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Vocal fatigue symptoms in secondary school teachers

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Abstract

This study aimed at examining vocal fatigue symptoms in secondary school teachers. The study sample comprised 40 willing premenopausal female secondary school teachers (age range: 22–45yrs). All participants completed a 16-item vocal fatigue questionnaire with a 4-point rating scale, where, never, sometimes, most of the times, and always which were given numerical values 0, 1,2,3, respectively for the analysis.

The total mean score of vocal fatigue was 11.95 ± 6.5. Symptoms were divided into 2 groups: (1) 7 physical-related symptoms (PRSs) and (2) 9 voice-related symptoms (VRSs).

Of the PRSs, tension in the neck/shoulder, dryness in the throat, and urge for throat clearing were more commonly reported with varying severity (≥65%), and of the VRSs, harshness and breathiness were reported with varying severity (≥65%). Of the VRSs, pitch range affected (72.5%), loudness range affected (72.5%), and harshness (70%) were more commonly reported, and of the PRSs, the urge for coughing was reported by most of the teachers (80%). A significantly high positive correlation was observed between PRSs and VRSs (r= 0.75), whereas no significant correlation was observed between vocal fatigue ratings and age and classes taken per week. Symptoms for which≥60% of the subjects responded with 'sometimes' were considered as sensitive indicators of vocal fatigue. These included pain in the throat, dryness in the throat, tightness in the throat, urge for coughing, pitch range affected, loudness range affected, hoarseness, harshness, and pitch breaks. These 9 indicators could be used for the early screening of vocal fatigue.

Keywords: Vocal fatigue, Secondary school teachers, Self-rating questionnaire

Introduction

Sataloff (2001) describes professional voice users as those whose ability to earn a living is negatively affected by a loss of vocal quality and endurance. Professional voice users include singers, actors, clergy, teachers, receptionists, sales personnel, and physicians. As professional voice users, teachers are susceptible to voice disorders and less privileged than elite professionals. Although they do not need the variation of voice parameters to the extent that elite professional voice users do, their prolonged voice usage is immensely demanding

Voice problems have been found to be more prevalent in female teachers (Boominathan, 2008; de Alvear et al, 2010;Miller and Verdolini, 1995).

Several studies have shown that a high prevalence of voice disorders, including the subjective, professional, and financial consequences of the disorders, is reported in teachers (Cutiva et al, 2013; Gotaas & Starr, 1993; Mattiske, Oates & Greenwood, 1998).
The work demands on Indian teachers are varied; they speak for an average of 5to 6hours a day. There are no regular scheduled breaks, and sometimes, even the available breaks have to be sacrificed to sudden demands including covering the job duties of an absent colleague, taking extra classes for the ninth and tenth standards, and organising extracurricular activities such as annual day competitions, debates, and sports for students. In addition, teachers face environmental adversities such as noise pollution within and outside classrooms. Usually, there is no provision of sound amplification systems in the classrooms, and therefore, teachers need to speak loudly during classes. Moreover, chalk is often used for writing on blackboards, and inhalation of chalk dust can cause throat irritation. Very few schools in metro cities use whiteboards and PowerPoint presentations. In addition, the demand on teaching increases according to the standard or level taught. For example, teaching tenth standard students may be more demanding than teaching fifth or sixth standard students. Furthermore, teachers do not receive special voice training during teacher training programmes. Moreover, they face more stresses than elite voice users with respect to low financial returns, making it necessary for them to use public transportation, which can be very demanding and stressful in metro cities. Also other family and personal responsibilities could also lead to additional stresses in daily life.
Vocal fatigue symbolizes a voice problem that begins as the speaking day progresses and usually wanes after a period of voice timeout (Gotaas & Starr, 1993).
High levels of vocal demands and poor acoustical environments in which teachers have to work are considered to cause this group to engage themselves in hyper functional vocal behaviours (Russell et al, 2001). Solderstein et al (2002) stated that vocal misuse and abuse are frequently considered the causal factors for functionally based voice disorders such as vocal fatigue and vocal nodules. Identifying vocal fatigue in its initial stages could facilitate timely intervention and prevention of voice disorders.
Voice disorders experienced by teachers can affect their teaching by limiting the effective communication of information to students and can force teachers to refrain from work (Roy et al, 2004). Hamdan et al (2005) reported that 46% of teachers perceived their voice as fair or worse; however, 79% never consulted a doctor or specialist. Vocal disorders have become a health concern owing to the lack of attention paid to vocal abuse, misuse, and vocal fatigue symptoms. This is mainly because of the lack of vocal health information and education available to teachers. The prevalence of vocal fatigue has been reported to be 45% (Preciado-Lopez, 2008).
Vocal fatigue symptoms may be an early indication of voice disorders. Identifying vocal fatigue in its initial stages could facilitate timely intervention and prevention of voice disorders.

Materials and methods

The aim of the present study was to examine vocal fatigue symptoms in secondary school teachers. The study sample comprised40 willing premenopausal female secondary school teachers (age range: between 22 and45years) with or without voice complaints but with no voice-related medical conditions. None of the teachers reported hearing defects or voice or speech problems. Teachers of physical education or

performing arts were not included in the study.

Detailed case history and demographic data were obtained from all subjects. All subjects completed a vocal fatigue questionnaire in the presence of the researcher.

The vocal fatigue questionnaire by Satav (2012) was used. This self-rating questionnaire is an adapted version of the vocal fatigue questionnaire developed by Oates & Kitch (1994). The questionnaire comprised16questions related to acoustic features, quality, physical discomfort, and behavioural adaptations. Prevalence of fatigue was rated on a 4-point rating scale, never, sometimes, most of the times, and always, which were given numerical values 0, 1,2,3, respectively for analysis. The symptoms of vocal fatigue were coded, and itemised analysis was performed.

Results

Table 1: Sample characteristics.

Secondary School Teachers (n=40)	Min	Max	Mean	SD
Age range (years)	22	45	34.5	8.38
Experience (years)	2	31	10.75	6.03
Classes taken/ week	40	63	35.9	5.35

Table 1 shows that the subjects had an average of 36 classes per week, indicating that the subjects had similar vocal loads.

As per the rating scale minimum score of 16 and maximum score of 48 could be obtained. However, the mean vocal fatigue score was11.95 ± 6,which suggests thatthe subjects did not experience all the symptoms.

The 16 items were divided into 2 groups: (1) 7 items based on physical-related symptoms (PRSs) and (2) 9 items based on voice-related symptoms (VRSs).

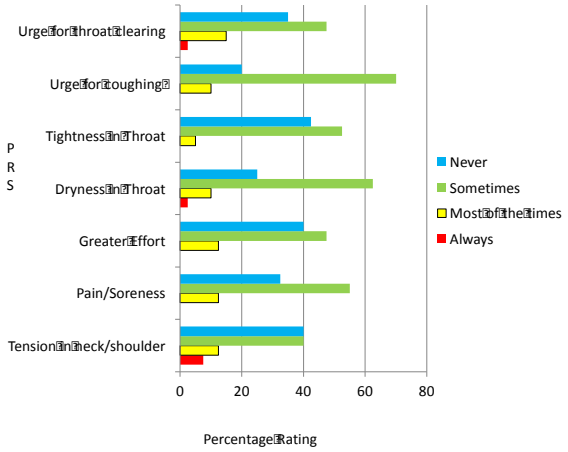

Figure 1: PRS percentage in teachers.

Figure 1 shows that the highest percentage of responses was ‘sometimes’, followed by ‘most of the times’. The lowest percentage of responses was ‘always’, reported for 3 PRSs, namely, tension in the neck/shoulder, dryness in the throat, and urge for throat clearing, and 2 VRSs, namely, harshness and breathiness. Further, of the responses termed ‘sometimes’, 70% were reported for the urge for coughing and 40% were reported for tension in the neck/shoulder, indicating that more teachers experienced the urge for coughing.

Of the responses termed ‘most of the times’, 15% were reported for the urge for throat clearing and5% were reported for tightness in the throat, indicating that more teachers experienced the urge for throat clearing.

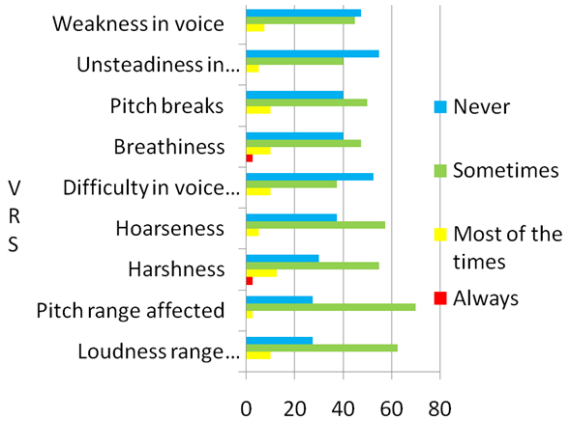

Figure 2: VRS percentage in teachers.

Figure 2 shows that of the responses termed 'sometimes', the highest percentage (70%)was reported for pitch range affected and the lowest percentage (37.5%)was reported for difficulty in voice projection, indicating that the symptom pitch range affected was more common than difficulty in voice projection in the teachers.

Of the responses termed 'most of the times', the highest percentage (12.5%)was reported for harshness and the lowest percentage (2.5%) was reported for both pitch range affected and breathiness, indicating that the symptom harshness was more common than pitch range affected in the teachers.

Of the 7PRSs, 3 including tension in the neck/shoulder, dryness in the throat, and urge for throat clearing were commonly reported (with varying frequencies of ≥65%), whereas of the VRSs, only 2 including harshness and breathiness were commonly reported (with varying frequencies of ≥65%). Thus, PRSs were more commonly reported than VRSs.

It is possible that PRSs appeared before VRSs or were recognised more easily by the teachers.

To observe the relationships between the various factors affecting voice, correlations were obtained between PRSs, VRSs, age, and classes taken per week.

A significantly high positive correlation (r=0.75) was observed between PRSs and VRSs, whereas no significant correlation was observed between vocal fatigue ratings and age and classes taken per week.

Moreover, all PRSs except tightness in the throat were reported by ≥60% of the teachers.

Further, all VRSs except 3 including difficulty in voice projection, weakness in voice, and unsteadiness in voice were reported by ≥60% of the teachers.

Discussion

In this study, the subjects more commonly reported PRSs than VRSs (mean PRS percentage, 62.9%; mean VRS percentage, 59.2%). The highest percentage of teachers (80%) reported the urge for coughing, whereas the lowest percentage of teachers (57.5%) reported tightness of the throat. Therefore, the urge for coughing was the most commonly reported symptom, whereas tightness of the throat was the least commonly reported. Urge for coughing, dryness of the throat, urge for throat clearing, and pain or soreness in the throat were the maximally reported (65% and more) PRSs.

Similar findings in primary teachers have been reported by Sivasankar (2002).

Wrong speech-breathing techniques, mouth breathing, and inhalation of chalk dust may cause irritation or dryness of the oral and pharyngeal mucosa, which may lead to these physical symptoms. Moreover, fatigue of the intrinsic and extrinsic laryngeal muscles could lead to a reduced capacity to maintain tension in the vocal folds and stability in the laryngeal posture (Titze, 1995).

Of the VRSs, pitch range affected (72.5%), loudness range affected (72.5%), and harshness (70%) were reported more commonly and were early symptoms, whereas unsteadiness in voice and difficulty in voice projection were reported less commonly and were delayed symptoms. Factors such as the classroom size, the noise inside and outside the classrooms, and the need to effectively communicate with the students mayimpose higher vocal demands in terms of loudness and pitch variations.

More than 50% of the teachers responded with 'sometimes' forpain and soreness in the throat, dryness in the throat, tightness in the throat, and urge for coughing (4 of 7 PRSs,≥60%);the symptoms loudness range affected, pitch range affected, harshness, hoarseness, and pitch breaks(5 of 9 VRSs,≥60%) were reported more commonly and were early symptoms. Therefore, these items can be listed as sensitive indicators for the early identification of vocal fatigue.

A significantly high correlation was observed between PRS and VRS scores (r=0.751; *p*=0.01), whereas no significant correlation was observed between vocal fatigue ratingsand age and vocal fatigue rating and classes taken per week. Similar findings have been reported by Banks (2015). It has been suggested that select individuals may be able to make subtle functional adjustments in their vocal styles in order to counter the initial onset of fatigue (Stemple, 1995).

Conclusion

The vocal fatigue questionnaire is a valuable tool that can be used to assess the vocal fatigue. It should be periodically administered to secondary school teachers to enable necessary measures for prevention of impending voice problems.

Physical symptoms are likely to occur before vocal symptoms. The sensitive indicators of vocal fatigue are as follows: pain and soreness in the throat, dryness in the throat, tightness in the throat, urge for coughing, pitch range affected, loudness range affected, hoarseness, harshness, and pitch breaks. These indicators could be used for the early identification of vocal fatigue.

Physical training (including relaxation techniques and exercises), voice training, and vocal hygiene regimes conducted by speech-language pathologists should be introduced at the beginning of teaching carrier to prevent the onset of vocal fatigue.

A Vocal fatigue screening test based on the observed 9 sensitive indicators of vocal fatigue can be developed, and its efficacy can be assessed by comparing its results of the 16-item test used in the present study

Conflict of interest: None

References

Banks, R. E., 2015. Understanding vocal fatigue and grade level demand as quantified by the vocal fatigue index (VFI). A thesis Submitted to Michigan State University in partial fulfillment of the requirements for the degree of Communicative Sciences and Disorders - Master of Arts

Kitch, J.A. and Oates, J. (1994). The perceptual Features of Vocal Fatigue as Self- reported by a Group of Actors and Singers. Journal of voice, 8 (3), 207-214.

Sataloff, R.T. (2001). Professional voice users: the evaluation of voice disorders. Occup Med 16(4), 633-47.

Boominathan, P., Rajendran, A., Nagarajan, R., Seethapathy, J., Gnanasekar, M., 2008. Vocal abuse and vocal hygiene practices among different level professional voice users in India: A Survey. Asia Pac. J Speech Lang. Hear. 11, 47–53.

Cutiva, L., Vogel, I., Burdorf, A., 2013. Voice disorders in teachers and their associations with work-related factors: a systematic review. J Commun.Disord. 46, 143–155.

de Alvear, R.M., Martínez-Arquero, G., Barón, F.J., Hernández-Mendo, A., 2010.An interdisciplinary approach to teachers'voice disorders and psychosocial working conditions.Folia Phoniatr.Logop. 62, 24–34.

Gotaas, C., Starr, C.D., 1993. Vocal fatigue among teachers. Folia Phoniatr.Logop. 45, 120–129.

Hamdan, A.L., Sibai, A.M., Srour, Z.M., Sabra, O.A., Deeb, R.A., 2007. Voice disorders in teachers. The role of family physicians. Saudi Med. J. 28, 422–428.

Mattiske, J.A., Oates, J.M., Greenwood, K.M., 1998. Vocal problems among teachers: A review of prevalence, causes, prevention, and treatment. J Voice. 12, 489–499.

Miller, M.K.,Verdolini, K., 1995. Frequency and risk factors for voice problems in teachers of singing and control subjects.J Voice. 9, 348–362.

Pasa, G., Oates, J., Dacakis, G., 2007. The relative effectiveness of vocal hygiene training and vocal function exercises in preventing voice disorders in primary school teachers. Logoped.Phoniatr.Vocol. 32, 128–140.

Preciado-Lopez, J., Perez-Fernandez, C., Calzada-Uriondo, M., Preciado-Ruiz, P., 2008. Epidemiological study of voice disorders among teaching professionals of La Rioja, Spain. J Voice. 22, 489–508.

Roy, N., Merrill, R., Thibeault, S., Parsa, R., Gray, S., Smith, E., 2004. Prevalence of voice disorders in teachers and the general population. J Speech Lang. Hear. Res. 47, 281–293.

Russell, A., Oates, J., Pemberton, C., 2001. Voice care for teachers: A prevention strategy. AcquiringKnowledge in Speech, Language and Hearing. 3, 74–75.

Sapir,S., Keidar, A., Mathers-Schmidt, B., 1993. Vocal attrition among teachers: Survey findings.Eur. J Disord.Commun. 28,177–185.

Sataloff, R.T., 2001. Professional voice users: the evaluation of voice disorders. Occup. Med. 16, 633–47.

Satav (2012) Satav, B.S. 2012. Perception of vocal fatigue and acoustic measures of voice in actors- pre & post performance. Unpublished MASLP Dissertation, MUHS,Nashik.

Solderstein, M., Granqvist, S., Hammarberg, B., Szabo, A., 2002. Vocal behaviour and vocal loading factors for preschool teachers at work studied with binaural DAT recordings. J Voice.

16, 356–371.

Sivasankar, M., 2002. Effects of vocal fatigue on voice parameters of Indian Teachers. Indian Journal of Otolaryngology and Head and Neck Surgery, 54(3), 245-247.

Titze,I.R., Schmidt S., Titze, M.R 1995.Phonation threshold pressure in a physical model of the vocal fold mucosa. I. Acoustic Soc Am., 97:3080-3084.