Anderson, K., Reimer, C., Carlson, K. J. & Dowdall, J. R. (2024). Targeted vocal education for voice disorder prevention in educators. *Educational Research: Theory and Practice, 35*(2), 1-7.

Targeted Vocal Education for Voice Disorder Prevention in Educators

Kayley Anderson, Camilla Reimer, Kristy J. Carlson, and Jayme R. Dowdall

University of Nebraska Medical Center USA

Abstract: *Teachers are at high risk of voice disorders due to the heavy vocal demand of their profession as well as diverse classroom conditions that can stress the voice. Healthy vocal hygiene practices reduce this risk, but many teachers lack knowledge in these areas or have misconceptions about ways to improve their vocal health. This study aimed to identify knowledge deficits among teachers, and directly address topics with poorest performance to better generate vocal health resources for teachers and improve their overall vocal health.*

Keywords: vocal health, educators, vocal knowledge, areas for targeted education

LITERATURE REVIEW

Vocal disorders are common in the general population, but many individuals do not receive appropriate treatment. Published studies have highlighted an increased prevalence of vocal symptoms among educators when compared with other professions (Alva et al., 2017; Roy et al., 2004; de Brito Mota et al., 2018). Due to variable study definitions, comparison of vocal disorder rates can be difficult to generalize between studies, but the consensus is that voice symptoms are exceedingly common, with a lifetime prevalence greater than 80% for educators (Alva et al., 2017). Common vocal symptoms include vocal fatigue, strained voice, dry or painful throat, difficulty projecting or producing high frequencies, and hoarseness (Tavares et al., 2007;Alva et al., 2017; de Brito Mota et al., 2018). Voice disorders have been reported in up to 64% of educators in various studies with 80% experiencing some degree of negative vocal symptoms during their teaching career (Alva et al., 2017; Roy et al., 2004; de Brito Mota et al., 2018).

Voice disorders among educators have also been associated with deterioration of quality of life and job satisfaction measures (Alva et al., 2017). Some changes are directly related to the impact of the physical symptoms, or the ability to complete necessary tasks of the profession themselves including increased sick day usage, avoidance of verbal communication, and changes in teaching style (Alva et al., 2017). Others result in deterioration of wellness due to concurrently reported poor mental health status, feelings of burnout, and difficult emotional regulation (Alva et al., 2017; de Brito Mota et al. 2018). Additionally, those experiencing vocal symptoms report dissatisfaction with personal job performance, changed outlook on their career, and consideration for an earlier retirement (Alva et al., 2017). Based on these reports it is clear that voice disorders

Correspondence concerning this article should be addressed to Kayley Anderson, E-mail: kayley.anderson@unmc.edu

and vocal symptoms have an all-encompassing burden on the lives of educators and is therefore a vitally important topic to address.

Educators' predisposition for vocal symptoms is multifactorial. The most common contributing environmental factors include high background noise levels in classrooms, large class size, increased frequency and duration of classes, poor classroom acoustics, and classroom ventilation or cleanliness (Tavares et al., 2007; Porcaro et al., 2021; Moreno et al. 2022). All of these factors require educators to use their voice more or speak loudly leading to potential for strain and subsequent development of a specific vocal symptom or even vocal disorders (Tahamtan et al. 2023; Bolbol et al. 2017) . Nonenvironmental contributing factors include prior vocal disorders, use of loud speaking voice, extended teaching career, and preexisting medical conditions (Moreno et al., 2022; de Brito Mota et al., 2018; Porcaro et al., 2021; Karatayli-Ozgursoy et al., 2022; Alva et al., 2017).

This risk of developing voice disorders is likely compounded when educators also participate in formal or informal vocal performance. These activities include membership in a volunteer choir and/or paid positions in local theater groups. In all cases, educators who perform use their voice more than they would just with teaching alone. Risk among all performers is elevated due to their heavy vocal load and poor vocal hygiene knowledge (Pestana et al., 2017; Ravall et al., 2018;& Sharma et al. 2021). Therefore, the additive effects of both teaching and performing make this population some of the highest risk individuals for the development of voice disorders.

Studies evaluating the efficacy of educational programing on vocal hygiene practices among teachers have revealed promising results. Analysis of knowledge before and after educational programing showed improved understanding as well as an increase in preventative behaviors (Bolbol et al., 2017; Porcaro et al., 2021; Karatayli-Ozgursoy et al., 2022). Of those already experiencing negative voice symptoms, voice treatments either through physician or speech language therapy led to a reduction in symptoms and improved quality of life (Woznicka et al., 2012). However, despite potential for positive impact, educators do not frequently access healthcare to address vocal symptoms, with less than 15% having sought help from a physician or speech language pathologist in the past (Roy et al., 2004).

One theory for the lack of utilization of healthcare driven therapies is the sources of information that performers have for vocal health are vastly different depending on performer demographics. Studies have shown distinct differences in preferences for sources of vocal health knowledge between amateur and profession performers, with professionals being more likely to seek advice from other vocal professionals, voice coaches and healthcare professionals (Edgar et al., 2021). Amateur performers were more likely to use popular media or social media to source information (Edgar et al., 2021). Age also plays a role considering millennials are more likely to turn to the internet for vocal health information and older generations prefer those they perceive as experts, including vocal coaches (Edgar et al., 2021). All groups studied, however, fell prey to at least some misinformation regarding vocal health further highlighting the need for accessible and factual vocal health information to be made available to performers (Edgar et al., 2021).

The aim of this study was to assess the knowledge base for teachers and identify the most misunderstood topics to target future education to prevent vocal symptoms. Teachers who concurrently participate in vocal performance are at extremely high-risk for vocal symptom development and could benefit from specific voice health education to aid in prevention of voice disorders.

METHODOLOGY

An anonymous electronic survey regarding vocal health was distributed by email and social media to vocal performers within the Midwestern state of Nebraska. Fifty-one subjects who identified themselves as both an educator and participant in vocal performance activities were included within the study sample. An 18-item true-or-false vocal health knowledge assessment was completed by all respondents and scores were quantified for each question to identify topics that were the most missed among participants. Correct answers for 9 items were false and 9 items were true. Questions were crafted based on popular misconceptions or techniques that impact vocal health used in previously published studies (Ranfarathnam et al., 2018; Ravall et al., 2020; Sharma et al., 2021; Neto et al. 2017). The most missed topics were identified based on the lowest number of correct answers.

DATA ANALYSIS

The average score for the vocal health assessment among our 51 self-identified teacher and vocal performer participants was 63.2% for an average of roughly 11 of 18 statements correctly identified as true or false (See Table 1). We identified the four most missed statements as areas for potential intervention: 1) Shouting or speaking loudly can be good for building healthy voice techniques;2) It is best to be silent for 24 hours when your voice feels tired or hoarse; 3) Gentle stretching of the legs can improve voice quality; and 4) Warming up the voice prior to singing takes a minimum of 20 minutes. All other questions were answered correctly by the majority of respondents as reflected in Table 1.

DISCUSSION

Vocal disorders lead to significant morbidity among educators affecting both their physical and mental health. The impacts of vocal symptoms on physical health include increased sick leave and avoidance of interpersonal communication. These physical symptoms are also intimately tied to the mental and emotional well-being of educators and performers. This may manifest as poor job satisfaction, difficulty in emotional regulation, decreased self-perception of adequate teaching performance, feelings of isolation due to avoidance of interpersonal communication, and experiences of psychiatric burnout (Alva et al., 2017;de Brito Mota et al., 2018). Our study specifically investigated the vocal health knowledge of 51 self-identified educators. Due to the sampling method used, some of those who qualify may not have participated. Those who did participate may have done so due to presence of vocal disorders affecting their own career or more of their educational duties being focused around voice as compared to others.

Any steps to reduce vocal disorders among this population are vitally necessary. Increasing treatment awareness can help to increase rates of teachers who seek vocal healthcare leading to a reduction in vocal symptoms among teachers already experiencing them (Woznicka et al., 2012). However, prevention is still the ideal mechanism of reducing educators' vocal burden. The evidence suggests educating this group on vocal hygiene may lead to implementation of good voice practices into teaching and everyday activities, reducing the incidence of vocal disorders in this population. (Porcaro et al., 2021; Bolbol et al., 2017; Karatayli-Ozgursoy et al., 2022). Therefore, efforts to provide targeted educational programing to teachers based on misperceptions is a reasonable first step in voice disorder prevention.

Table 1
True/False Knowledge Assessment Items and Total Correct Responses (n = 51)

Question Statements (True/False)	Correct Answer	Total Correct (%)
Shouting or speaking loudly can be good for building healthy voice techniques.	True	11.8
It is best to be silent for 24 hours when your voice feels tired or hoarse.	False	19.6
Gentle stretching of the legs can improve voice quality.	True	31.4
Eating just before going to sleep can affect my voice negatively.	True	52.9
A majority of injuries to the vocal cords occur while talking.	True	60.8
Coughing is unhealthy for your voice.	True	62.7
Singing pop music or belting is bad for the voice.	False	64.7
There is no treatment for voice changes due to aging.	False	66.7
Meditation can help you relax, but it does not have any impact on the voice.	False	68.6
Vocal warm-ups are best when individualized.	True	74.5
Chronic neck and shoulder pain has little impact on the voice.	False	74.5
A person's emotional state can be detected by their voice quality.	True	76.5
Having a cool down routine following practice or rehearsal sessions can help the voice recover faster when fatigued.	True	80.4
Talking all day provides an adequate warm-up for singing.	False	80.4
It is important to warm up your voice only in the range you plan to sing.	False	86.3
The total amount of time spent talking and singing each day can affect vocal health.	True	90.2
"Projecting" your voice requires straining.	False	98.0
Total Overall Score		**63.2**

Our study specifically investigated the vocal health knowledge of 51 self-identified educators. Due to the sampling method used, some of those who qualify may not have participated. Those who did participate may have done so due to presence of vocal disorders affecting their own career or more of their educational duties being focused on voice as compared to others. It is also possible that this population's vocal health knowledge may be different from those not sampled. Regardless providing targeted education can still be beneficial to the vocal health of educators in the long term.

FULL BODY MUSCULOSKELETAL CONNECTION TO VOICE FUNCTION

While most respondents identified a negative effect of chronic neck and shoulder pain on voice, almost 70% of teachers did not believe that leg stretching would impact the voice quality. Nelson (2018) describes how excess tension in one part of the body can be dispersed, leading to tension in the vocal folds and by extension vocal strain. Therefore, the release of tension through

gentle leg and full body stretching can result in improved voice quality and is a low-cost way to improve vocal health in this population.

PROPER TREATMENT OF VOCAL FATIGUE OR HOARSENESS

Over 80% of respondents thought 24 hours of silence is the recommended treatment for vocal fatigue or hoarseness. Complete vocal rest is only used as a supplementary treatment in some cases of vocal fold hemorrhage or after vocal fold surgery (Huntzinger, 2010). It should never be used as a primary treatment. Rather, the American Academy of Otolaryngology-Head and Neck Surgery recommends preventative and supportive measures early in treatment course. ENT evaluation for hoarseness lasting greater than 3 months or hoarseness causing significant vocal dysfunction is also recommended (Huntzinger, 2010). Some of these preventative measures include using humidification or moisture regiments, controlling acid reflux symptoms, maintaining proper hydration, and avoiding things that can irritate the vocal folds such as smoke or other pollutants (Huntzinger, 2010). Supportive measures can include lubrication of the vocal folds with honey or teas and reduction, but not complete elimination of vocal load (Huntzinger, 2010).

VOCAL PROTECTION TECHNIQUES

While nearly all (98._%) of participants understood that projecting does not require straining the voice, only 11.8% of teachers correctly identified that shouting could help build healthy vocal techniques. Certain techniques including anchoring of the head and torso to stabilize the larynx and improve respiratory function can allow for "safe" shouting that can build sustainability and efficiency in those with high vocal burden like educators (Martínez-Arellano et al., 2022). This is because it prevents the vocal tract from being put under stress or at risk for damage (Martínez-Arellano et al., 2022). Learning these techniques can help educators with differing levels of classroom noise to better strength their voice and protect it from damage when using higher volumes.

PROPER SINGING WARMUPS

Considering preparation for heavy vocal use, 74.5% of educators believed that individualized warmups were best, but only 37.3% of participants correctly identified that warmups do not have a set time length to be successful. Studies that have looked at vocal warmups effect on singing performance have shown that warm up length does not create a significant difference in singer power ratio or vocal fatigue as long as adequate exercises are performed (Duke et al., 2015). Rather it is more important that vocal warmups are comprehensive and a regular part of preparation before heavy vocal use such as teaching or performing.

CONCLUSIONS

Vocal health is vitally important to the overall wellbeing of teachers. This study revealed common voice knowledge deficits regarding concepts of vocal technique development, singing warmups, treatment of fatigued voice, and physical impacts of the body on the voice. These categories show the need for education both on vocal fatigue and symptom prevention as well as treatment once symptoms have begun. Specific education on these topics will help to mitigate the increased occupational risk attributed to the voice of educators, especially those who all participate in vocal performance.

REFERENCES

Alva, Arati et al. "Study of Risk Factors for Development of Voice Disorders and its Impact on the Quality of Life of School Teachers in Mangalore, India." *Journal of clinical and diagnostic research : JCDR* vol. 11,1 (2017): MC01-MC05. doi:10.7860/JCDR/2017/17313.9234

Bolbol, Sarah A et al. "Risk Factors of Voice Disorders and Impact of Vocal Hygiene Awareness Program Among Teachers in Public Schools in Egypt." *Journal of voice : official journal of the Voice Foundation* vol. 31,2 (2017): 251.e9-251.e16. doi:10.1016/j.jvoice.2016.07.010

de Brito Mota, Aline Ferreira et al. "Voice Disorder and Burnout Syndrome in Teachers." *Journal of voice : official journal of the Voice Foundation* vol. 33,4 (2019): 581.e7-581.e16. doi:10.1016/j.jvoice.2018.01.022

Duke, E., Plexico, L. W., Sandage, M. J., & Hoch, M. (2015). The Effect of Traditional Singing Warm-Up Versus Semioccluded Vocal Tract Exercises on the Acoustic Parameters of Singing Voice. *Journal of voice : Official journal of the Voice Foundation*, *29*(6), 727–732. https://doi.org/10.1016/j.jvoice.2014.12.009

Huntzinger, Amber. "Guidelines for the Diagnosis and Management of Hoarseness." *American Family Physician*, 15 May 2010, www.aafp.org/pubs/afp/issues/2010/0515/p1292.html.

Martínez-Arellano, Ana, et al. "Describing the acoustic and vocal production characteristics of the irrintzi: Feasibility of its use for the treatment of voice disorders." Journal of Speech, Language, and Hearing Research, vol. 65, no. 10, 2022, pp. 3789–3797, https://doi.org/10.1044/2022_jslhr-21-00394.

Moreno, Milena et al. "Systematic Review of Literature on Prevalence of Vocal Fatigue Among Teachers." *Journal of voice : official journal of the Voice Foundation*, S0892-1997(22)00231-4. 19 Sep. 2022, doi:10.1016/j.jvoice.2022.07.029

Karatayli Ozgursoy, Selmin et al. "The Effect of Vocal Hygiene Training Via Videoconference in Teachers' Voices." *Journal of voice : official journal of the Voice Foundation*, S0892-1997(22)00110-2. 14 May. 2022, doi:10.1016/j.jvoice.2022.04.007

Nelson, Samuel H., and Elizabeth L. Blades. "Tension and Function." *Singing with Your Whole Self: A Singer's Guide to Feldenkrais Awareness through Movement*, Rowman & Littlefield, Lanham, MD, 2018.

Pestana, Pedro Melo et al. "Prevalence of Voice Disorders in Singers: Systematic Review and Meta-Analysis." *Journal of voice : official journal of the Voice Foundation* vol. 31,6 (2017): 722-727. doi:10.1016/j.jvoice.2017.02.010

Porcaro, Connie K et al. "Impact of Vocal Hygiene Training on Teachers' Willingness to Change Vocal Behaviors." *Journal of voice : official journal of the Voice Foundation* vol. 35,3 (2021): 499.e1-499.e11. doi:10.1016/j.jvoice.2019.11.011

Ravall, Sofie, and Susanna Simberg. "Voice Disorders and Voice Knowledge in Choir Singers." *Journal of voice : official journal of the Voice Foundation* vol. 34,1 (2020): 157.e1-157.e8. doi:10.1016/j.jvoice.2018.07.005

Roy, Nelson et al. "Prevalence of voice disorders in teachers and the general population." *Journal of speech, language, and hearing research : JSLHR* vol. 47,2 (2004): 281-93. doi:10.1044/1092-4388(2004/023)

Sharma, Vasudha et al. "A survey of vocal health in church choir singers." *European archives of oto-rhino-laryngology : official journal of the European Federation of Oto-Rhino-*

Laryngological Societies (EUFOS) : affiliated with the German Society for Oto-Rhino-Laryngology - Head and Neck Surgery vol. 278,8 (2021): 2907-2917. doi:10.1007/s00405-021-06770-0

"Statistics and Facts about Nebraska Schools 2022-2023 - Education.Ne.Gov." Nebraska Department of Education: Data Reports, Nebraska Department of Education, 9 Aug. 2023, www.education.ne.gov/wp-content/uploads/2023/01/Statsfacts_20222023.pdf.

Tahamtan, Mahdi et al. "Vocal Tract Discomfort Symptoms in Elementary and High School Teachers." *Journal of voice : official journal of the Voice Foundation* vol. 37,1 (2023): 68-78. doi:10.1016/j.jvoice.2020.11.009

Tavares, Elaine L M, and Regina H G Martins. "Vocal evaluation in teachers with or without symptoms." *Journal of voice : official journal of the Voice Foundation* vol. 21,4 (2007): 407-14. doi:10.1016/j.jvoice.2006.04.001

Woznicka, Ewelina et al. "Applicability of the vocal tract discomfort (VTD) scale in evaluating the effects of voice therapy of occupational voice disorders." *Medycyna pracy* vol. 63,2 (2012): 141-52.