

Original Research Article

Voice Related Quality of Life (V-RQOL): Impact of Vocal Hygiene Programme in Secondary School Teachers

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ABSTRACT

Objective: Teachers as professional voice users are thought to be at a higher risk of voice problems due to intensive voice use during routine at work. The purpose of this study was to investigate the effect of a Vocal Hygiene Programme on the Voice Related Quality of Life (V-RQOL) in Secondary School Teachers.

Method: A longitudinal study where 40 full-time secondary school teachers in the age range of 27-50 years with a mean age of 36.7 years volunteered to participate. The participants had a mean teaching experience of 10 years. Out of the total, 28 were females and 12 males. Most of the teachers indulged around minimum 30 hours of teaching per week in a class of more than 45 students each. A self-administered questionnaire was administered to obtain information on demographic data, prevalence of vocal symptoms in past one year and vocal usage in different situations. A 3-months Vocal Hygiene Programme was given to them to be followed. To assess the effect of the programme on voice of the participating teachers, the Voice-Related Quality of Life instrument (V-RQOL by Hogikyan and Seturaman, 1999) was applied at baseline and three months after conclusion of the Vocal Hygiene Programme.

Results: The Vocal Hygiene Programme had a significant positive impact on the Voice related quality of Life of the teachers. The total global V-RQOL score improved from 81.25 to 87.19. Hence, it is concluded that a Vocal Hygiene Programme can be used as a preventive programme in high risk occupational voice users i.e. teachers.

Key words: Vocal Symptoms, dysphonia, Voice Related Quality of Life (V-RQOL), Vocal Hygiene Programme (VHP).

INTRODUCTION

The importance of voice as an occupational tool in a number of professions today is unambiguous. The term “professional voice user” refers to those people who depend on a consistent, special, or appealing voice quality as a primary tool of trade, and those who with any effect on their voice would generally be discouraged in their jobs and seek alternative employment. ^[1]

Thus, teachers as professional voice users are thought to be at a higher risk of voice problems. ^[2] Various studies have reported that voice problems are common among teachers ^[2,3] Roy et al ^[2] reported the prevalence of lifetime voice disorders to be significantly higher among teachers (57.7%) than in non-teachers (28.8%). According to many questionnaire studies, 50-80% of teachers experienced voice problems, ^[4,5] and teaching constitutes one of the 10

occupations that often require medical help for voice difficulties. [6] In India, a survey study conducted by Boominathan et al [7] found 49% of high and higher secondary Indian school teachers experiencing voice problems.

The voice, which may be qualified as a 'professional instrument', is frequently put to rude use. Voice use in the teaching profession is highly demanding, and the hazardous factors are often teaching at high voice output level because of the presence of background noise, poor classroom acoustics, and poor working posture, long speaking distance, poor quality of air ventilation, stress, and non-availability of or poor-quality aids. It appears that this prolonged and often intense occupational voice use contributes to high prevalence rates of voice disorders among teachers. [4, 8-13] In addition, voice problems reportedly interfere with future job options [12] Contributing co-factors are individual endurance, gender, living habits, vocal experiences, medical conditions, stress, anxiety and psychological factors. Many studies reported that the voice disorders are twice in female teachers compared with their male peers. [12,14]

Deviant voice qualities, inability to sustain phonation, vocal fatigue, and pain during phonation and throat irritation are some of the reported voice problems resulting from these causes. [15,16] Owing to professional demands, voice problems in teachers lead to reduced effectiveness at work. [17] However, teachers do not always seek professional help unless the impact of the voice problem worsens. Teacher's awareness of the importance of the voice as a tool with which to capture their listeners' attention and communicate effectively should sensitize them to the acoustic conditions of their working environment and encourage them to consult specialists in the initial stages of vocal fatigue.

A voice disorder may have mental, physical, emotional and communicational repercussions and thus have an impact on professional and social life. The health

illness process of teachers is based on the teacher's work related quality of life which is considered an important determinant in the investigation of the connections among multiple dimensions of relationship between health and work, and also promoting integrative and interdisciplinary approaches in the promotion of health and social well-being.

It has been indicated that these risk factors are cumulative but preventable. [18,19] Preventive strategies are recommended to reduce the risk of voice disorders among the working population. [19] One such suggested method of primary prevention is voice training for professional voice users. [20] Although singing and acting professions often receive training in voice care and preservation, the vast majority of professional voice users, such as teachers, are unaware of how to maintain or improve on their voice, which is their greatest professional asset and communication tool. The literature among the teaching profession reported that one of the main factors contributing to the high prevalence of voice disorders is the lack of voice training especially during teaching training courses [21] and later problems may interfere in the performance of their work and social relationships, causing frustration and low self-esteem. [22-27]

Therefore, educational programs directed towards the prevention of occupational dysphonia have been recommended for the control of vocal alterations and improvement in the quality of life of professionals who frequently use their voice. [28-31] Objective and clinical tests are commonly used in evaluating the effectiveness of vocal health programs, however these objective evaluations do not show the individual's view with respect his/her psycho-emotional, social and professional state as a consequence of changes in health. [29-32]

An important first-line strategy is to use a voice hygiene program, and the majority of most voice education programs would be described as voice hygiene,

sometimes modified with the addition of exercises or other basic therapeutic techniques. Voice hygiene is a preventive and therapeutic approach that focuses on behavior modification to protect voices from abusive and hyper functional behaviors during vocalization. Vocal hygiene usually includes education on the voice mechanism, abusive behaviors, excessive talking, abnormal pitch and loudness, reflux control, and systemic and laryngeal hydration. One would then hope to modify such behaviors to decrease or even eliminate the risk factors, particularly in the case of functional voice disorders. [33]

However, few studies have evaluated the bio-psychosocial quality of the voice of subjects after participating in educational programs [31,34] and these showed the evaluation of subjects' self-perception.

Several studies have reported on the outcome of vocal hygiene education and voice training for subjects who do not suffer from voice disorders but who belong to the risk groups for such problems. Kaufman and Johnson(1991) [35] developed a preventative voice program for teachers including a videotape and a booklet in which the anatomy and physiology of voice production, common voice pathologies, prevention strategies and early warning symptoms for voice disorders were provided. According to the authors, the program received a positive response from the teachers; however, no further evaluation of the effectiveness of the program was made. Bistrisky and Frank, (1981) [36] found improvements in awareness of voice function and self-evaluation of voice in a group of teachers who attended vocal hygiene programs. Boone et al said, "Identification and reduction of vocal abuse and misuse are the primary goals of voice therapy for hyper functional disorders such as a functional dysphonia with or without such physical changes as vocal nodules, polyps or contact ulcer." [36]

In a study by Chan (1994) [37] concerning the effects of preventive vocal

hygiene education for daycare center teachers, the participants attended a 90-minute workshop session and followed a vocal hygiene regimen for two months. The results indicated that the participants showed significant voice improvement compared to the group that did not receive the inputs.

Boominathan et al.,(2008) [16] conducted vocal hygiene awareness program aimed at educating professional voice users regarding prevalent voice use, abuse, and misuse and address ways to prevent voice problems. Their study investigated the efficacy of a program on vocal hygiene education designed for schoolteachers in Chennai. Sixty-five teachers were asked to complete a questionnaire twice i.e., before and after one month (post education) and the results showed teachers had better awareness after the program. Boominathan et al., (2009) [38] evaluated the impact of Vocal Hygiene Awareness Program (VHAP) based on knowledge gained, implementation of vocal hygiene practices and concern for prevention of voice problems. Thirty-two teachers who attended VHAP two years back were asked to complete a questionnaire, which was based on the contents of VHAP. The authors found that the majority of teachers followed dietary modifications, vocal tips and were not following classroom modifications. The authors concluded that VHAPs were effective in increasing knowledge, modifying practices and adopting a positive attitude.

The V-RQOL has been used by various researchers in the area of Phonoaudiology to investigate the relationships between quality of life and voice in teachers and subjects with and without vocal alterations, in addition to being pointed out as an important instrument for evaluating the impact of dysphonia on subjects' lives. Voice Related Quality of Life (V-RQOL) helps to understand what perception the subject has in regard to his own voice and his reaction

to voice disorders. Analysis of the quality of life with regard to vocal health has been the focus of researches conducted in cross-sectional and clinical studies.

However, there is a need for studies that evaluate the impact of vocal health programs that are collective in scope, with regard to the quality of life of subjects in a longitudinal study. Evaluating the effectiveness of vocal health programs by instruments after an intervention may be considered an important factor in planning public health policies.

There is a dearth of literature and empirical data on the use of vocal hygiene programmes in small districts of India. Hence, the present study aimed at evaluating the impact of a Vocal Hygiene Programme (VHP) on the voice related quality of life in secondary school teachers of Sundernagar, (Mandi District, H.P) by means of a Voice Related Quality of Life (V-RQOL) questionnaire and results have been discussed in an exploratory manner.

METHODOLOGY

Sample

The population of the present study comprised of 40 full time secondary school teachers from five government schools in Sundernagar, Mandi. A purposive random sampling procedure was followed considering the fact that the work load per week, strength of students in the class and course and pattern of teaching did not differ significantly between the schools.

The inclusion criteria included full time teachers who had completed at least five years of service in the profession with no serious illness affecting voice aged below the age of 55 years. The exclusion criteria used was that the participating teachers should not have an organic pathology pre-diagnosed by an otolaryngologist or report of persisting hoarseness for longer than two weeks.

A consent form was obtained from each teacher before starting the study and they were explained in detail regarding their active involvement in the study. The

teacher's willingness to sincerely follow the vocal hygiene programme was very important as it would reflect on the efficacy of the study.

Questionnaire

All the participants were required to complete a semi structured self-devised short vocal questionnaire at the beginning of the study that would shed light on signs and symptoms of dysphonia and vocal usage pattern in each individual both at home and at work. This questionnaire was validated by three speech language pathologists having a work experience of more than five years in the field. Responses were evaluated on the basis of a five-point Likert scale with response options like never, rarely, sometimes, mostly and always. Responses were dichotomized between yes (mostly and always) and no (never, rarely and sometimes).

Procedure

The subjects participated in a twelve week programme which was obligatory for all. For the first two weeks, the teachers participated in a Voice Education Programme (VEP) which lasted for one hour session per week after school hours. In the first session, the subjects were explained about the process of voice production along with the subsystems involved and the various pathologies that might affect their professional tool i.e. their voice. The second session involved the subjects as volunteers to help identify the faulty teaching patterns that they were themselves using in their classes but were unaware of their negative effects on voice (vocally abusive behaviors). After the process of identification they were introduced to the Vocal Hygiene programme (VHP) which they had to follow for the next ten weeks.

The scope of the VHP included targeting their vocally abusive habits like throat clearing, shouting, talking in background noise, excessive talking, speaking till out of breath, and writing while talking and constant use of lozenges. They were given alternatives like sipping water to keep the vocal tract hydrated, use of facial

expressions and physical gestures or clapping or blowing a whistle to gain attention of the students rather than straining voice by shouting and to moderate the background noise before speaking if possible. Use of amplifications was emphasized wherever possible along with classroom modifications with respect to acoustics and ventilation.

Dietary modifications were discussed which included limiting the amount of caffeinated beverages, spicy and oily food and substituting them with healthy alternatives. The participants were also briefed about the benefits of following a disciplined meal pattern and how it might prevent them from having gastro-esophageal reflux, which also may be the causative factor for future voice problems.

Maintenance of proper body posture and breathing exercises were also demonstrated however no direct therapy session was taken in this regard. The teachers were provided with handouts on vocal warm-up and cool down exercises, which included body stretching and breathing with the emission of fricative sounds. For vocal cool down, yawning and chanted speech was emphasized.

The participants received a folder containing all the information and copy of the Vocal hygiene Programme to be followed. The sessions were aided by power point presentation to support the lectures. Follow up sessions were held once a month to discuss any issues if any presented by the participants

Quality of life Measures

To assess the effect of the programme on voice of the participating teachers, the Voice-Related Quality of Life instrument (V-RQOL by Hogikyan and Seturaman, 1999) was applied at baseline and three months after conclusion of the vocal hygiene program. This instrument has the capacity to evaluate the perception of subjects with regard to the impact of voice on their quality of life and may be used to follow-up the development in the clinical

area and in planning vocal health promotion actions

V-RQOL involves 10 questions, to which quality of life and voice are related, involving the Physical (Questions 1, 2,3,6,7 and 9), Socio-emotional (4, 5, 8 and 10) and Global (questions from 1 to 10) domains. For each response, judgment on a Likert scale is used, ranging between the least severity to the greatest severity of the problem. The scale corresponds to 1 = never happens and it is not a problem; 2 = hardly happens and rarely is a problem; 3 = sometimes happens and is a moderate problem; 4 = often happens and almost always is a problem; 5 = it always happens and really is a serious problem. To calculate the final score of the V-RQOL, the rules generally applied in the majority of quality of life instruments were used. The standard score is calculated from the gross score, with a higher value indicating greater correlation between the voice and quality of life. The maximum score is 100 (best quality of life) and the minimum score is zero, for both the physical and socio-emotional domains, as well as the global domain. To calculate the scores, a formula is used provided by the author of the questionnaire

Statistical analysis

The data was analyzed using SPSS (version 16.0) software. Descriptive statistics include reporting of the prevalence of vocal symptoms and frequency and mean and standard deviations of demographic characteristics. Independent t-test was used to estimate Pearson's correlation coefficient and the significance level was set at a level of $p < 0.05$.

RESULTS

Demographic data

40 fulltime secondary school teachers in the age range of 27-50 years with a mean age of 36.7 years volunteered to participate in the study. The participants had a mean teaching experience of 10 years. Out of the total, 28 were females and 12 males. Most of the teachers indulged in

minimum 30 hours of teaching per week in a class of more than 45 students each.

Frequency of vocal symptoms

History of vocal symptoms was evaluated through the voice questionnaire. Tired voice while speaking (52.5%) and constant throat clearing (35%) along with difficulty maintaining loud voice (35%) were the most frequent symptoms as reported by the participating teachers. Voice usage refers to the act of teaching in which it was seen that 57.5 % of teachers used their voice intensively and 50% indulged in shouting too much either to get their voice across to all the students or to discipline them. The prevalence of vocal symptoms and pattern of vocal usage in class is presented in Table-1

Table 1: Frequency of responses regarding vocal symptoms and pattern of vocal usage in class of teachers (n=40).

Vocal symptoms	Present	%
Hoarseness	12	30
Tired voice while speaking	21	52.5
Constant throat clearing	14	35
Dry throat	12	30
Feeling of lump in throat	08	20
Loss of voice	0	0
Change in pitch	05	12.5
Difficulty maintaining loud voice	14	35
Shortness of breath while speaking	08	20
Voice Usage Intensive voice use	23	57.5
Shouting too much	20	50

The table shows that the teachers had existing signs and symptoms of vocal problems that could aggravate and lead to future voice problems if not taken care of by a professional.

Compliance with the Vocal Hygiene Programme (VHP)

Adherence with the VHP was found to be good in all areas other than the warm up and cool down exercises as the teachers found it difficult to follow these considering their hectic schedules and not much clarity on how to do them as they were not a part of the training programme. With respect to classroom modification, the teachers made sure that they controlled the external noise to possible extent by not scheduling any drills or physical education classes adjacent to regular periods and internal fan noises were reduced. Ventilation was improved by getting damaged windows repaired and cleanliness quotients were increased to avoid allergy and dust which in turn damages the laryngeal mucosa. 50% of teachers improved on their dietary pattern. Use of amplification was also an area which could not be implemented due to unavailability of assistive devices in the school.

Pre and Post V-RQOL scores after completion of the Vocal Hygiene Programme (VHP)

Table-2 shows the pre and post comparison of mean and standard deviations in the three domains of the V-RQOL namely the physical functioning, social emotional and global scores after the successful completion of the three months Vocal Hygiene Programme.

Table 2: Comparison of Pre and Post V-RQOL score of teachers (N=40).

Variables	Conditions	Mean	SD	t-Value	P-Value
Physical functioning score	Pre-Intervention	77.50	5.57	4.456	0.000
	Post Intervention	83.23	5.93		
Social Emotional score	Pre-Intervention	86.88	5.80	4.818	0.000
	Post Intervention	93.13	5.80		
Total Global Score	Pre-Intervention	81.25	5.00	5.291	0.000
	Post Intervention	87.19	5.04		

The mean average Physical functioning score at Pre-Intervention condition was 77.50 ± 5.57 . The mean average score of Physical V-RQOL domain at Post-Intervention condition was 83.23 ± 5.93 . The comparison results indicate a significant difference between the pre and post intervention condition ($t=4.456$, $P=0.000$, $df=39$). Similarly, in the Social-

Emotional section, the mean average score obtained was 86.88 ± 5.80 at Pre-Intervention condition whereas at post intervention condition, the mean average Social-Emotional score was 93.13 ± 5.80 . The comparison results from pre to post intervention condition indicate a significant difference of the score ($t=4.818$, $P=0.000$, $df=39$). Finally, in the global V-RQOL

score, it was found that, at pre intervention level the mean average score was 81.25 ± 5.00 whereas the mean average score of Total global V-RQOL at post intervention condition is 87.19 ± 5.04 . The total results of pre and post intervention condition of V-RQOL indicated a significant difference from pre to post in every domain of V-RQOL suggesting the efficacy of the VHP.

DISCUSSION

The subjects who participated in the study were all fulltime practicing secondary school teachers who belonged to similar age group and had a similar pattern of teaching exposure. The purpose of the study was to investigate the effect of a Vocal Hygiene Programme in secondary school teachers using the Voice Related Quality of Life (V-RQOL) questionnaire.

Change in V-RQOL scores post VHP programme

In the present study, the mean total global score of V-RQOL ranged between 72.50 to 90.88 in the pre intervention condition, which is quite high, and relatively close to 100 indicating that the voice related quality of life of teachers was not much affected by the dysphonic symptoms. Although the participants did report of presence of vocal symptoms, however they do not associate these symptoms as negatively impacting their quality of life measures. The difficulties that were more evident in the physical domain included problem being heard in noisy environment and speaking loudly. In the social-emotional domain, most of the participants scored well except in question which dealt with anxiety or frustration because of voice problem. After the educational activities, teachers showed significantly higher domain and overall V-RQOL scores between 77.50 to 92.50 after preventive intervention showing that these activities had a positive impact on the participant's lives. This shows that the activities which provided guidance on vocal hygiene and those including modifications of healthy voice usage patterns along with

few warm up exercises reflected positively on the quality of life of subjects. The results corroborate the findings of Grillo and Penteado (2005) [22] who studied the impact of voice on the quality of life of primary school teachers. A study by Pizolato et al (2013) [39] also showed positive results for an educational intervention programme done on 70 teachers which involved two groups-one with vocal training exercises along with vocal hygiene habits and control group was given guidance only for vocal hygiene habits. The V-RQOL scores before and after three months of intervention showed significantly higher overall global scores in both the groups.

However, in a similar study done by Ribas T.M (2014) [40] on teachers, there was a significant decrease in the values of social-emotional domain after the intervention of speech language pathologist. This negative change might have been a result of heightened attention and awareness of the relationship between voice and quality of life due to which the subjects during reassessment proved more critical and sensitive regarding the impacts of their voice in social life and emotions. In a study done by Nerriere E et al (2009) [41] 3646 teachers were evaluated to see the association between voice complaints and psychological stress using the MH score of SF-36 as an indicator of mental health status. The results indicated that teachers who did not report voice disorders showed lower level of psychological distress than those who did. Hence, it can be stated that the occurrence of a voice problem in teachers may not only be linked to physical aspects of voice but also to personality traits of any individual. This adds weight age to the fact that teachers should undergo personality tests in the initial phase of their recruitment which can actually put light to the fact that why some teachers are more susceptible to develop voice problems than others.

Significant effects of Vocal Hygiene Programme

With regard to the vocal hygiene programme, instructions such as taking care of hydration and perceptive measures such as, for example, not shouting in the classroom and not speaking with strong intensity in the presence of noise decreased the speaking effort of the teachers to a large extent. Hydration promotes and maintains healthy functioning of the larynx, especially in individuals that use the voice professionally. On the other hand, dehydration may increase phonatory effort, contributing to the manifestation of vocal fatigue, particularly for professionals who use the voice as an instrument for work. Emphasis on the practice of changing unhealthy vocal habits to structured healthier ones favored the increase in overall global score of V-RQOL in the present study. Bovo et al(2007) [30] found similar improvement in the scores obtained about the different vocal behaviors on the questionnaire on the various strategies to reduce the vocal behaviors in classroom, good vocal habits, correct respiration, reduced muscle tension in subjects after treatment though the changes were not statistically significant. After 3 months, 85% of teachers reported that they practiced good vocal hygiene and 90% had adopted strategies for reducing vocal demand in classrooms. Study by Chan (1994) [37] also investigated the efficacy of vocal hygiene education designed for kindergarten teachers where 12 teachers who attended a 90 minute workshop which included concepts of vocal abuse, vocal hygiene and practiced vocal hygiene for two months showed significant improvement. However, few studies have documented the use of voice training exercises associated with vocal hygiene habits for significant positive changes to be observed. [29,40]

Use of amplification was one area that could not be followed by most of the teachers due to the infrastructural constraints of the educational system in our country despite being a developed nation. Most of the schools do not provide their teachers amplification systems due to financial

reasons. Hence, teachers were counseled on how to use their voice wisely and effectively without abusing it.

A limitation of the study was that the Vocal Hygiene Programme could have been for a longer duration and documented with the objective parameters of the participants voices to provide a broader view of the change observed due to the programme both psychologically as well as physiologically.

Thus, it is important to incorporate such Vocal Hygiene Programmes in teachers who are at risk for developing voice problems. Such programmes focus on prevention rather than treatment and this partnership between Speech Language Pathologists and teachers can help promote better quality of life in this group of professional voice users.

CONCLUSION

A Vocal Hygiene Programme had a positive effect on quality of life of teachers both from psycho-emotional aspect as well as physical aspect of voice. Such programmes can be incorporated during the training programme of teachers to make them aware of healthy teaching habits in the initial phase of their careers to prevent them from future occupational hazards. While assessing a voice disorder, it is also important to assess the psychological impact of the disorder on the individual's quality of life and V-RQOL is an appropriate and easy tool for such measurement.

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REFERENCES

1. Titze IR, Lemke JH, Montequin D. Populations in the U.S. workforce who rely on voice as a primary tool of trade: a preliminary report. *J Voice*. 1997; 11:254-259.
2. Roy N, Merrill RM, Thibeault S, Gray S, Smith E. Prevalence of voice disorders in teachers and the general population: effects

- on work performance, attendance, and future career choices. *J Speech Lang Hear Res.* 2004; 47: 542-551.
3. Sataloff RT. Professional voice users: the evaluation of voice disorders. *Occup Med.* 2001; 16:633-647.
 4. Pekkarinen E, Himberg L, Pentti J. Prevalence of vocal symptoms among teachers compared with nurses: a questionnaire study. *Logoped PhoniatrVocol.* 1992; 17:113-117.
 5. Gotaas C, Starr C. Vocal fatigue among teachers. *Folia Phoniatr.* 1993; 45: 120-129.
 6. Fritzell B. Voice disorders and occupations. *Logopedics PhoniatrVocol.* 1996; 21:7-12.
 7. Boominathan P, Rajendran A, Nagarajan R, Seethapathy J, Gnanasekar M. Vocal abuse and vocal hygiene practices among different levels of professional voice users in India: A survey. *Asia Pacific Journal of speech, Language, and hearing.* 2008; 11(1):46-53.
 8. Lejska, V. Occupational voice disorders in teachers. *PracoviniLekarstvi,* 1967; 19, 119-121.
 9. Marks, J. B. A comparative study of voice problems among teachers and civil service workers. Unpublished master's thesis. 1985; Minneapolis: University of Minnesota.
 10. Mattiske, J. A., Oates, J. M., & Greenwood, K. M. Vocal problems among teachers: A review of prevalence, causes, prevention, and treatment. *Journal of Voice,* 1998; 12, 489-499.
 11. Smith, E., Gray, S. D., Dove, H., Kirchner, H. L., & Heras, H. Frequency and effects of teachers' voice problems. *Journal of Voice,* 1997; 11, 81-87.
 12. Smith, E., Kirchner, H. L., Taylor, M., Hoffman, H., & Lemke, J. H. Voice problems among teachers: Differences by gender and teaching characteristics. *Journal of Voice,* (1998); 12, 328-334.
 13. Smith, E., Lemke, J., Taylor, M., Kirchner, H. L., & Hoffman, H. (1998). Frequency of voice problems among teachers and other occupations. *Journal of Voice,* 1998; 12, 480-488.
 14. Gray SD. Basement membrane zone injury in vocal nodules. In: Gauffin J, Hammarberg B, eds. *Vocal Fold Physiology: Acoustic, Perceptual, and Physiological Aspects of Voice Mechanisms.* San Diego, Calif: Singular Publishing Group; 1991; 21-27.
 15. Yiu, E.M. Impact and prevention of voice problems in the teaching profession: Embracing the consumers' view. *Journal of Voice,* 2002; 16, 215-228.
 16. Boominathan, P., Chandrasekhar, D., Nagarajan, R., Madraswala, Z., & Rajan, A.. Vocal hygiene awareness programme for professional voice users (teachers): An evaluative study from Chennai. *Asia Pacific Journal of Speech, Language and Hearing,* 2008; 11 (1), 39-45.
 17. Sapir, S., Keidar, A., & Mathers-Schmidt, B.). Vocal attrition in teachers; Survey findings. *International Journal of Language and Communication Disorders,* 1993; 28(2), 177-185.
 18. Vilkmann E. Voice problems at work: a challenge for occupational safety and health arrangement. *Folia PhoniatrLogop.* 2000; 52:120-125.
 19. Williams N, Carding P. *Occupational Voice Loss.* USA: Taylor & Francis Group, 2005.
 20. Duffy OM, Hazlett D. The impact of preventive voice care programs for training teachers: a longitudinal study. *J Voice.* 2004; 18:63-70.
 21. Niebudek-Bogusz E, Sznurowska-Przygocka B, Fiszler M, KotyloP, Modrzewska M, Sinkiewicz A, Sliwinska-Kowalska M. The effectiveness of voice therapy for teachers with dysphonia. *Folia PhoniatrLogop* 2008; 60:134-141.
 22. Grillo MHMM, Penteadro RZ: The impact of voice on the quality of life of elementary school teachers. *Pro Fono* 2005; 17:321-330.
 23. Bassi IB, Assunção AA, Medeiros AM, Menezes LN, Teixeira LC, Gama ACC. Quality of life, self-perceived dysphonia, and diagnosed dysphonia through clinical tests in teachers. *J Voice* 2011; 25:192-201.
 24. Silverio KCA, Gonçalves CGO, Penteadro RZ, Vieira TPG, Libardi A, Rossi D: Actions in vocal health: a proposal for improving the vocal profile of teachers. *Pro Fono* 2008; 20:177-182.
 25. Behlau M, Hogikyan ND, Gasparini G: Quality life and voice: study of a Brazilian population using the voice-related quality of life measure. *Folia Phoniatr Logop* 2007; 59:286-296.
 26. Maertens K, de Jong FI: The voice handicap index as a tool for assessments of the biopsychosocial impact of voice problems. *B-ENT* 2007; 3:61-66.
 27. Bovo R, Galceran M, Petrucelli J, Hatzopoulos S: Vocal problems among teachers: evaluation of a preventive voice program. *J Voice* 2007; 21:705-722.
 28. Ilomaki I, Laukkanen AM, Leppänen K, Vilkmann E: Effects of voice training and voice hygiene education on acoustic and perceptual speech parameters and self-reported vocal well-being in female

- teachers. *Logoped Phoniatr Vocol* 2008; 33:83-92.
29. Duan J, Zhu L, Yan Y, Pan T, Lu P, Ma F: The efficacy of a voice training program: a case-control study in China. *Eur Arch Otorhinolaryngol* 2010; 267:101-105.
 30. Timmermans B, Covelliers Y, Meeus W, Vandenabeele F, Van Looy L, Wuyts F: The effect of a short voice training program in future teachers. *J Voice* 2011; 25:191-198.
 31. Pasa G, Oates J, Dacakis G: The relative effectiveness of vocal hygiene training and vocal function exercises in preventing voice disorders in primary school teachers. *LogopedPhoniatrVocol* 2007; 32:128-140.
 32. Hogikyan ND, Sethuraman G: Validation of an instrument to measure voice-quality of life (V-RQOL). *J of Voice* 1999; 13:557-569.
 33. Boone, D. R., McFarlane, S. C. & Von Berg, S. L. *The Voice and Voice Therapy* (7th edition), Boston, MA: Pearson/Allyn & Bacon; 2005
 34. Pizolato RA, Rehder MIBC, dos Santos Dias CT, et al. Evaluation of the effectiveness of a voice training program for teachers. *J Voice*. 2013; 27: 603-610.
 35. Kaufman, T.J., & Johnson, T.S. An exemplary preventative voice program for educators. *Seminars in Speech and Language*, 1991; 12, 40-48.
 36. Bistrisky, Y., & Frank, Y. 1981 In Mattiske, J. A., Oates. , & K. M. Greenwood 1998. Vocal problems among teachers: A review of prevalence, causes, prevention and treatment. *Journal of Voice*, 12 (4), 489-499.
 37. Chan, R.W. Does the voice improve with vocal hygiene education? A study of some instrumental voice measures in a group of kindergarten teachers. *Journal of Voice*, 1994; 8, 279- 291.
 38. Boominathan, P., Chandrasekhar, D., Ravi, S., &Krupa M. Impact of 'Vocal Hygiene Awareness Programme' in Professional Voice Users (Teachers). *Journal of Indian Speech and Hearing Association*, 2009; 23, 10-18.
 39. Pizolato RA, Rehder MI, Meneghim MC, Ambrosano GM, Mialhe FL, Pereira AC. Impact on quality of life in teachers after educational actions for prevention of voice disorders: a longitudinal study. *Health Qual Life Outcomes*. 2013; 11:28.
 40. Ribas, TâniaMaestrelli, Penteadó, Regina Zanella, &García-Zapata, Marco Tulio A. Voice Related Quality of life: Impact of a Speech Language Pathologist with Teachers. *Revista CEFAC*, 2014; 16(2), 554-565.
 41. Nerriere E, Vercambre MN, Gilbert F, Kovess-Masfety V. Voice disorders and mental health in teachers: a cross-sectional nationwide study. *BMC Public Health*. 2009; 9:370.

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