Vocal Symptoms and Associated Risk Factors between Male and Female University Teachers

Gustavo Polacow Korn[1] Sung Woo Park[1] Antonio Augusto de Lima Pontes[1] Paulo Pontes[1]

[1] Department of Otorhinolaryngology and Head and Neck Surgery, Universidade Federal de São Paulo, SP, Brazil

Int Arch Otorhinolaryngol 2018;22:271–279.

Address for correspondence Gustavo Polacow Korn, Departamento de Otorrinolaringologia e Cirurgia de Cabeça e Pescoço, Universidade Federal de São Paulo, Rua Pedro de Toledo, 947, São Paulo, SP, 04532-000, Brazil (e-mail: gustavokorn@uol.com.br).

Abstract

Introduction Many recent studies on teachers warn of the adverse effects that voice problems have on work performance. However, only a few of these studies included university teachers.

Objective To compare the vocal symptoms and risk factors between male and female university teachers in a private institution within the city of São Paulo.

Methods In a cross-sectional survey, a voice self-evaluation form prepared by the Ministry of Labor in Brazil was administered to 846 university teachers at a private institution in the city of São Paulo.

Results The percentage of hoarseness, vocal tract discomfort, neck pain and foreign body sensation was significantly higher in female than in male subjects. A significantly higher percentage of males participated in other professional activities in addition to teaching, reported working in a calm environment compared with working in a moderately or severely tense and stressful environment, and rated themselves as calm, slightly stressed and anxious or moderately stressed and anxious rather than very stressed and anxious. A significantly higher percentage of females spent most of their time teaching compared with performing other professional activities, and rated themselves as chatty or impulsive.

Conclusion Among university teachers, a significantly higher percentage of females than males reported hoarseness, vocal tract discomfort, neck pain and foreign body sensation. Some risk factors related to work organization, workplace environment, voice care and quality of life variables were related to this higher prevalence in females.

Keywords
- dysphonia
- risk factors
- faculty

Introduction

Many recent studies on teachers warn of the adverse effects that voice problems have on work performance,[1,2] and suggest a high risk of work-related vocal problems.[1,3,4] However, only a few of these studies included university teachers.[5,6] University teachers should be studied as a single group because they may exhibit high levels of social and cultural uniformity[5,6] since they are a homogeneous group (for instance, university teachers subject to the same work shifts at a single institution, under the same environmental conditions, in a single city).

To evaluate functional dysphonia in a professional voice user, the term occupational dysphonic syndrome (ODS)[7] was developed, which includes five symptoms: (1) hoarseness, (2) pain or irritation in the throat (vocal tract discomfort), (3) neck pain, (4) foreign body sensation, and (5) clearing of the throat.

In a systematic review, Cantor Cultiva et al[8] found a wide variation in the prevalence of voice disorders and suggested

received
September 9, 2016
accepted
August 10, 2017
published online
October 26, 2017

DOI https://doi.org/10.1055/s-0037-1606604.
ISSN 1809-9777.

that this variation may be due to the use of generic terms such as 'vocal complaints' and 'vocal symptoms' to describe these disorders. Thus, it is of interest to use the voice self-evaluation form reformulated by the Ministry of Labor in Brazil, which examines each ODS symptom, to obtain an epidemiological profile of vocal complaints and risk factors in a university setting.[5,6]

Recently, we performed two studies to assess the presence of risk factors for specific vocal symptoms, for example, hoarseness and vocal tract discomfort, among 846 university teachers at a private institution using a self-evaluation form prepared by the Brazilian Ministry of Labor.[9] In the first study, we concluded that university teachers have a high prevalence of hoarseness (39.6%) and that factors such as teaching time, female gender, work organization, noise and sound competition in the work environment, air pollution and stress and anxiety in the work environment, tension, personal habits and lifestyle/quality of life are related to the presence of hoarseness in this population.[5] In the second study,[6] we concluded that university teachers have a high prevalence of vocal tract discomfort (50.8%) and identified related factors, which included female gender, age ($\leq$ 60 years), time-consuming professional activities, noise and sound competition in the workplace, air pollution-related stress and anxiety, access to free water, care or medication used for the voice, seeking a doctor's care for the symptom, the degree of teaching difficulty in terms of use of voice within and outside the workplace, tension, stress and anxiety.

We hypothesized that females have more vocal symptoms than males and sought to determine whether there are differences in the risk factors for voice problems between the genders.

In this study, a previously published voice self-evaluation form[5,6] was used to identify differences in the five symptoms (hoarseness, vocal tract discomfort, neck pain, foreign body sensation and clearing of the throat) between males and females and the associated risk factors in a sample of university teachers.

The objective of this study was to compare the vocal symptoms and risk factors between male and female university teachers in a private institution within the city of São Paulo.

Methods

This cross-sectional study was reviewed and authorized by the Research Ethics Committee of the Universidade Federal de São Paulo (354.895/2013) from which the data were collected.

Voice self-evaluation forms, which were prepared by the Ministry of Labor in Brazil, were completed within a one-month period in 2007 by 846 university teachers working in various positions at a single private institution in the city of São Paulo. Teachers from this single private institution were recruited. The response rate was 86%.

Of the 846 university teachers, 49.8% were male and 46.5% female. Gender information was not available for 3.8% of the teachers.

Data on five vocal symptoms (hoarseness, vocal tract discomfort, neck pain, foreign body sensation and clearing of the throat) and risk factors were compiled from the completed self-evaluation forms. The risk factor variables were categorized into groups as follows:

- Identification variables: age and teaching time.
- Work organization variables: number of institutions employed at (some teachers work at more than one institution), maximum workload during the week, class length, time between classes, maximum number of students per classroom, participation in other professional activities (for example, many teacher have other professional activities such as working for a law firm, or as an engineer) and participation in time-consuming professional activities (more time teaching, which means more vocal use or other activity that demands less vocal use).
- Workplace variables: noise in the classroom, air pollution, stress and anxiety related to a specific activity, and water supply at the institution.
- Vocal symptoms: hoarseness, vocal tract discomfort, neck pain, foreign body sensation, clearing of the throat.
- Voice care variables: use of medication for the throat or voice, medical consultations made for vocal symptoms, and degree of vocal difficulty during teaching.
- Personal habits and lifestyle/quality of life outside the institution: voice use (in and out of the workplace), stress and anxiety, water consumption/hydration habits, diet, body weight, smoking habits, alcohol consumption, use of other drugs, continuous use of medication, physical activity, and health care.

The aim of this paper was to compare the different variables of the genders of university teachers to the search variables. To test for differences in numerical variables between genders, we used Student *t*-tests, and to test for differences in categorical variables, we used chi-square tests. Where appropriate, Fisher exact test or the likelihood ratio test was used. In the comparisons of the variables with more than two categories, multiple comparisons corrected by the Bonferroni method (comparisons among categories two by two) were used only in the variables in which the result of the test was significant. A significance level of 5% (p-value < 0.05) was used.

Results

Identification Variables

The percentage of males was higher in teachers $>$ 60 years of age than in teachers $\leq$ 60 years of age (►**Fig. 1**). The mean age (and standard deviation) was higher in male (42.9 ± 10.4) than female (41.2 ± 9.6) subjects.

No significant difference in teaching time was observed between the genders (►**Table 1**).

Work Organization Variables

No significant differences were observed between the genders for the variables 'number of institutions where you teach', 'maximum workload during the work week', 'duration

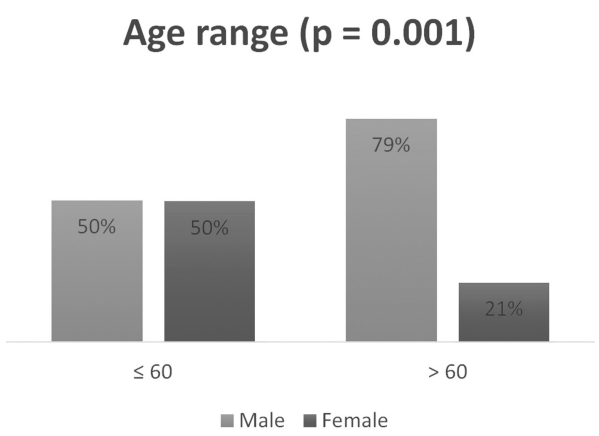

Fig. 1 Comparison of the genders by age range.

of the most frequent classes', and 'minutes of break time' (►**Table 2**).

In terms of the maximum number of students per classroom, the percentage of females with maximum students between 51 and 100 was significantly lower than teachers with less than 30 students or between 31 and 50 students (►**Table 2**).

The percentage of males was significantly higher among teachers with other professional activities than teaching (►**Table 2**).

The percentage of females was significantly higher among teachers who spent most of their time teaching than among those who spent most of their time performing other professional activities (►**Table 2**).

Workplace Variables

The percentage of males was significantly higher among teachers who considered the workplace to be a calm environment compared with those who considered the workplace as a moderately or highly tense and stressful environment, $p = 0.018$ e $p = 0.049$, respectively (►**Fig. 2**).

No significant differences were observed between the genders for the variables 'noise in the classroom', 'air pollution', and 'water supply at the institution' (►**Table 3**).

Voice Symptoms and Voice Care Variables

The percentages of hoarseness, vocal tract discomfort, neck pain and foreign body sensation were all significantly higher for females than for males (►**Fig. 3**, **4**, **5** and **6**).

No significant differences were observed between the genders for the variable 'clearing of the throat' (►**Table 4**).

The percentage of females was significantly higher among those teachers who generally underwent care or took medication for the throat or voice than among those who did not; similarly, the percentage of females was higher among those teachers who sought medical advice for the throat or voice than among those who did not (►**Table 4**).

The percentage of males was lower among those teachers who did not experience any difficulty teaching than among those who did experience moderate difficulty teaching because of their vocal problems, $p = 0.049$ (►**Fig. 7**).

Personal Habits and Lifestyle/Quality of Life Variables

In terms of voice quality within and/or outside the workplace, the percentage of females was significantly higher among teachers who were chatty or impulsive than among those who were communicative or introspective (►**Table 5**). In terms of tension, stress and anxiety, the percentage of females was significantly higher among teachers who were very stressed and anxious than male teachers. Female teachers represented a significantly lower percentage among teachers who were calm or slightly stressed (►**Table 5**).

In terms of body weight, the percentage of females was significantly higher among those teachers who described themselves as lean or at the ideal weight and the percentage of males was significantly higher among those teachers who described themselves as slightly overweight or obese (►**Table 5**).

A significantly higher percentage of males than of females was observed for each of the variables alcohol consumption and physical activity (►**Table 6**).

No significant differences were observed between the genders for the variables 'water/hydration', 'diet', 'smoking', 'use of other drugs', 'continuous-use medication', and 'health care' (►**Table 5** and **6**).

Table 1 Comparison of teaching time between the genders (Chi-square test)

Gender	Male n (%)	Female n (%)	Total n (%)	*p*-value
Teaching tenure				
In 1 year or less	13 (54.2)	11 (45.8)	24 (100)	0.467
Between 1 and 5 years	109 (54)	93 (46)	202 (100)	
Between 5 and 10 years	135 (54.9)	111 (45.1)	246 (100)	
Between 10 and 20 years	105 (46.9)	119 (53.1)	224 (100)	
More than 20 years	55 (50.9)	53 (49.1)	108 (100)	
Total	417 (51.9)	387 (48.1)	804 (100)	

Table 2 Comparison of the genders regarding work organization variables

Gender	Male n (%)	Female n (%)	Total n (%)	*p*-value
Number of institutions where you teach				
1	196 (47.7)	215 (52.3)	411 (100)	0.059
2	157 (55.7)	125 (44.3)	282 (100)	Chi-square test
3	48 (53.3)	42 (46.7)	90 (100)	
More than 3	19 (67.9)	9 (32.1)	28 (100)	
Total	420 (51.8)	391 (48.2)	811 (100)	
Maximum workload during the work week				
1 to 3 class hours per day	70 (51.1)	67 (48.9)	137 (100)	0.734
4 to 6 class hours per day	174 (54)	148 (46)	322 (100)	Chi-square test
6 to 8 class hours per day	102 (50.5)	100 (49.5)	202 (100)	
More than 8 class hours per day	74 (49)	77 (51)	151 (100)	
Total	420 (51.7)	392 (48.3)	812 (100)	
Duration of the most frequent classes in the workday				
40 minutes	13 (56.5)	10 (43.5)	23 (100)	0.643
50 minutes	203 (49.8)	205 (50.2)	408 (100)	Chi-square test
60 minutes	23 (57.5)	17 (42.5)	40 (100)	
100 minutes	93 (51.7)	87 (48.3)	180 (100)	
More than 100 minutes	89 (56)	70 (44)	159 (100)	
Total	421 (52)	389 (48)	810 (100)	
Minutes of class breaks usually granted				
Less than 20	385 (50.9)	372 (49.1)	757 (100)	0.077
20 to 30	33 (67.3)	16 (32.7)	49 (100)	Likelihood ratio test
More than 30	3 (50)	3 (50)	6 (100)	
Total	421 (51.8)	391 (48.2)	812 (100)	
Maximum number of students per classroom				
Fewer than 30 students	10 (33.3)	20 (66.7)	30 (100)	0.028*
31 to 50 students	84 (45.9)	99 (54.1)	183 (100)	Likelihood ratio test
51 to 100 students	254 (55.9)	200 (44.1)	454 (100)	
101 to 150 students	67 (48.9)	70 (51.1)	137 (100)	
More than 150 students	4 (66.7)	2 (33.3)	6 (100)	
Total	419 (51.7)	391 (48.3)	810 (100)	
Fewer than 30 students × 31 to 50 students				1.000
Fewer than 30 students × 51 to 100 students				0.048*
Fewer than 30 students × 101 to 150 students				1.000
Fewer than 30 students x more than 150 students				1.000
31 to 50 students × 51 to 100 students				0.049*
31 to 50 students × 101 to 150 students				1.000
31 to 50 students x more than 150 students				1.000
51 to 100 students × 101 to 150 students				1.000
51 to 100 students x more than 150 students				1.000
101 to 150 students x more than 150 students				1.000
Other professional activity besides teaching				
Yes	315 (56)	247 (44)	562 (100)	< 0.001*
No	105 (42.2)	144 (57.8)	249 (100)	Chi-square test
Total	420 (51.8)	391 (48.2)	811 (100)	
Time-consuming professional activity				
Professor	215 (46.5)	247 (53.5)	462 (100)	< 0.001*
Professor/ Other	10 (41.7)	14 (58.3)	24 (100)	Chi-square test
Other	185 (60.9)	119 (39.1)	304 (100)	
Total	410 (51.9)	380 (48.1)	790 (100)	
Professor x Professor/ Other				1.000
Professor x Other				< 0.001*
Professor/ Other x Other				0.195

Discussion

Most of the vocal symptoms (hoarseness, vocal tract discomfort, neck pain and foreign body sensation) in our study of university teachers were more prevalent in females than in males, which is consistent with the studies by Russell et al,[10] Marçal and Peres,[11] Van Houtte et al,[2] Van Houtte et al,[12] de Jong et al.,[13] and Nerrière et al,[14] which included

Fig. 2 Comparison of the genders by stress and anxiety in the workplace.

Table 3 Comparison of the genders in terms of workplace variables (Chi-square test)

Gender	Male n (%)	Female n (%)	Total n (%)	*p*-value
Workplace in terms of noise and sound competition				
Quiet and adequate (comfortable)	64 (58.7)	45 (41.3)	109 (100)	0.072
Slightly noisy (tolerable)	249 (53.3)	218 (46.7)	467 (100)	
Uncomfortably noisy (disturbing)	99 (46.3)	115 (53.7)	214 (100)	
Highly noisy (intolerable)	6 (35.3)	11 (64.7)	17 (100)	
Total	418 (51.8)	389 (48.2)	807 (100)	
Workplace in terms of air pollution				
Clean, cool and airy (comfortable)	177 (52.2)	162 (47.8)	339 (100)	0.079
Slightly polluted, hot, cold, windy or muffed (disturbing)	194 (54.6)	161 (45.4)	355 (100)	
Moderately polluted, hot, cold, windy or muffed (disturbing)	45 (42.5)	61 (57.5)	106 (100)	
Highly polluted, hot, cold, windy or muffed (intolerable)	3 (30)	7 (70)	10 (100)	
Total	419 (51.7)	391 (48.3)	810 (100)	
Water at ease and easily accessible				
Yes	339 (51.4)	320 (48.6)	659 (100)	0.662
No	76 (53.9)	65 (46.1)	141 (100)	
Total	415 (51.9)	385 (48.1)	800 (100)	

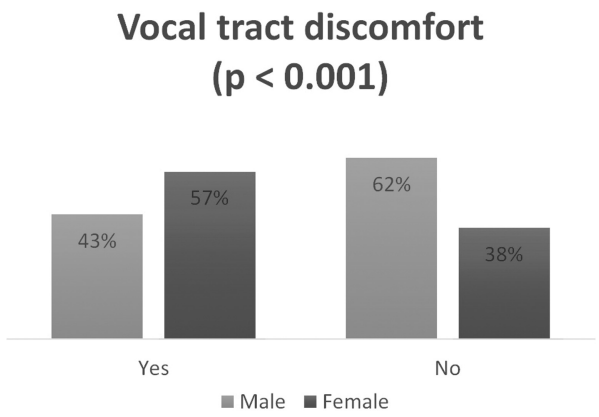

Fig. 3 Comparison of the genders by the presence of vocal tract discomfort.

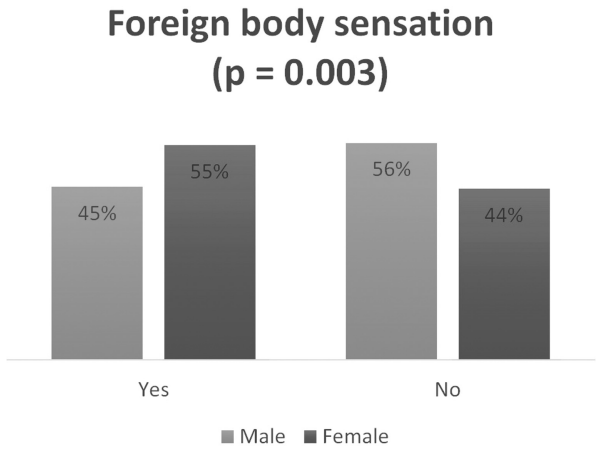

Fig. 4 Comparison of the genders by the presence of foreign body sensation.

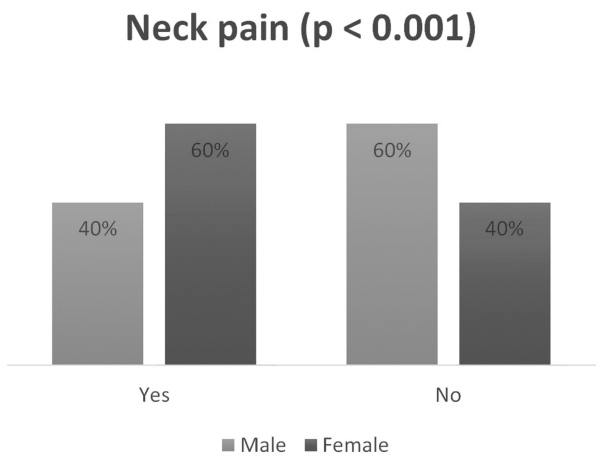

Fig. 5 Comparison of the genders by the presence of neck pain.

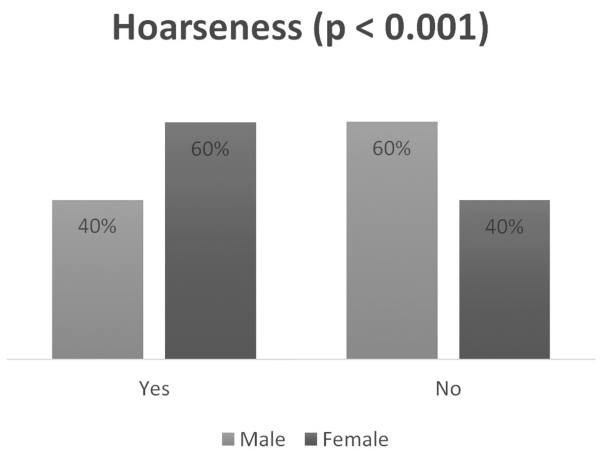

Fig. 6 Comparison of the genders by the presence of hoarseness.

Table 4 Comparison of the genders in terms of symptoms variables (Chi-square test)

Gender	Male n (%)	Female n (%)	Total n (%)	*p*-value
Some care or medication for the throat or voice				
No	320 (55.1)	261 (44.9)	581 (100)	0.006*
Yes	95 (43.8)	122 (56.2)	217 (100)	
Total	415 (52)	383 (48)	798 (100)	
Medical advice sought for voice symptoms				
Yes	51 (34.7)	96 (65.3)	147 (100)	< 0.001*
No	337 (55.3)	272 (44.7)	609 (100)	
Total	388 (51.3)	368 (48.7)	756 (100)	
Clearing of the throat				
Yes	177 (54.6)	147 (45.4)	324 (100)	0.195
No	231 (49.7)	234 (50.3)	465 (100)	
Total	408 (51.7)	381 (48.3)	789 (100)	

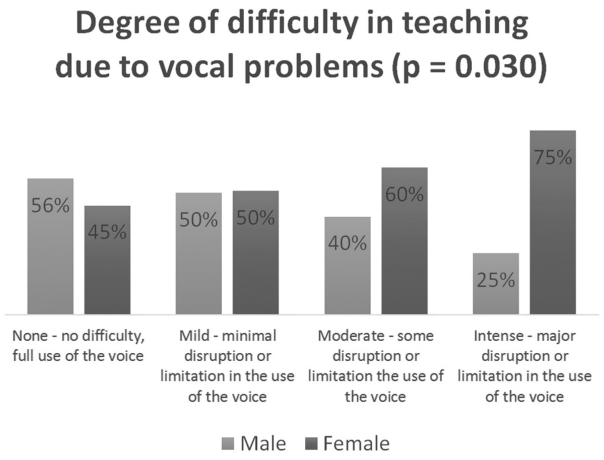

Fig. 7 Comparison of the genders by the degree of teaching difficulty due to vocal problems.

teachers from kindergarten, primary, secondary, elementary, middle and high school.

In general, females have a higher rate of benign vocal pathologies and a higher rate of voice disorders.[15–17] The female larynx has a predisposition to vocal fold injury, which may be explained by the higher fundamental frequency compared with the male larynx,[18] by the incomplete posterior glottis closure and by the glottis proportion.[19]

While acknowledging the female predisposition to vocal fold injury, it is important to identify other potential gender predispositions to voice disorders.[20] We aimed to determine whether any other variables, including work organization, workplace, voice care, personal habits and lifestyle/quality of life variables, could also account for the higher prevalence of ODS symptoms in females.

A higher percentage of male than female teachers engaged in other professional activities, which usually demand less vocal use than teaching activities do. In addition, the percentage of female professionals who spend most of the time teaching was higher than the corresponding percentage of males. Therefore, there are work organization variables that

Table 5 Comparison of the genders regarding other variables (Chi-square test)

Gender	Male	Female	Total	*p*-value
	n (%)	n (%)	n (%)	
In terms of voice inside and/or outside the work place, you qualify as a person who:				
Speaks little (introvert)	32 (71.1)	13 (28.9)	45 (100)	< 0.001*
Speaks moderately (communicative)	305 (58)	221 (42)	526 (100)	Chi-square
Speaks a lot (chattering)	73 (35.4)	133 (64.6)	206 (100)	test
Speaks too much (impulsive)	10 (30.3)	23 (69.7)	33 (100)	
Total	420 (51.9)	390 (48.1)	810 (100)	
Speaks little (introvert) x Speaks moderately (communicative)				0.516
Speaks little (introvert) x Speaks a lot (chattering)				< 0.001*
Speaks little (introvert) x Speaks too much (impulsive)				0.002*
Speaks moderately (communicative) x Speaks a lot (chattering)				< 0.001*
Speaks moderately (communicative) x Speaks too much (impulsive)				0.012*
Speaks a lot (chattering) x Speaks too much (impulsive)				1.000
In terms of stress and anxiety, you qualify as a person who is:				
Calm	122 (60.7)	79 (39.3)	201 (100)	0.002*
Slightly tense and stressful	179 (51)	172 (49)	351 (100)	Chi-square

Table 5 (*Continued*)

Gender	Male	Female	Total	*p*-value
	n (%)	n (%)	n (%)	
Moderately tense and stressful	97 (49.7)	98 (50.3)	195 (100)	test
Strongly tense and stressful	21 (33.3)	42 (66.7)	63 (100)	
Total	419 (51.7)	391 (48.3)	810 (100)	
Calm x Slightly tense and stressful				0.168
Calm x Moderately tense and stressful				0.168
Calm x Strongly tense and stressful				0.001*
Slightly tense and stressful x Moderately tense and stressful				1.000
Slightly tense and stressful x Strongly tense and stressful				0.048*
Moderately tense and stressful x Strongly tense and stressful				0.049*
In terms of drinking water/hydration, you qualify as a person who:				
Drinks a few liquids (forgets or does not feel thirsty, and urinates less than 3 times/day)	66 (45.8)	78 (54.2)	144 (100)	0.177
Drinks moderately (1 to 2 L a day)	238 (52.5)	215 (47.5)	453 (100)	Likelihood
Drinks a lot (More than 2 L a day)	114 (54.5)	95 (45.5)	209 (100)	ratio test
Drinks excessively (the need to urinate is frequent and it bothers you)	1 (20)	4 (80)	5 (100)	
Total	419 (51.7)	392 (48.3)	811 (100)	
In terms of diet, you qualify as a person who:				
Eats little (fastens or eats less than 3 meals a day)	70 (62.5)	42 (37.5)	112 (100)	0.099
Eats moderately (eats 3 meals a day)	289 (49.7)	292 (50.3)	581 (100)	Likelihood
Eats a lot (does not control gluttony and realizes that you abuse it a bit)	54 (50.9)	52 (49.1)	106 (100)	ratio test
Eats excessively (the stomach feels full and/or you are losing control)	5 (55.6)	4 (44.4)	9 (100)	
Total	418 (51.7)	390 (48.3)	808 (100)	
In terms of body weight, you qualify as a person who is:				
Lean (underweight)	14 (45.2)	17 (54.8)	31 (100)	< 0.001*
At the ideal weight	130 (42.1)	179 (57.9)	309 (100)	Chi-square
Slightly overweight	234 (56.8)	178 (43.2)	412 (100)	test
Obese (very overweight)	41 (70.7)	17 (29.3)	58 (100)	
Total	419 (51.7)	391 (48.3)	810 (100)	
Lean (underweight) x At the ideal weight				1.000
Lean (underweight) x Slightly overweight				1.000
Lean (underweight) x Obese (very overweight)				0.048*
At the ideal weight x Slightly overweight				< 0.001*
At the ideal weight x Obese (very overweight)				< 0.001*
Slightly overweight x Obese (very overweight)				0.264

Table 6 Comparison of the genders regarding other variables

Gender	Male n (%)	Female n (%)	Total n (%)	*p*-value
Cigarettes (tobacco)				
Yes	61 (54.5)	51 (45.5)	112 (100)	0.910
No	220 (52.8)	197 (47.2)	417 (100)	Chi-square test
Former smoker	74 (51.7)	69 (48.3)	143 (100)	
Total	355 (52.8)	317 (47.2)	672 (100)	
Alcohol use				
Yes	167 (68.2)	78 (31.8)	245 (100)	$< 0.001^{*}$
No	248 (45.8)	293 (54.2)	541 (100)	Chi-square test
Total	415 (52.8)	371 (47.2)	786 (100)	
Other drugs				
No	389 (52.2)	356 (47.8)	745 (100)	1.000
Yes	3 (50)	3 (50)	6 (100)	Fisher exact test
Total	392 (52.2)	359 (47.8)	751 (100)	
Continuous-use medication				
No	298 (52.9)	265 (47.1)	563 (100)	0.343
Yes	111 (48.9)	116 (51.1)	227 (100)	Chi-square test
Total	409 (51.8)	381 (48.2)	790 (100)	
Physical activity				
No	174 (47)	196 (53)	370 (100)	0.019^{*}
Yes	240 (55.6)	192 (44.4)	432 (100)	Chi-square test
Total	414 (51.6)	388 (48.4)	802 (100)	
In terms of health care, you consider yourself as being:				
Absent-minded	78 (51.7)	73 (48.3)	151 (100)	0.817
Controlled/cautious	285 (50.2)	283 (49.8)	568 (100)	Likelihood ratio test
Concerned	42 (56)	33 (44)	75 (100)	
Alarmed	2 (50)	2 (50)	4 (100)	
Total	407 (51)	391 (49)	798 (100)	

place females at a higher risk of vocal symptoms compared with males.

The female teachers considered the workplace environment to be more tense and stressful than males did. Furthermore, the female subjects experienced more difficultly teaching because of their vocal problems than did the male subjects.

However, the percentage of females was higher than the percentage of males among those teachers who take care or medication for the throat or voice and among those who sought medical advice. This treatment-seeking behavior is in accordance with the results of Van Houtte et al.[2]

In studies of professional voice users, it is important to consider vocal use both in and out of the workplace. In the present study, the females spoke more frequently than the males, and they qualified themselves as more tense and stressed than did the males. Nerrière et al[14] found an association between psychological distress and voice issues. Unfortunately, a cross-sectional dataset such as ours does not allow us to distinguish causes and consequences.

In this study, more females described themselves as leaner than males. The males reported more alcohol consumption and physical activity relative to the females. We speculate that heavier weights and higher levels of alcohol consumption could be associated with laryngopharyngeal reflux symptoms, such as foreign body sensation. In this study, we did not evaluate a reflux finding score. However, we speculate that this symptom is not exclusive of reflux.

This study emphasizes the recognition of vocal symptoms in university teachers, and treatment and prevention for these symptoms in this population is warranted. These symptoms in professionals must be investigated and acknowledged, especially in females.

To reduce variation among individuals in the interpretation of the self-evaluation survey, we surveyed cultural, social, and regional viewpoints in a homogeneous group

(for instance, university teachers subject to the same work shifts at a single institution under the same environmental conditions in a single city).

Limitations to this study include the sampling from a single institution. Therefore, these data cannot be generalized to university professors from around Brazil. Future directions in this line of research include the characterization of vocal symptoms in another group of professional voice users.

Conclusion

Among university teachers, significantly higher percentages of females than males reported hoarseness, vocal tract discomfort, neck pain and foreign body sensation. Some risk factors related to work organization, workplace environment, voice care and quality of life variables were linked to a higher prevalence in females.

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(02):281–293
2 Van Houtte E, Claeys S, Wuyts F, Van Lierde K. The impact of voice disorders among teachers: vocal complaints, treatment-seeking behavior, knowledge of vocal care, and voice-related absenteeism. J Voice 2011;25(05):570–575
3 Smith E, Gray SD, Dove H, Kirchner L, Heras H. Frequency and effects of teachers' voice problems. J Voice 1997;11(01):81–87
4 Behlau M, Zambon F, Guerrieri AC, Roy N. Epidemiology of voice disorders in teachers and nonteachers in Brazil: prevalence and adverse effects. J Voice 2012;26(05):665.e9–665.e18
5 Korn GP, Augusto de Lima Pontes A, Abranches D, Augusto de Lima Pontes P. Hoarseness and risk factors in University teachers. J Voice 2015;29(04):518.e21–518.e28
6 Korn GP, Augusto de Lima Pontes A, Abranches D, Augusto de Lima Pontes P. Vocal tract discomfort and risk factors in University teachers. J Voice 2016;30(04):507.e1–507.e8
7 de Almeida SIC, Pontes P. Dysphonic occupational syndrome: new aspects of this nosological entity. Arq Int Otorrinolaringol 2010; 14(03):346–350
8 Cantor Cutiva LC, Vogel I, Burdorf A. Voice disorders in teachers and their associations with work-related factors: a systematic review. J Commun Disord 2013;46(02):143–155
9 Ministry of Labor and Employment (BR). Labor Office in the State São Paulo SDT 1 North/SP. Occupational dysphonia program in teachers. São Paulo, BR: Labor Office in the State of São Paulo, Security Section and Health Worker; 2003
10 Russell A, Oates J, Greenwood KM. Prevalence of voice problems in teachers. J Voice 1998;12(04):467–479
11 Marçal CC, Peres MA. Self-reported voice problems among teachers: prevalence and associated factors. Rev Saude Publica 2011; 45(03):503–511
12 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(03):107–116
13 de Jong FI, Kooijman PG, Thomas G, Huinck WJ, Graamans K, Schutte HK. Epidemiology of voice problems in Dutch teachers. Folia Phoniatr Logop 2006;58(03):186–198
14 Nerrière E, Vercambre MN, Gilbert F, Kovess-Masféty V. Voice disorders and mental health in teachers: a cross-sectional nationwide study. BMC Public Health 2009;9(01):370
15 Coyle SM, Weinrich BD, Stemple JC. Shifts in relative prevalence of laryngeal pathology in a treatment-seeking population. J Voice 2001;15(03):424–440
16 Herrington-Hall BL, Lee L, Stemple JC, Niemi KR, McHone MM. Description of laryngeal pathologies by age, sex, and occupation in a treatment-seeking sample. J Speech Hear Disord 1988; 53(01):57–64
17 Zhukhovitskaya A, Battaglia D, Khosla SM, Murry T, Sulica L. Gender and age in benign vocal fold lesions. Laryngoscope 2015;125(01):191–196
18 Titze IR. Physiologic and acoustic differences between male and female voices. J Acoust Soc Am 1989;85(04):1699–1707
19 Pontes P, Kyrillos L, Behlau M, De Biase N, Pontes A. Vocal nodules and laryngeal morphology. J Voice 2002;16(03):408–414
20 Hunter EJ, Tanner K, Smith ME. Gender differences affecting vocal health of women in vocally demanding careers. Logoped Phoniatr Vocol 2011;36(03):128–136