

Original Research Article

Prevalence and factors of vocal symptoms amongst school teachers in the United Arab Emirates: a cross-sectional study

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ABSTRACT

Background: Teaching is an occupation that mainly relies on one to use one's voice as a tool. Hence, teachers are at a greater risk than most for developing a voice disorder. This study determined the prevalence and risk factors of vocal symptoms among schoolteachers.

Methods: A cross-sectional study including 318 teachers and a self-reported questionnaire was used to collect data over six months. The chi-square test was used to assess the association. Logistic regression was used to determine the degree of association. $P \leq 0.05$ was considered statistically significant. Informed consent was taken from all participants, and ethics approval was obtained from the International Review of Boards Committee.

Results: 77.4% of the teachers suffered from vocal difficulties during their teaching careers. Years of teaching, class size, and behavioral factors such as stress, exerting extra muscular pressure while talking, speaking in a loud tone, weather conditions, and health conditions such as tonsillitis were significantly associated with the prevalence of vocal symptoms in teachers.

Conclusions: The prevalence of vocal symptoms was found to be very high. It was directly proportionate to the number of years of teaching; behavioral factors such as talking loudly, being stressed while teaching, and applying extra pressure on the neck muscles and weather conditions all impacted acquiring vocal symptoms.

Keywords: Vocal symptoms, Teaching, Stress, Tonsillitis, Weather

INTRODUCTION

Voice comprises one of the key communication mediums between living beings, serving as a vital development, social, and occupational tool. Among various professions worldwide, occupational voice users are the most vulnerable group to develop vocal difficulties at some point. Teachers, one of the occupational voice users, are reported to have a high risk of developing vocal difficulties. As they constitute a significant portion of the working population, it is vital to understand the association of their occupation with vocal disorders. A cross-sectional study in the United States on a random

sample found that teachers had a higher prevalence of vocal symptoms (11.0%) than those who were not teachers (6.2%) and that the lifetime prevalence of voice disorders in teachers was 57.7%, which was also higher than that in the non-teacher reference group of 28.8%.¹

A meta-analysis study has shown the association of several risk factors influencing the development of vocal issues, such as sociodemographic factors (gender), health conditions (URTI), occupational environment (noise, increased teaching hours & years of teaching), and health behaviors (shouting or yelling while teaching).² Female teachers had a 1.6-fold higher risk of voice disorders than

male teachers, those who shouted while teaching had a 2.1-fold higher risk of voice disorders than those who rarely shouted, teachers who gave lectures 20h or more had 1.6 fold higher chance of voice disorders than those teaching <20h, etc.² Another study in Malaysia revealed those with voice disorders were more likely to have anxiety coinciding the result with two other studies in Europe and Egypt.³⁻⁵

Our purpose in conducting this study was to find the prevalence of vocal symptoms amongst teachers in the United Arab Emirates (UAE) and to identify the significant risk factors associated with it.

METHODS

Study design

A cross-sectional study conducted between September 2018 and October 2019 used a self-administered questionnaire. We recruited teachers from Woodlempark School and The Emirates National school in the emirate of Sharjah and Ajman respectively.

Inclusion and exclusion criteria

The teachers of different levels of schooling, such as kindergarten, primary, and secondary, of both genders and all nationalities were included in the study. Teachers who were not willing to participate were excluded.

Variables

The information collected includes various teaching-related factors such as class size, teaching hours, external noise, loud tone, and extra muscular pressure. Other variables included were the conditions during different weather and tonsillitis. We also collected information related to the weather conditions and the presence of conditions such as tonsillitis. In addition to this, sociodemographic factors were collected.

Ethical approval

The ethical approval was obtained from the Institutional Review Board (IRB) of the Medical University. We sought informed consent from the participants and ensured the confidentiality and anonymity of the data.

Pilot study

We conducted a pilot study among five teachers to identify and rectify any issues or limitations in the study instrument.

Study size

The sample size was calculated using the formula $4pq/L^2$. The prevalence rate from the previous study was 60.2%,⁶ $L=0.05$. The total sample was 460 teachers, including a

20% non-response rate. However, our sample size obtained was 318, with a 69% response rate.

Statistical methods

Data was analyzed using SPSS software (version 24). Descriptive statistics were used. Results were expressed in frequency and percentages. The chi-square test assessed the association between factors and voice symptoms. A Binary logistic regression analysis was done to calculate the crude and adjusted odds ratio.

RESULTS

The total number of samples collected was 299. Most participants, 124 (41.5%), are between 30-39 years of age, and 94.2% (294) of the study group were females. Most participants are from India (88.1%), and 11.9% are from other nationalities. Amongst the study population, 98.4% (304) were married (Table 1).

Table 1: Distribution of socio-demographic factors of the schoolteachers.

Variables	Distribution	Frequency	%	Total
Age (in years)	20-29	30	10	299
	30-39	124	41.5	
	40-49	112	37.5	
	50 +	33	11	
Gender	Female	294	94.2	312
	Male	18	5.8	
Nationality	Indian	273	88.1	310
	Others	37	11.9	
Marital status	Married	304	98.4	309
	Single	5	1.6	

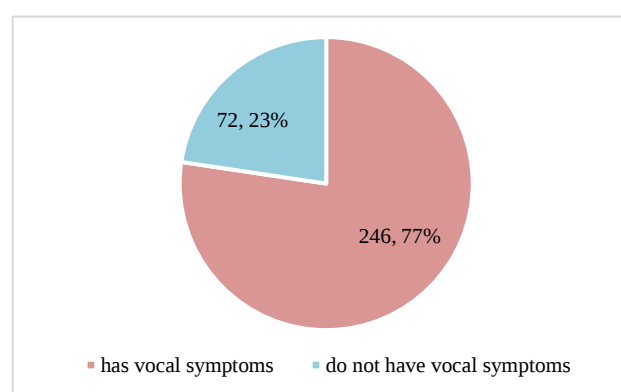


Figure 1: Prevalence of teachers who experienced vocal difficulty in their teaching career.

About 77.4% (246) of the teachers suffered from vocal difficulties, and 22.6% (72) of them have not had trouble with their voice during their career (Figure 1).

Table 2 shows the association between the variables and the prevalence of vocal symptoms. The significant risk factors were years of teaching, class size, stress, extra

muscular pressure, loud tone, weather conditions, and tonsillitis. Almost 80% of the teachers with 6-20 years of experience in teaching were more affected by vocal symptoms ($p<0.05$). The vocal symptoms were more common among the teachers who handled the classes with more than 35 students. The vocal symptoms were

more prevalent among teachers (88.4%) who had class sizes above 35 students ($p<0.05$). About 94.3% of the teachers used extra muscular pressure when teaching, 80.5% used a loud tone, 83.3% reported during weather conditions, especially winter, and those already have tonsillitis, i.e., 92% had exhibited vocal symptoms.

Table 2: Association between selected variables and the prevalence of vocal symptoms.

Factors	Prevalence of vocal symptoms		P value
	No	Yes	
	% (N)	% (N)	
Age (in years)			
20-29	23.3 (7)	76.7 (23)	NS
30-39	23.4 (29)	76.6 (95)	
40-49	18.8 (21)	81.3 (91)	
50+	33.3 (11)	66.7 (22)	
Gender			
Female	22.8 (67)	77.2 (227)	NS
Male	27.8 (5)	72.2 (13)	
Year of Teaching			
1-5	28.4 (21)	71.6 (53)	<0.05
6-10	18.2 (18)	81.8 (81)	
11-15	16.4 (10)	83.6 (51)	
16-20	16.3 (7)	83.7 (36)	
20+	38.7 (12)	61.3 (19)	
Class size			
<15	20 (10)	80 (4)	<0.05
15-25	32.9 (24)	67.1 (49)	
25-35	24 (37)	76 (114)	
35+	11.6 (10)	88.4 (76)	
Teaching hours			
1-3	33.3 (11)	66.7 (22)	NS
4-6	23.2 (56)	76.8 (185)	
7-9	11.9 (5)	88.1 (37)	
External noise			
No	23.2 (65)	76.8 (215)	NS
Yes	18.4 (7)	81.6 (31)	
Stress			
No	30.8 (20)	69.2 (45)	<0.05
Always	25 (2)	75 (6)	
Sometimes	14.2 (19)	85.8 (115)	
Rarely	27.6 (27)	72.4 (71)	
Extra muscular pressure			
No	37 (30)	63 (51)	<0.05
Yes	5.7 (6)	94.3 (100)	
Sometimes	26.9 (35)	73.1 (95)	
Loud tone			
No	41.4 (12)	58.6 (17)	<0.05
Yes	19.5 (30)	80.5 (124)	
Sometimes	21.6 (29)	78.4 (105)	
Weather condition			
No	37.4(34)	62.6 (57)	<0.001
Yes	16.7 (38)	83.3 (189)	
Tonsillitis			
No	33.3 (47)	66.7 (94)	<0.05
Yes	7.2 (6)	92.8 (77)	

Table 3: Crude odds ratio & adjusted odds ratio.

Factors	Crude Odds Ratio			Adjusted Odds Ratio		
	OR	CI	P value	OR	CI	P value
Years of teaching						
<5 years (R)	1			1		
5-10	1.59	0.6 - 3.8	0.30			
11-15	2.84	1.1 - 6.8	0.02			NS
16-20	3.22	1.2 - 8.6	0.02			NS
20+	3.24	1.1 - 9.6	0.03			
Class size						
<15 (R)	1					
15-25	0.58	5.5 - 0.6	0.63			
25-35	0.92	8.5 - 0.9	0.93			
35+	1.9	0.2 - 18.7	0.58			
Stress						
No (R)	1					
Always	1.33	0.3 - 7.2	0.74			
Sometimes	2.69	1.3 - 5.5	0.01			NS
Rarely	1.2	0.6 - 2.3	0.66			
Extra muscular pressure						
No (R)	1			1.0		NS
Yes	9.80	25.1 - 3.8	<0.001			
Loud tone						
No (R)	1			1.0		NS
Yes	2.92	1.3 - 6.8	0.12			
Sometimes	2.56	1.1 - 5.9	0.30			
Weather conditions						
No (R)	1			1.0		
Cold weather	3.83	1.8 - 8.4	<0.001	5.38	1.4 - 21.4	<0.005
Tonsillitis						
No (R)	1			1.0		
Yes	3.25	1.2 - 8.6	0.02			NS

The results of the binomial logistic regression analysis are given in Table 3. Those with 20-plus years of teaching had three times (CI: 1.1-9.6, 95%) more risk for vocal symptoms than those with less than five years of teaching. Teachers who reported stress had a 1.6 (CI: 1.3-5.5, 95%) times risk, while those who used extra muscular pressure when teaching had about 9.8 (CI: 3.8-25.1, 95%) times risk for vocal symptoms than their counterparts. Those who had tonsillitis also had 3.2 (CI: 1.2-8.6, 95%) times more chance of vocal symptoms, while cold weather conditions contributed a risk of 5.3 (CI: 1.4-21.4, 95%) times when adjusted with other variables. Symptoms such as sinusitis, allergy, and GERD reported in the study were insignificant.

DISCUSSION

This study found that 77% of the teachers had vocal symptoms, and the critical risk factors were years of teaching, extra muscular pressure, weather conditions, and conditions like tonsillitis. The proportion of teachers who experienced vocal difficulties during their teaching careers was relatively high. A similar finding went with

many other studies conducted in different countries amongst teachers, including Spain, India, and Latvia.⁷⁻⁹ The significant factors proven in this study are the number of years the teachers taught, student strength in the class, the pressure exerted by external muscles while teaching, teaching in a loud tone and suffering from tonsillitis. Cold weather was, in fact, highly significant in our study.

This study found that years of teaching are directly proportional to vocal symptoms. It coincided with a study conducted on 226 schoolteachers in Brazil, which found that teaching for more than 15 years was an associated factor for those with chronic voice problems.⁶

Almost half of the teachers who participated in the study taught a class strength of 25 to 35, indicating that an increased number of students in a classroom requires more vocal usage, hence a more significant occurrence of vocal symptoms. The highest prevalence rate for vocal symptoms was seen in teachers who taught a class of more than 35 students, which is again logical. The pattern of increasing prevalence rate of vocal symptoms in

higher-order class sizes is relatable to another similar study conducted in Goa, India, where the percentage of teachers having vocal disorders increased as the number of students increased.¹⁰

Stress is proven to be related to vocal disorders. It can negatively influence the voice by altering the phonation pattern and causing dysphonia. Our data is supported by other studies based in other countries. A study in Finland showed that stress increased the risk of voice disorders in teachers by 3.6 times. The relationship between voice disorders and stress was more substantial than that of respiratory issues like asthma and allergic rhinitis, which usually lead to a greater risk of voice problems.¹¹ Also, emotional states (struggles with students or with other work-related stress) were also found to lead teachers to dysphonia in a study conducted in Brazil.¹²

In our study, 94.3% of the teachers who exerted extra muscular pressure while teaching had vocal symptoms. Teachers who applied extra muscular pressure while teaching were ten times more at risk of developing vocal symptoms than those who did not exert excess pressure. Exerting extra muscular pressure leads to an improper position of the larynx. This tension causes difficulty in phonation, swallowing, and breathing. Exerting extra muscular pressure while teaching causes an increase in the tension of extrinsic muscles, which leads to improper position of the larynx, and this causes tension in vocal folds and intrinsic muscles. Most of the teachers expressed their musculoskeletal issues on a self-assessment questionnaire in a Nordic study last year, which suggested that their vocal use had an effect on their body muscles like their voice box or larynx and the vocal tract.¹³

Any source of overall classroom noise forces the teacher to speak louder. Our study found that almost half of our teachers “always” taught with a loud tone. Upon analyzing the data, we found that teachers who speak in a loud tone were three times more likely to acquire vocal symptoms than those who teach in normal tones. Similarly, a study conducted in Brazil showed that the use of intense voice was considered a predictor by teachers of their voice suffering.¹² Another study conducted amongst Taiwanese teachers showed that teachers in the voice disorder group were at a higher risk of teaching in a loud voice.¹⁴

Weather conditions can also cause or increase vocal symptoms in teachers. Our study showed a significant association between voice problems and weather conditions, particularly cold weather. On further analysis, teachers had five times more risk of developing vocal symptoms in cold weather. A study conducted in India recorded that environmental factors such as climate, seasonal changes, dust, smell, and smoke in the environment were barriers to their vocal usage, making it difficult for them to maintain their vocal health.¹⁵

Tonsillitis can have a significant impact on the occurrence of vocal symptoms by causing soreness of the throat. In our study, 83 teachers suffered from tonsillitis, which was positively associated with the prevalence of vocal symptoms. Those with tonsillitis were three times more likely to have vocal difficulties than those suffering from other health conditions. A study conducted in Brazil showed that respiratory problems, including tonsillitis, were significantly associated with teachers' vocal symptoms.¹² Another study also showed that vocal symptoms had significance with some self-reported pathologies, including tonsillitis.¹⁶

The strength of our study was that we used content-validated questionnaires by experts, and the questionnaire was pilot-tested. We collected most variables that would affect the prevalence of vocal symptoms.

There are certain limitations to the study. The response rate was very low. We adopted a convenient sampling method to recruit participants, which affected the generalizability of the study. Most of the variables measured are self-reported, which might lead to information bias. However, this study helped us know the prevalent condition among the teachers.

CONCLUSION

The prevalence of vocal symptoms amongst the teachers surveyed was relatively high. It was significantly associated with risk factors including years of teaching, number of students in a class, stress in their life, extra muscular pressure, teaching in a loud tone, and having acquired tonsillitis. Cold weather was highly significant on the vocal health of the teachers.

Educational training for voice use is advised to be part of the hiring process in schools. Teachers suffering from vocal symptoms for a prolonged duration are advised to seek medical help to prevent the progression of vocal disorders. We suggest classrooms have microphones and a voice-enhancing acoustic environment so teachers don't have to exert their voice while teaching.

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REFERENCES

1. Roy N, Merrill RM, Thibeault S, Parsa RA, Gray SD, Smith EM. Prevalence of voice disorders in

- teachers and the general population. *J. Speech Lang Hear Res*. 2004;47(2):281-93.
2. Byeon H. The Risk Factors Related to Voice Disorder in Teachers: A Systematic Review and Meta-Analysis. *Int J Environ Res Public Health*. 2019;16(19):3675.
3. Moy FM, Hoe VCW, Hairi NN, Chu AHY, Bulgiba A, Koh D. Determinants and effects of voice disorders among secondary school teachers in Peninsular Malaysia using a Validated Malay Version of VHI-10. *PLoS ONE*. 2015;10:e0141963.
4. van Houtte E, Claeys S, Wuyts F, van Lierde K. Voice disorders in teachers: occupational risk factors and psycho-emotional factors. *Logoped Phoniatr Vocol*. 2012;37(3):107-16.
5. Shoeib RM, Nassar JF, Ghandour HH. Anxiety in female teachers with dysphonia: correlation between the voice handicap index and anxiety state. *The Egyptian Journal of Otolaryngology* 2012;28:142-8.
6. Rossi-Barbosa LA, Barbosa MR, Morais RM, de Sousa KF, Silveira MF, Gama AC, et al. Self-Reported Acute and Chronic Voice Disorders in Teachers. *J Voice*. 2016;30(6):25-755.
7. Bermúdez de Alvear RM, Barón FJ, Martínez-Arquero AG. School teachers' vocal use, risk factors, and voice disorder prevalence: guidelines to detect teachers with current voice problems. *Folia Phoniatr Logop*. 2011;63(4):209-15.
8. Menon UK, Raj M, Antony L, Soman S, Bhaskaran R. Prevalence of Voice Disorders in School Teachers in a District in South India. *J Voice*. 2021;35(1):1-8.
9. Trinite B. Voice disorders in teachers: Prevalence, risk factors, psycho-social impact. Summary of the Doctoral Thesis Speciality Theoretical Medicine Riga. 2012.
10. de Sousa E, Goel HC, Fernandes VLG. Study of Voice Disorders Among School Teachers in Goa. *Indian J Otolaryngol Head Neck Surg*. 2019;71:679-83.
11. Vertanen-Greis H, Löyttyniemi E, Uitti J. Voice Disorders are Associated With Stress Among Teachers: A Cross-Sectional Study in Finland. *J Voice*. 2020;34(3):488.e1-488.e8.
12. Hermes EG, de Oliveira Bastos PR. The Prevalence of Teachers' Vocal Symptoms in Municipal Network of Education in Campo Grande, Mato Grosso do Sul, Brazil. *J Voice*. 2016;30(6):756.e1-756.e7.
13. Colla CN, Andriollo DB, Cielo CA. Self-assessment of teachers with normal larynges and vocal and osteomuscular complaints. *J Voice*. 2022;12:S0892-1997(22)00105-9.
14. Chen SH, Chiang SC, Chung YM, Hsiao LC, Hsiao TY. Risk factors and effects of voice problems for teachers. *J Voice*. 2010;24(2):183-90.
15. Nallamuthu A, Boominathan P, Arunachalam R, Mariswamy P. A Peek into Contributing Factors and Impact of Voice Problems among Teachers in Chennai: A Bio Psychosocial Perspective. *Indian J Public Health Res Develop*. 2020;11:21-6.
16. Albuquerque Lopes MC, Fagundes SN, Mousinho KC, Correia MGC, Ribeiro CMB, Vanderlei AD. Factors associated with vocal health and quality of life in teachers/professors. *Rev. CEFAC*. 2018;20(4):515-31.

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