators influencing a teacher's voice. Three months after application of vocal hygiene awareness program, the teachers who were studied showed a statistically significant increase in their awareness about vocal hygiene tips.

Conclusions. Egyptian teachers working in public schools are dealing with classes that include a great number of students per class. They also have to deal with unprofessional facilities and limited assisting resources. Therefore, they are highly exposed to the risk of voice-related disorders. Increasing awareness about healthy behavior with the voice in their occupations will help in improving their quality of work and in minimizing any permanent impairments and/or disability.

Key Words: Risk factors—Teachers—Vocal hygiene—Voice disorders—Voice Handicap Index.

INTRODUCTION

Voice-related disorders represent a high risk of a disorder that has been found among professional voice users like teachers.¹ Voice problems can be seen as a combination of self-reported symptoms and clinically observed signs.² This has been proposed by the World Health Organization in the new version of the International Classification of Impairments, Disabilities and Handicaps.³ Therefore, if individuals during their career report sufficient apprehensions and continuous disruption in their voice, their observations to their own voice health should not be overlooked.

The prevalence of vocal dysfunction among teachers compared with other occupations in one of the largest epidemiologic studies to date (Roy et al¹) was significantly high, $P < 0.001$ (11.0% vs 6.2%). Teachers' job requirements of being able to speak loudly for long periods in loud classrooms enhance the occurrence of occupational voice-related disorders.⁴ Also, the unsuitable work environment like a hot, poorly ventilated loud environment, overcrowded classrooms, chalk dust, work organization problems, violence, lack of discipline, and disrespect can predispose individuals to adverse general and vocal health.

Moreover, voice abuse or misuse, laryngeal irritation, and voice competition all can lead to voice disorders.⁵

In like manner, high rates of population growth in Egypt lead to rapid increase in the number of students' enrollment rates, which leads to high class density in Egyptian public schools, with the average amount of students in class for elementary, middle, and high schools being 44, 42, and 39, respectively, as reported by the Ministry of Education.⁶

Voice problems have disadvantageous effects on teaching performance and communicative capacity, and can also impair daily activities and social functioning.⁷ These effects lead to work performance that is below the standard, increase absenteeism, and can even force teachers to end their career because of vocal difficulties.^{7,8} The economic load of voice dysfunction in teachers is enormous in the form of lost wages, decreased productivity, cost of substitute teachers, and impact on non-work activities. The estimated societal cost of voice problems among U.S. teachers, as an example, is \$2.5 billion annually, considering lost work days and treatment expenses.⁹

In Egypt, the teaching profession tends to be associated with a low social and economic status, as teachers' salaries rarely amount to more than 1600 LE (\$281) a month, which leads teachers to double their work hours and pay as private tutors in order to supplement their salaries.¹⁰ They do this because they need to be able to live off of their occupation. As they studied earlier in life for this occupation, they are not able to change their career paths into a more successful one now.

The problems of overcrowding within classes in Egyptian public schools in addition to faulty facilities do not create an environment conducive to learning. However, to reduce the pressures caused by overcrowding, many schools operate in shifts,

Accepted for publication July 18, 2016.

Competing interests: The authors declare that there are no competing interests. This research paper was financed totally by the authors of the study.

From the *Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Zagazig University, Egypt; and the †Department of Phoniatrics, Faculty of Medicine, Zagazig University, Egypt.

Address correspondence and reprint requests to Sarah A. Bolbol, Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Zagazig University, Egypt. E-mail: sar_bo@yahoo.com

Journal of Voice, Vol. 31, No. 2, pp. 251.e9–251.e16

0892-1997

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<http://dx.doi.org/10.1016/j.jvoice.2016.07.010>

especially with limited resources as the government budget is already under strain. All these combined factors lead to increasing the risk of having occupational voice disorders among working teachers in Egyptian public schools and persistent need of applying solutions and awareness programs to reduce these occupational problems.^{11,12}

Voice educational programs directed toward the prevention of dysphonia and control of vocal alterations should be recommended in work settings to improve the quality of life of professionals who frequently use their voice.¹³

Overall, this study was conducted to investigate the underlying risk factors of voice problems among teachers, and equally important to measure teachers' knowledge about vocal care and treatment, to assess the effect of a short voice educational program on raising awareness toward vocal hygiene habits, and to demonstrate vocal cord lesions that originated from the constant use of their voices.

METHODS

Study design and settings

A comparative cross-sectional study was conducted from January 1, 2015 to April 30, 2015 on a sample of public schools in the western district, Sharkia governorate. Then, an interventional study was conducted from May 1, 2015 to October 30, 2015.

Study sample and procedures

The total number of teachers working in the public schools of the western district at the time of the study was 5362, and the number of schools was 270. A multistage stratified random sampling technique was done to obtain a representative sample, suitable for the purpose of the study. A sample size of 248 teachers was calculated through *Epi Info* program version 6.1 (CDC, Atlanta, Ga, USA). A sample frame of all schools was obtained from the Western Educational Administration. In the first stage, the schools were divided into elementary, middle, and high schools. In the second stage, the schools within each section were classified into urban and rural. One school was selected randomly from each of the previously mentioned sections. After the six schools were selected, a sample frame of teachers working in each of those six schools was obtained from the school records. The estimated ratio of elementary : middle : high schools in the western district at the time of the study was 2:1:2, and the ratio of urban to rural schools was 1:3. The third stage was done by choosing teachers from each one of the six schools randomly from the obtained frames in accordance to the previously mentioned ratios. Then the exclusion criteria were applied on the selected sample (teaching experience of less than 1 year, history of throat and chest surgeries, endotracheal intubation, recurrent upper respiratory tract infection, nasal allergy, nasal septum deviation, hormonal problems, and gastrointestinal reflux). Two hundred three teachers were eligible to participate in this study.

After excluding teachers who had only participated in the pilot study, 156 of them accepted to participate in the next study. A matched control group of 180 administrative workers were randomly selected from the Faculty of Medicine in Zagazig

University. The pilot study was conducted in January 2015. The validity of the questionnaire was tested through the opinions of three experts on language clarity, content, relevancy, ability to understand questions, and the time needed to answer. A reliability test using reliability coefficients was conducted to determine the internal consistency of the items, and this resulted in a Cronbach's alpha of .8, which was suitable for the questionnaire. The pilot sample was 25 teachers, and they were not included in the study because the questionnaire was then modified due to the removal of a part related to absenteeism associated with voice disorders. It was removed after receiving complaints from the participants of it being so long.

Procedures of the study

The study was separated into two phases:

Phase 1

This phase included offering a self-administered structured questionnaire to participants through a 15-minute standardized face-to-face interview. The researchers first explained the purpose of the study and how to fill the questionnaire, and assured the privacy of personal information being obtained from all teachers accepted to participate. The interviews were conducted in the teacher's lounge during recess. The questionnaire consists of four parts: Part I: *demographic characteristics*: gender, age, marital status, level of education, living habits, and medical and occupational history. Part II: *voice-related symptoms*.¹⁴ Part III: *Voice Handicap Index (VHI)*, which was developed by Jacobson et al¹⁵ and used for assessment of voice and its effects on the teacher's life. It included three domains: functional, physical, and emotional. The initial reference values that were used for the VHI were ≤ 30 for minimal effects and >30 for serious effects.¹⁶ Part IV: Teachers' knowledge about vocal care and treatment-seeking behavior.¹⁷

Phase 2

This phase was conducted after scheduling appointments with the participants during their recess. It included an application of a vocal hygiene health education program after the researchers stated the objective.

Objectives

The study aimed to increase teachers' awareness and improve their attitude toward vocal hygiene.

Message

The introduction contains knowledge about the anatomy of the vocal cords and physiology of phonation, causes and risk factors harming the voice, and warning signs of vocal fatigue. These messages were delivered by the researchers and the phoniatric specialist, and encouraged to answer any questions and respond to teachers' concerns. The teachers were then presented with a slide presentation designed by the researchers containing explanatory pictures and video clips. These messages focused on healthy vocal habits tips, eg, importance of drinking water, eating healthy food, and vocal rest after work. They were also given advice on how to protect their vocal cords by avoiding

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