

Vocal Health Practices Among School Teachers: A Study From Chennai, India

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Summary: Introduction. A healthy vocal system is a prerequisite to produce a serviceable voice for any vocal profession. The concept of vocal health (VH) among teachers is worth exploring considering their known risk of developing voice disorders.

Aim. To provide socioculture-specific information on VH practices and nature of voice problems in teachers.

Method. A VH questionnaire was developed to elicit opinions toward one's own voice health and factors that indicated and contributed to impaired/poor VH from 384 school teachers.

Results and discussion. 'Flexible voice' (23%), 'enduring voice' (22%), and 'good voice' (22%) were descriptions to indicate good VH by teachers. 'Vocal fatigue' (13%), 'dry throat' (9.4%), 'throat irritation' (4.7%), and 'pain while swallowing/speaking' (3.1%) were frequently reported throat sensations to indicate poor VH. For 30.2% of the teachers, voice mattered for professional needs. However, most of them managed to cope with voice problems through several home remedies and 'intentional/self-imposed neglect' despite their vocal difficulties. Sociocultural factors influencing these findings and scope to escalate voice problems in teachers as a public health issue are discussed.

Conclusion and implication. Insight and perception of VH based on self-reports and information on voice practices among teachers pertinent to this geographical location provide scope to develop models for counseling and preventive treatment for voice problems.

Key Words: Vocal health—School teachers—Voice practices—Voice usage—Voice problems.

INTRODUCTION

An individual who is capable of producing a voice with ease and meets his/her personal, professional, and social expectation is considered to have a healthy voice. When vocal health (VH) is affected, it leads to voice disorders. On comparing with other vocal professionals, teachers are at a greater risk of developing voice problems nearly five times than nonteachers.^{1–8} Review of previous literature indicated that the prevalence of voice problems in teachers varies widely.^{1,9} It ranges from 11% to 50% in the United States, Australia, Nigeria, and Europe.^{10–13} Similarly, in India, 49% of teachers reported voice-related problems due to their work demand.¹⁴ The common voice concerns/problems reported are vocal fatigue (that included tiredness and weakness of voice, increased effort to talk, and difficult to sustain speech), pain, and throat irritation.¹⁴

Voice problems in teachers are majorly attributed to their use of loud voice in the class and the necessity to speak for a prolonged duration in poor acoustic environments such as background noise.^{15–18} Teachers are generally aware of the voice problems¹⁹; however, they are often necessitated to use loud continuous voice (possible phonotrauma) leading to vocal loading.² This can worsen their pre-existing voice problems (if any) or can pose threat to develop voice problems in many.^{2,10} In addition, teachers also do not undergo any formalized voice use training program²⁰ that can help educate them and help

them prevent voice problems.^{7,21} They tend to consider voice problems as an inevitable part of their occupation.¹¹

Although voice problems in teachers are found to interfere with their effectiveness at work,⁵ many avoid seeking medical advice due to logistic issues.¹⁴ Further, when teachers avail sick leave due to their voice problems, it often leads to financial consequences and mental stress.^{13,22–25} Teachers, generally, use several simple (common sense-based) strategies to cope with their voice problems in speaking situations.²⁶ In India, teachers often tend to ignore their voice problems, or live/cope with the problem temporarily by following some home remedies as their first choice to resolve voice-related issues.¹⁴ These practices were seen as a temporary remedy whenever voice problems were encountered.²⁷ They often tend to neglect voice concerns at the initial stage and seek professional help only when their voice problems hinder their teaching and other day-to-day activities.²⁸

There are about 254,178 schools in India.²⁹ Tamil Nadu (one of four Southern states of Indian subcontinent) contributes to a total of 55,667 schools with 549,691 teachers, with Chennai (Capital of Tamil Nadu) alone having 1554 schools (<https://tnschools.gov.in>).²⁹ According to United Nations Educational, Scientific, and Cultural Organization (UNESCO) and International Labour Organization (ILO), the ideal student strength in a class should not exceed 25 students.³⁰ However, considering the magnitude of student population and number of schools and teachers, meeting the prescribed teacher-to-student ratio in classrooms is almost (always) not practical in India. The probability to develop voice problems in teachers is three times higher when the classroom size and strength is increased.³⁰ In addition, teachers are unaware and are not trained to identify early vocal changes due to their insufficient formal training on VH and hygiene and added occupational demand.³¹ Therefore, teachers are unprepared to combat this potential occupational risk. Factors such as work

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demand, speaking continuously in a loud voice, compromised classroom acoustics, low teacher-to-student ratio, and stress (personal and academic) contribute to teachers developing voice problems in India.^{2,14,31–33} In addition to the regular teaching schedules of a typical school day, many teachers are involved in handling extra classes for higher secondary students and are involved in private coaching. These contribute to prolonged voice use that negatively impacts the vocal folds leading to vocal fatigue³⁴ and reduces the time for vocal recovery.³⁵ It is a known reality that the years of teaching have a direct impact on voice-related problems and further increase vocal fatigue in teachers.² Most of the teachers start their career at a young age and continue until retirement age. Further, to retain experienced teachers for longer period, the University Grant Commission (2010) has instructed to increase the age of superannuation for teachers working in Central Education Institutions to 65 years.³⁶ These occupational demands of teachers and work style of typical teachers in India could possibly be escalated as a public health issue in them.³⁷ Therefore, it is vital to provide professional guidance to teachers on voice care to prevent and treat voice problems.

Structured vocal hygiene programs are essential to increase the awareness for preserving voice and preventing voice problems in teachers.³⁸ Vocal hygiene approaches focus on identifying inappropriate vocal behaviors and eliminate the same and/or substitute it with hygienic and vocally healthy behaviors. However, it has been found that vocal hygiene strategies were not consistently followed by teachers.³⁸ Many attempts are made across the globe to customize vocal hygiene programs to facilitate effectiveness of practice of vocal hygiene among teachers.^{38–43}

Failure to successfully implement vocal hygiene programs in teachers could be attributed to two major factors as follows: (i) issues in general logistics, and (ii) issues related to personal aspects. General logistics issues include barriers imposed due to policies of school management (work hours and nature) and their expectations of teachers (commitment, productivity, and creativity), travel time and mode of travel to reach school, additional responsibilities during the work day, and vacations such as special events of the school like annual sports day, awards day, school accreditation and standards, public-related activities assigned to teachers by school management or government, and so on. The logistic factors also include environmental noise and dust, low teacher-to-student ratio, number of classes taught without breaks, and lack of facilities provided in the educational setup.³⁸ Personal factors include aspects related to age, health, lifestyle and habits, attitude and aptitude of the teacher, and so on. Several of those factors listed as issues related to logistics are explored in earlier studies.^{44,45} Implementation of vocal hygiene programs in day-to-day practice can largely be influenced by personal factors of the teachers. Personal factors such as health and lifestyle and attitude of the teacher toward the concept of VH (importance of voice) are unexplored here. Therefore, it is essential to obtain information on the practices that teachers follow to maintain VH and to prevent voice-related problems. Considering the aforementioned background, the current study aimed the following:

1. Estimate the percentage and nature of voice problems among school teachers through self-report.
2. Delineate the concept of “vocal health” (views regarding good VH, impediments to VH, importance of voice for a teacher) among school teachers.
3. Document practices followed by teachers that affect or improve VH.

METHOD

Sample size calculation and ethical clearance

The sample size of 350 was arrived upon based on the calculation for a population of 1,000,000 at 95% confidence interval. Students Ethics Committee of Sri Ramachandra University approved the study (reference number: CSP/13/MAR/27/62).

Development of VH questionnaire

In the first phase, a questionnaire was constructed in English to profile the VH of teachers. Duke's questionnaire on VH was adapted (after obtaining due permission) based on literature review and sociocultural contexts. The questionnaire had three sections that included demographic details of the teachers (age, sex, teaching experience, and classes taught), general questions related to voice (teacher's perception of their quality of voice, importance of voice, and symptoms related to throat sensations), and questions related to VH. The vocal and nonvocal practices of the teachers were categorized under “productive practices” that improved VH (water intake and steam inhalation) and “counter-productive practices” that affected VH (vocal abuse, smoking, and improper dietary habits).

The content validity of the developed questionnaire was evaluated by three speech pathologists (working in the area of voice assessment and management). The speech pathologists were asked to discuss and agree on the relevance of the questions to obtain information about the VH practices in school teachers through a consensus agreement. Based on their inputs on the contents of the questions, the questionnaire was finalized for pilot study.

The pilot study was conducted on 35 teachers, about 10% of the total calculated sample size of 350 teachers, to assess internal consistency of the questions and to assess the feasibility of carrying out the study on a large number of teachers. Thirty teachers returned the filled questionnaire. Five teachers returned incomplete questionnaire that were not filled across different sections. There was no specific trend observed in the unanswered questions. The internal consistency was assessed using Cronbach's alpha (α) for 30 completed questionnaires. Results indicated that the questionnaire had an acceptable level of internal consistency ($\alpha = 0.601$) and the questionnaire did not require any further modification (Appendix S1). The same was used for the present study.

Administration of VH questionnaire

Chennai City is divided into 15 political zones (<http://www.chennaicorporation.gov.in/deploy/CORP.war/zone/index.htm>). Two schools from each of the 15 zones were contacted.

Fifteen schools in Chennai (zone number III, VI, VII, VIII, IX, XI, and XIII) agreed to participate in the study. A total of 550 questionnaires were distributed to all teachers working in the 15 schools.

Of the 550 questionnaires distributed, 400 questionnaires were received (response rate of 69.8%), and of which, 16 were incomplete, and so these questionnaires could not be analyzed. Frequency analysis was carried out on 384 questionnaires to estimate the presence of voice problems (based on symptoms that hindered their professional activity) and percentage of productive and counterproductive practices of the teachers. Additionally, chi-square test was done to assess the presence or absence of significant correlation between lifestyle habits, presence of self-reported voice disorders, and risky vocal behaviors (such as use of loud and continuous voice in the presence of background noise).

RESULTS

General details about the teachers who participated in this study

Of the 384 questionnaires analyzed, 367 (95.6%) were answered by female teachers and 17 (4.4%) by male teachers in the age range of 22–70 years. The mean age was 41 years (± 8.78) for male teachers and 38 years (± 8.53) for female teachers. The teaching experience ranged from 5 months to 43 years (mean = 13.65 years). Of these 384 teachers, 166 teachers taught primary school students only, while 127 teachers taught high school students. A few teachers handled more than one grade.

Percentage and nature of voice problems

Onset of voice-related problems reported in teachers

In this study, the teachers provided a self-report about the presence or absence of voice problem. The presence of voice problem denoted that teachers encountered symptoms that affected their voice use in their day-to-day life and professional activity.¹⁷ Of the 384 teachers, 144 teachers (37.5%) reported presence of voice problem during the point of survey; however, 86 of these teachers were not sure about the onset and duration of the problem. Only 52 teachers reported exact details pertinent to onset of the problem. Many teachers reported that they developed voice problems in the last 1 year (35.5%) and 29% between 2 and 5 years. However, 10.03% of them could not recollect the exact time of onset and reported a perennial presence of voice problems when they strained or used voice excessively.

Description of voice quality and throat sensation

Describing the voice quality, 62.5% teachers reported that they had “normal voice.” Others reported vocal fatigue (32%), involuntary changes in pitch/loudness (7.2%), strain while speaking (4.1%), voice breaks (1.6%), and a combination of vocal symptoms (8.4%). Thirty-six percent of teachers did not experience any throat sensation-related problems. Additional symptoms such as “lump in throat” sensation and “pain while swallowing” were reported by 10.2% of the teachers. The next commonly reported throat sensation was “dry throat” (9.4%). In addition to dry throat, teachers reported other symptoms

TABLE 1.
Report of Throat Sensation-related Symptoms

Throat Sensation-related Symptoms	Percentage
Voice tires easily	13
Dry throat	9.4
Throat irritation	4.7
Pain in throat	3.1
Frequent throat clearing	1.8
Mucus in throat	1.6
Frequent coughing	1.3
Pain while swallowing	1
Tickle in throat	0.3
Lump in throat	0.2
Presence of One or More Symptoms	
Voice tires easily with other symptoms	10.2
Dry throat with other symptoms	8.5
Dry throat and tiring of voice	2.8
Other symptoms in combination	6.9

such as “frequent throat clearing,” “mucus in throat,” “throat irritation,” and so on (see Table 1).

Concept of VH

“Flexible voice” represented good VH for 87 teachers (23%), “voice with endurance” for 86 teachers (22%), and “good voice” for 85 teachers (22%). One hundred and sixty-one teachers chose more than one option as representative of VH. The second- and third-most frequently opted representations of good VH were “voice use without strain” and “comfortable voice.”

Voice usage-related aspects contributing to VH

Teachers used their voice for more than 6 hours per day (32.08%). Forty percent of teachers used their voice for 6–8 hours a day, and 37% for more than 8 hours per day. Speaking at an uncomfortably loud volume and screaming or shouting were frequently reported vocal abuse or misuse behaviors by teachers. In addition, background noise had significant influence on speaking at an uncomfortable volume ($\chi^2 = 40.85$, $P = 0.001$). The other vocal abuse and misuse and risky vocal behaviors followed by the teachers are presented in Table 2.

Practices followed by teachers that affect or improve VH

The vocal and nonvocal habits followed by the teachers were categorized under productive and counter-productive practices to VH. These were categorized based on previous literature support.^{8,14,46–48} The practices followed by teachers to facilitate and improve VH were categorized under productive practices. It included adequate water intake⁴⁹ and steam inhalation.^{50,51} Conversely, the counter-productive practices addressed possible habits that could affect VH. These included use of throat lozenges,⁵² intake of caffeinated beverages,⁵³ intake of aerated drinks,¹⁴ alcohol consumption and smoking,⁴⁶ intake of oily

TABLE 2.
Frequency of Indulging in Vocal Abuse/Misuse (in %)

Voice Use	Always/Most Often	Often	Sometimes	Hardly Ever	Never
Throat clearing	3.4	12	42.7	19.5	22.4
Coughing	0.5	4.2	48.2	30.5	16.7
Speaking at a loud volume	10.2	32.8	44.5	8.1	4.4
Whispering	0.8	2.9	33.3	27.6	35.4
Mimicry/singing	3.1	7.3	29.2	13.5	46.7
Screaming, yelling, shouting, and cheering	8.3	30.5	41.7	12.2	7.3

and spicy food,¹⁶ and reduced interval between intake of meal and sleeping.^{46,54}

Productive practices to VH

In this study, 21% of teachers had water intake of greater than eight glasses per day, 43% reported intake of six to eight glasses per day, and 28% had intake of four to six glasses. Thirty-six percent of teachers drank less than six glasses of water on a daily basis. Teachers who used their voice for longer hours had more intake of water ($\chi^2 = 49.65$, $P = 0.000$). However, there was no significant relationship between hours of voice usage and quantity of water intake ($\chi^2 = 19.42$, $P = 0.247$). Steam inhalation is an additional method of hydrating the vocal apparatus. Teachers practiced steam inhalation at various frequencies (28.4% practiced occasionally, 2.6% more often, 3.4% frequently, and 37.5% did not practice steam inhalation).

Counter-productive practices to VH

Forty-five percent of teachers refrained from using throat lozenges. Eighty-eight percent of teachers reported intake of caffeinated beverages. Fifty-nine percent of them reported intake of less than two cups of caffeinated beverages per day, 26.8% had three to five cups per day. The number of teachers reporting intake of carbonated beverages was even lesser (11%). Of the 384 teachers, 383 teachers refrained from intake of alcohol and 382 teachers reported that they did not smoke cigarettes. The teachers in the study reported intake of oily and spicy food at different frequency: 2.1% reported intake of oily and spicy foods more often, 17% often, and 70.1% reported an occasional intake. Forty-five percent of teachers followed a healthy practice of maintaining interval of 2 hours or more between meals and sleep. Of the remaining teachers, 32% allowed an interval of 1 hour, 19% within $\frac{1}{2}$ hour, and 2% immediately after meal.

DISCUSSION

The objective of the present study was to profile the concept of VH in teachers with voice problems in Chennai, India. School teachers were included from 15 political zones in Chennai City to consider representation of the population.

Previous studies suggest that more female teachers report voice problems compared to male teachers.^{2,55–58} In this present study, a similar trend was observed. Apart from physiological reasons explained in previous literature, the reason for this

finding could also be owing to a policy decision of the government (for other reasons like improved work opportunities, education, empowerment of women, and so on) to employ more female teachers than male teachers in Tamil Nadu.⁵⁹ There were also more female respondents (95.6%) in this study, so it is likely that voice problems in female teachers be reported proportionately high.

Percentage and nature of voice problems among school teachers

The prevalence of voice problems in teachers ranged from 15% to 80%.^{2–5,14,31,60–67} In the present study, teachers in the age range of 31–40 years and teachers above 50 years of age reported voice problems. This was similar to the findings of earlier studies.^{2,68} However, there was a drop in the percentage of teachers above 50 years who reported voice problems. Elderly teachers (teachers above 60 years of age) were at a higher risk of developing voice problems⁶⁸; however, this study could not provide any such support as this study had responses from two elderly teachers only.

Few teachers were unable to recollect the exact time of onset of voice problem. This probably indicated that the voice problems could have been episodic or gradual in onset. Also, most often, these teachers did not remember the factors that related to the onset of the problems, and so they did not seek professional consultation closer to the onset.

Vocal fatigue, dryness of throat, voice breaks, throat discomfort, and a rough-sounding voice were commonly reported symptoms by teachers.^{14,69} In addition, teachers had difficulty speaking in a low voice and had “effortful voice.”⁷⁰ In this present study, “straining to speak” was another common reported symptom by teachers. The potential reasons that lead to develop these symptoms could be attributed to phonotrauma-related factors and vocal loading that is common in teaching profession.^{2,71,72} Teachers felt that continuous voice use was a factor that contributed to voice problems¹² and teachers are often compelled to use voice in a more traumatizing, risky manner (abuse and misuse of their voice) on daily basis to meet the work demand. Provisions of amplification devices in classrooms to address a large class (compromised teacher-to-student ratio) are minimal in many schools. Further, aspects like chalk dust/powder, poor room acoustics, and teaching for prolonged periods are inevitable in a situation like in India, and these further increased the chances of developing

a problem. Teachers who worked in rooms with poor acoustics, dusty environments, and dryness of air had greater chances of episodic or permanent voice problems.⁷³

Concept of “vocal health” among school teachers

Flexibility in usage of voice, strength to use voice throughout the day, and using voice without strain represented VH for majority of the teachers. Teachers also chose representations of good VH as “voice use without strain” and “comfortable voice.” This indicated that the capacity to use voice for their profession was more identified as determiner for VH than voice quality. Therefore, it is pertinent to explore vocal fatigue as an important symptom over changes in vocal quality for early detection of voice problems in teachers. Many teachers in the study were unaware regarding the onset and duration of voice problem. It was common for teachers to consider the voice problem to be a part of their profession.⁶² This was an important barrier for teachers to seek professional help despite the adverse effect of voice problem on their professional performance.⁷⁴ In addition, teachers with voice problems were unaware of treatment options.^{62,75} Further, teachers had to take leave from their work for habilitation, which had economic consequence to them.⁷ Several such barriers for voice care can be overcome by involving school speech language pathologist for early diagnosis and treatment for voice problems in teachers.⁶²

Voice usage-related aspects contributing to VH

The teachers had to engage in risky vocal behaviors on a daily basis. The most commonly reported behaviors included speaking at an uncomfortable volume for prolonged duration, screaming, yelling, and throat clearing.⁷⁶ Studies have reported that higher background noise, poor room acoustics, unavailability of public addressing systems, and noise made by students (common in primary grades) were common contributing risk factors for developing voice problems in teachers.^{18,77–79} These behaviors in turn increase vocal loading in teachers.⁸⁰ In addition to the classroom teaching, teachers undertake tuition/additional classes for students in the evening for financial compensation. These socioeconomic and logistic factors in India complicate the issue and allow one to assume a logical escalation of voice problems in teachers as a social disorder.

Practices followed by teachers that affect or improve VH

Information on existing VH practices is crucial to facilitating and imparting VH education for teachers. Maintaining adequate hydration is important to avoid developing vocal pathologies. Increased and frequent intake of water is necessary especially in tropical countries like India.³⁸ However, only few teachers had adequate water intake on a daily basis. Lack of access to proper sanitation facilities in schools and during travel could possibly create burden for female teachers to consume less amounts of water.

Although steam inhalation exhibits positive effect on voice quality,⁵⁰ only 1% of teachers practiced steam inhalation to prevent voice problems. The process of steam inhalation could

be cumbersome, time consuming, and difficult to practice in a school setup. In addition, lack of knowledge on the importance of surface hydration of the vocal apparatus is a factor for teachers not to practice steam hydration regularly. Consequently, to maintain adequate hydration, majority of teachers preferred intake of water compared to steam/vapor inhalation.

In India, despite overstated media propagation for use of throat lozenges, majority of teachers refrained from using throat lozenges that often lead to drying of the vocal apparatus. Teachers followed healthy practices of not indulging in intake of excess carbonated drinks and coffee that increase the chances of dehydration and in turn lead to voice-related problems.⁸¹ However, teachers consumed oily and spicy food—part of Indian everyday cuisine. “Ready-to-eat” packaged and processed food available to people in India may lead to gastroesophageal reflux disorder.⁸² Individuals with gastroesophageal reflux disorder experience hoarseness of voice and may develop voice-related problems.⁸¹ “Social drinking” (consumption of alcohol) is not a well-accepted practice as a teacher (“guru” who serves as a model to the students/shishyas) in India. This could be a reason that majority of the teachers in this study refrained from intake of alcohol and smoking.

CONCLUSION

In India, school teachers have a high risk of developing voice problems with a prevalence of 37.5%. Teachers reported voice problems when they encountered voice-related symptoms and when they were unable to meet their professional demand. It is vital to inculcate the aspects of “vocal health” in teachers for early diagnosis and preventive treatment. Socioculturally relevant contributing factors for developing voice problems are documented. Since most of the contributing factors are related to use of voice and lifestyle habits, they can be prevented by systematically inculcating tailor-made vocal hygiene programs. To establish such programs, this information on VH practices and the concept of VH will provide opportunities to reflect and modify vocal hygiene instructions/programs for teachers.

APPENDIX. SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at [doi:10.1016/j.jvoice.2018.04.005](https://doi.org/10.1016/j.jvoice.2018.04.005).

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