



# Vocal signs and symptoms in university professors during the COVID-19 pandemic

Sinais e sintomas vocais em professores  
universitários durante a pandemia da COVID-19

Signos y síntomas vocales  
en profesores universitarios durante  
la pandemia del COVID-19

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## Abstract

**Introduction:** Teachers use their voice as a work tool. At this time of the COVID-19 pandemic, the challenges of vocal demands have increased. **Objective:** To analyze the vocal signs and symptoms present in university professors during the COVID-19 pandemic period, which required online classes and meetings. **Method:** The sample consisted of 664 university professors, from all areas of knowledge, 366 of whom were female and 298 of whom were male. An online form was applied that included the Questionnaire of Vocal Signs and Symptoms and the filling in of data related to biological sex, university, and department to which each subject is linked. The association of signs and symptoms was carried out through factor analysis and the vocal symptoms were compared to the variables gender and area of knowledge using the chi-square test. **Results:** The most frequent signs and symptoms were dry throat, difficulty in high-pitched singing, and vocal tiredness. 29.1% of the teachers had at least 5 vocal

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symptoms. There was statistical significance with sex in relation to the symptoms of difficulty in high-pitched singing, dry throat, and sore throat. The symptom of vocal tiredness was significantly correlated with the areas of knowledge Health Sciences and Biological Sciences. **Conclusion:** University professors self-reported physical and functional vocal symptoms during the COVID-19 pandemic period, with a prevalence of dry throat sensation and difficulty in high-pitched singing.

**Keywords:** Faculty; Voice Disorders; Voice; Self-evaluation; COVID-19.

## Resumo

**Introdução:** Os professores utilizam a voz como instrumento de trabalho. Neste momento de pandemia da COVID-19, aumentaram os desafios das demandas vocais. **Objetivo:** Analisar os sinais e os sintomas vocais presentes em professores universitários durante o período da pandemia da COVID-19, o qual exigiu a realização de aulas e reuniões online. **Método:** A amostra foi composta por 664 professores universitários, de todas as áreas de conhecimento, sendo 366 do sexo feminino e 298 do masculino. Foi aplicado um formulário online que incluiu o Questionário de Sinais e Sintomas Vocais e o preenchimento de dados relativos a sexo biológico, universidade e departamento ao qual está vinculado. Foi realizada a associação de sinais e sintomas por meio de análise fatorial e foram comparados os sintomas vocais às variáveis sexo e área de conhecimento por meio do teste qui-quadrado. **Resultados:** Os sinais e os sintomas mais frequentes foram garganta seca, dificuldade para cantar agudo e cansaço vocal. 29,1% dos docentes apresentaram no mínimo 5 sintomas vocais. Houve significância estatística na relação de sexo com os sintomas de dificuldade para cantar agudo, garganta seca e dor na garganta. O sintoma de cansaço vocal foi significativamente correlacionado com as áreas de conhecimento Ciências da Saúde e Ciências Biológicas. **Conclusão:** Os professores universitários autorreferiram sintomas vocais físicos e funcionais durante o período da pandemia da COVID-19, havendo uma prevalência na sensação de garganta seca e dificuldade para cantar agudo.

**Palavras-chave:** Docentes; Distúrbios da Voz; Voz; Autoavaliação; COVID-19.

## Resumen

**Introducción:** Los profesores utilizan la voz como instrumento de trabajo. En estos momentos de pandemia por el COVID-19, aumentaron los desafíos y las demandas vocales. **Objetivo:** Analizar los signos y síntomas vocales presentes en profesores universitarios durante el período de la pandemia COVID-19, que requirieron hacer clases y reuniones virtuales. **Método:** La muestra fue compuesta por 664 profesores de todas las áreas de conocimiento, siendo 366 del género femenino y 298 del masculino. Fue aplicada una encuesta virtual que incluyó el Examen de Signos y Síntomas Vocales, así como también datos relacionados con el sexo biológico, universidad y programa académico vinculado. La asociación de signos y síntomas se realizó mediante análisis factorial y los síntomas vocales se compararon con las variables de género y área de conocimiento mediante la prueba de chi-cuadrado. **Resultados:** Los signos y síntomas más frecuentes fueron garganta seca, dificultad para cantar agudos y fatiga vocal. 29,1% de los profesores presentaron por lo menos 5 síntomas vocales. Hubo significancia estadística en la relación entre el sexo y los síntomas de dificultad para cantar agudos, garganta seca y dolor de garganta. El síntoma de fatiga vocal tuvo correlación significativa con las áreas de conocimiento de Ciencias de la Salud y Ciencias Biológicas. **Conclusión:** Los profesores universitarios auto relataron síntomas vocales físicos y funcionales durante el período de la pandemia del COVID-19, siendo predominante la sensación de garganta seca y la dificultad para cantar agudos.

**Palabras clave:** Docentes; Trastornos de la Voz; Voz; Autoevaluación; COVID-19.

## Introduction

The voice is the main instrument of human communication and it is considered the most important work tool for voice professionals. Among them, teachers are the ones most often affected by vocal problems<sup>1</sup>. In a study with university professors, the prevalence found was 41%<sup>2</sup>, but the prevalence of voice disorders in this population, in general, is still uncertain, with values ranging from 20% to 80%<sup>3</sup>.

A literature review<sup>3</sup> pointed out that voice changes occur in teachers due to extensive workload to which they are exposed, an excessive number of students per room, competitive environmental noise, inadequate classrooms, exposure to chalk dust, among other risk factors. In university professors, the overwork, competitiveness, and recognition in the academic environment<sup>4</sup>, are compiled, in the context of the COVID-19 pandemic (Coronavirus Disease), to the psychological stress for those who had previously presented this situation, changing the setting of facing new resources to teach classes.

Throughout their professional careers, teachers tend to show vocal signs and symptoms<sup>5</sup>, the most common being found: hoarseness, vocal tiredness, sore throat, effort to talk, dry throat, and throat clearing<sup>3,6</sup>. Roy et al., demonstrated in a study that the prevalence of the development of vocal alterations over the years was significantly higher in teachers (57.7%) when compared to non-teachers (28.8%)<sup>5</sup>. For this, one of the vocal self-perception assessments, already carried out, was the Vocal Signs and Symptoms Questionnaire (VSSQ)<sup>5,6</sup>. In the VSSQ, the participants refer to the vocal signs and symptoms that they perceive at the moment they complete it to ascertain the presence of vocal alterations. The vocal symptoms refer to the complaints and sensations associated with phonation identified by the subject, and the vocal signs are the characteristics of the voice that can be observed or tested<sup>7</sup>.

The feeling of insecurity, facing technology-mediated education, was present in 51% of teachers in a survey carried out during the pandemic<sup>8</sup>. Teaching has also become more challenging due to the demands of a fast and complex transition to the virtual environment, the didactic adequacy through online platforms, and the limited familiarity with remote teaching tools<sup>9</sup>. The positive aspect of this

context is that a recent survey with 335 teachers in the Eastern Province of Saudi Arabia showed that with the stabilization of these changes, there were fewer vocal changes in remote teaching compared to the face-to-face context<sup>10</sup>.

Thus, in the literature on this topic, it is observed that there are few citations involving research with university professors, and especially in the period of the pandemic. The present study aimed to analyze the vocal signs and symptoms present in university professors during the COVID-19 pandemic period, which required online classes and meetings.

## Method

The present study is characterized by being a cross-sectional analytical type that sought to analyze the vocal signs and symptoms in university professors from different higher education institutions in the State of Rio Grande do Sul (Brazil).

The research was approved by the Research Ethics Committee of the Federal University of Health Sciences of Porto Alegre under number 3.766.794. All participants read and agreed to the Free and Informed Consent Form (ICF).

The recruitment of university professors took place through an invitation to participate sent individually via e-mail and disseminated on social networks during the period from April to November of 2020. Data collection was performed using a virtual form, prepared by researchers via Google Docs platform, whose link was incorporated into the invitation.

The form created to carry out the study was organized in 4 stages. The first consisted of the presentation of the study and the ICF; if the teacher agreed to participate, he was directed to the next step. The second consisted of filling in personal data, related to name, biological sex, university, and department to which they are linked. The third stage consisted of the application of the VSSQ<sup>5,6</sup>. Finally, the last part of the form included a field so that the participants could clarify doubts or make observations on the study and a notification with the researchers' contact, if necessary.

The professors were divided into 8 areas of knowledge, according to the classification of the Coordination for the Improvement of Higher Education Personnel (Capes)<sup>11</sup>. Inclusion criteria were considered: being a teacher at a higher education

institution and consenting to participate in the study according to the ICF. The exclusion criteria were: not having answered the research questionnaire in its entirety and being linked to a university outside the State of Rio Grande do Sul.

The sample was estimated at 384 professionals, expecting to find heterogeneity in the presence of vocal symptoms ( $p = 50\%$ ), with a tolerable absolute error of 0.05 and 95% confidence. In the total sample, 676 participants were obtained who completed the form. Following the exclusion criteria, 12 responses were not considered (4 did not complete the questionnaire completely and 8 were active in universities located in other states), totaling 664 university professors in this study.

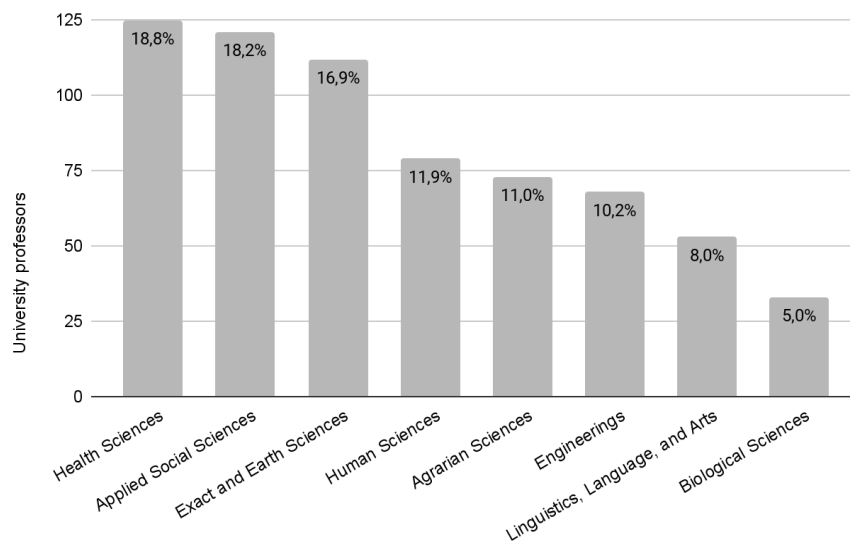
The VSSQ was developed in the English language and subsequently translated and adapted to the Portuguese language<sup>5,6</sup>. It is a questionnaire composed of 14 simple answer questions (“yes” or “no”), whose objective is to investigate the vocal signs and symptoms present in the evaluated subject. The items included in it can be separated into 2 categories<sup>12</sup>. The first comprises 10 phonatory signs and symptoms that are associated with vocal disorders, which are: hoarseness, voice tiring or changing quality after short use, trouble speaking or singing softly, difficulty projecting voice, difficulty in high-pitched singing, discomfort while using voice, monotone voice, effort to talk, dry throat and sore throat. The second category contains 4 laryngopharyngeal signs and symptoms, including

swallowing difficulties, throat clearing, acidic and/or bitter taste in the mouth, and voice instability or trembling.

To organize the data obtained from the form, an electronic spreadsheet from the Google Docs platform was used, in which all the collected information was tabulated. Subsequently, the data were subjected to statistical analysis. The variables were described by absolute and relative frequencies and associated by Pearson’s chi-square test with the analysis of adjusted residuals. The signs and symptoms were grouped according to the Factor Analysis by main components and with Varimax rotation. The Kaiser-Meyer-Olkin index (KMO) and Bartlett’s test of sphericity were used to verify the adequacy of the factor analysis. The level of significance was set at 5% ( $p < 0.05$ ) and the analyses were performed using the SPSS version 21.0 program.

## Results

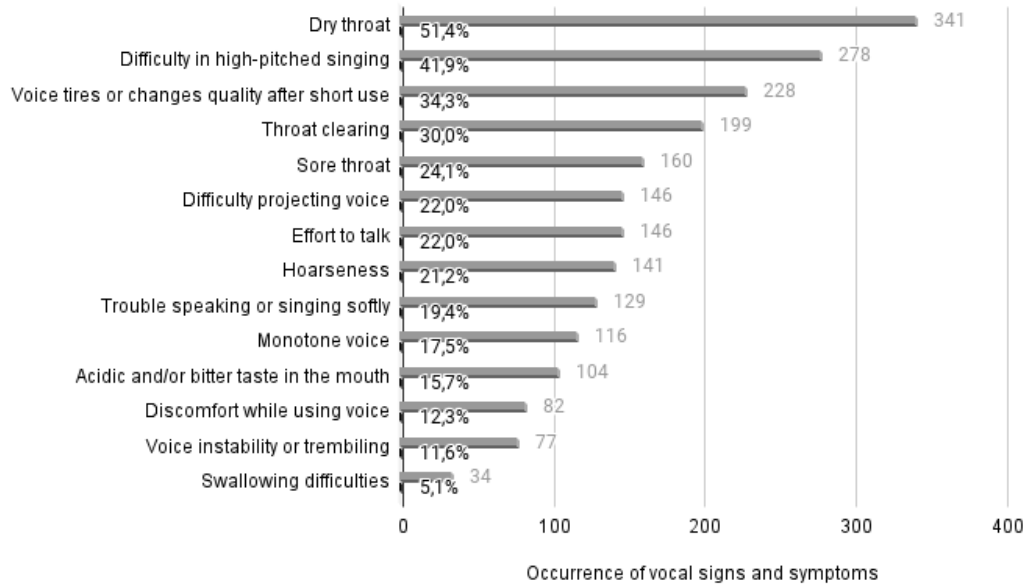
The profile of the sample consists of 664 professors, 366 female (55.1%) and 298 male (44.9%). Participants were grouped into 8 areas of knowledge: Agrarian Sciences, Biological Sciences, Health Sciences, Exact and Earth Sciences, Human Sciences, Applied Social Sciences, Engineering and Linguistics, Languages, and Arts. Figure 1 shows the frequency of participants for each area, in percentage.



**Figure 1.** Relative frequency by area of knowledge.

Participants who reported having at least one vocal sign or symptom represented a total of 82.2% (546 professors) and 29.1% (193 professors) reported having at least 5 of the 14 items

investigated. The most frequent symptom was dry throat, being reported in 51.4% of responses. Figure 2 shows the frequency of presentation of each symptom.



**Figure 2.** Relative frequency of vocal signs and symptoms.

Through factor analysis, it was possible to group vocal signs and symptoms into four groups that were related according to a presentation pattern in the responses to the questionnaire. For the

analysis, the value of the KMO index was 0.836, an indicator that the factor analysis is adequate. Table 1 shows the groups formed.

**Table 1.** Presentation of vocal signs and symptoms in four groups

	Group 1	Group 2	Group 3	Group 4
Hoarseness	0,478	-	-	-
Voice tires or changes quality after short use	0,653	-	-	-
Trouble speaking or singing softly	-	0,740	-	-
Difficulty projecting voice	-	-	-	0,541
Difficulty in high-pitched singing	-	0,764	-	-
Discomfort while using voice	0,720	-	-	-
Monotone voice	-	-	-	0,733
Effort to talk	0,701	-	-	-
Dry throat	-	-	0,450	-
Sore throat	0,661	-	-	-
Throat clearing	-	-	0,667	-
Acidic and/or bitter taste in the mouth	-	-	0,746	-
Voice instability or trembling	0,505	-	-	-

Factor analysis by main components and with Varimax rotation (Kaiser normalization).

The groups were named group 1, group 2, group 3, and group 4. The question swallowing difficulties was not allocated in any of them as it reached a value below the minimum to be considered in the factor analysis (0.348).

The median and average of vocal signs and symptoms were higher for females when compared to males, with medians 3 and 2 and averages 3.4 and 3.1, respectively. The gender variable was related to vocal signs and symptoms using Pearson's chi-square test (Table 2).

**Table 2.** Frequency of vocal signs and symptoms by sex.

	Female	Male	p-value
	n (%)	n (%)	
Hoarseness	83 (22.7)	58 (19.5)	0,362
Voice tires or changes quality after short use	137 (37.4)	91 (30.5)	0,075
Trouble speaking or singing softly	71 (19.4)	58 (19.5)	1,000
Difficulty projecting voice	89 (24.3)	57 (19.1)	0,131
Difficulty in high-pitched singing	139 (38.0)	139 (46.6)*	0,030**
Discomfort while using voice	52 (14.2)	30 (10.1)	0,135
Monotone voice	59 (16.1)	57 (19.1)	0,362
Effort to speak	81 (22.1)	65 (21.8)	0,996
Dry throat	210 (57.4)*	131 (44.0)	0,001**
Sore throat	100 (27.3)*	60 (20.1)	0,039**
Swallowing difficulties	17 (46)	17 (5.7)	0,66
Throat clearing	105 (28.7)	94 (31.5)	0,475
Acidic and /or bitter taste in the mouth	66 (18.0)	38 (12.8)	0,079
Voice instability or trembling	49 (13.4)	28 (9.4)	0,140

Pearson's chi-square test.

Key- n: number of participants who presented the symptom; %: percentage relative to the number of participants who presented the symptom within the corresponding sex; \*: sex with statistical significance; \*\*: statistically significant p-value.

The symptoms that showed statistical significance were: difficulty singing high-pitched ( $p=0.030$ ), dry throat ( $p=0.001$ ) and sore throat ( $p=0.039$ ). The first was more frequent in males and the last two in females.

The area of knowledge variable was also associated with vocal signs and symptoms by Pearson's chi-square test. Only voice tiring or changing quality after short use was statistically significant ( $p=0.010$ ). In this variable, the Biological Sciences area had an adjusted residual of 2.9, indicating that it was the area that most manifested this symptom (57.6%) when compared to the others, significantly. On the other hand, the Health Sciences area had an adjusted residual of -2.7, showing that this symptom is less (24.0%) when compared to the others, significantly. The adjusted residual value shows which factors obtained more (residual greater than 2.0) or less (residual less than -2.0) presentations with statistical significance for the different items

evaluated. The tests performed with the other symptoms were not statistically significant.

## Discussion

The present study analyzed the presentation and occurrence of vocal signs and symptoms and verified whether there was a difference in these parameters according to sex and/or area of knowledge in university professors conducting online classes and meetings during the pandemic period due to the COVID-19.

Regarding the studies<sup>4,7,13-22</sup> that sought to research this same population, it were found, which presented an average of 269.2 participants, with only two<sup>13,14</sup> having a larger sample (both with 846 professors than that of the present study, which had a sample of 664 participants. However, these two<sup>13,14</sup> deal with the theme of risk factors for vocal disorders.



A systematic review and meta-analysis, carried out in works in English and Persian, recently showed the prevalence (41%) in which vocal alterations occur in university professors<sup>2</sup>. In this study, the averages of vocal signs and symptoms for both sexes indicated values close to (3.4 in women and 3.1 in men) and lower than the findings of other studies<sup>6,12</sup>. The literature points to a higher occurrence of vocal disorders in females due to their glottis configuration<sup>26</sup>, but one cannot fail to consider other characteristics of comparison. Individual specificities can interfere in the process of manifestation of alterations using the voice, such as the amount of speech, the effort made to do so, habits aimed at vocal hygiene, anxiety/stress, and hormonal changes, among others<sup>2</sup>.

In the largest epidemiological study of vocal disorders in teachers, conducted in Brazil<sup>6</sup>, an average of 3.7 vocal signs and symptoms was found, and in an American survey<sup>12</sup> this average reached 4.3. These studies were carried out with the participation of elementary and high school teachers. The averages identified in the current study agree with a recent study conducted with university professors<sup>15</sup>, suggesting that higher education teachers tend to have fewer vocal signs and symptoms when compared to elementary and high school teachers. A study showed that basic education teachers miss work more often due to vocal changes than teachers who work in teaching with adult students, indicating that there is a greater vocal demand on teachers in primary education<sup>23</sup>.

A study during the context of the pandemic, in which remote activity was predominant and all the adaptation occurred, showed that the use of the voice less frequently and with reduced intensity, decreased vocal symptoms<sup>10</sup>. Furthermore, during this period, it was concluded that monitoring is necessary to ensure that adaptations are made to preserve the voice and ensure effective communication, with a change in the way teachers communicate during classes<sup>29</sup>.

Through the application of the VSSQ, the presence of five or more vocal symptoms was also a finding of studies previously mentioned<sup>6,12,15</sup>, this finding occurring in 34.9% of Brazilian teachers<sup>6</sup>, in 42.3 % of North American professors<sup>12</sup> and 24% of university professors<sup>15</sup>. The current study reached a percentage of 29.1% (193 professors) in this criterion.

Behlau et al. indicated, in their Brazilian epidemiological study, that there was a greater report of vocal problems in the southeastern region and less in the south<sup>6</sup>. The findings of our study (with professors from the Southern region) indicated that a higher percentage of teachers reported having at least 5 vocal signs or symptoms when compared to the study by Gomes et al.<sup>15</sup>, which was carried out in the Southeast of Brazil.

Among the vocal signs and symptoms listed in the VSSQ, the most common presented by teachers, according to the literature are: dry throat, hoarseness, voice tires or changes quality after short use, and throat clearing<sup>6,12,15,16,24</sup>. More than half of the participants in the current study reported having the symptom dry throat, making it the most reported. This symptom was identified as one of the most frequent in all studies cited<sup>6,15,16,24</sup>, except for that of Roy et al.<sup>12</sup>. The high reference rate for dry throat is mainly due to dryness of the vocal tract due to lack of hydration or insufficient hydration, since many teachers do not have the habit of drinking water during classes<sup>14,16,17,23,24</sup>, which can be inferred that in the context of virtual classes, this may have intensified.

The second symptom highlighted in the responses to the questionnaire was that of difficulty in high-pitched singing. Despite not being constantly reported by other teachers in other studies, it was the second most mentioned by Gomes et al. in the study carried out with university professors<sup>15</sup>. This fact could not be explained by the authors, given that singing is not an activity normally practiced in higher education classes<sup>15</sup>. According to Smith et al., the symptom was presented twice as often in teachers than in non-teachers<sup>27</sup>. The hypothesis to explain this finding is that this variable is strongly influenced by the high vocal demand presented by professors, since the practice of singing also requires vocal effort and intense use of the voice, being factors that contribute to the increase in vocal fatigue.

Hoarseness was widely cited as one of the main symptoms present in teachers<sup>6,12,15,16,24</sup>. In studies by Roy et al.<sup>5</sup> and Behlau et al.<sup>6</sup>, it was the most recurrent. Gomes et al., indicated that this symptom was presented by 25.4% of university professors, being in the fifth position in the ranking<sup>15</sup>. On the other hand, in the present study, it ranked eighth among the 14 vocal signs and symptoms, being indicated by 21.2% of the subjects. The hypothesis for this di-

vergence is that, due to the distance learning format, professors are showing adaptations in their vocal habits, in view of the voice's self-perception due to changes in the work environment and the lack of social coexistence in the university environment.

Given this, the low occurrence of hoarseness differed from the data found in the literature<sup>6,12,15,16,24</sup>. Differences in the presentation of vocal signs and symptoms may have been influenced by the pandemic caused by the new coronavirus (SARS-CoV-2), which required the practice of social distancing to decrease the chain of transmission of COVID-19<sup>9</sup> and, because of this, it interrupted the occurrence of in-person classes and face-to-face meetings, which took place remotely using the distance education methodology and, thus, characterizing a new work context for most university professors.

Unlike other levels of education, the predominant sex among higher education teachers is still male. The Higher Education Census to 2019, of National Institute of Educational Studies and Research Anísio Teixeira (Inep, 2019) revealed that 54.2% of university professors in Brazil are men and 45.8% are women<sup>28</sup>. Even though the number of participants in the present study is mostly female (55.1%), there is a homogeneous distribution regarding sex in the sample. Thus, the data agree with those from Inep.

The vocal signs and symptoms that showed statistical significance according to the respondents' sex were: difficulty in high-pitched singing, dry throat and sore throat (table 2). The difficulty in high-pitched singing was predominant in 46.6% of the male participants. This is due to the fact that men have a low voice, with an average fundamental frequency ( $F_0$ ) between 80 and 150 Hz. In contrast, female vocal physiology favors high frequencies because the average  $F_0$  is 150 to 250 Hz. For this reason, the number of women who had difficulty in high-pitched singing was significantly lower (38%).

Women reported more often, with statistical significance, the symptoms of dry throat and sore throat when compared to men. A study carried out with the general population, which compared the presentation of vocal symptoms according to sex, pointed out sore throat as more frequent in females<sup>26</sup>. In the present study, the symptom dry throat was reported by 57.4% of women and 44%

of men. The other vocal signs and symptoms were not statistically significant for the gender variable.

The different areas of knowledge were related to vocal signs and symptoms. The symptom referred to as voice tires or changes quality after short use, showed a statistically significant difference in two areas of knowledge: greater presence in the Biological Sciences area, in which 19 of the 33 professors mentioned it, and less in the Health Sciences area, only 30 of the 125 professors reported it. The hypothesis for the finding is that health professors intuitively have a greater interest and health care in general, which is reflected in vocal health, when compared to professors in other areas.

Some studies also point out relationships between vocal symptoms<sup>6,7,13,23,30</sup>. Group 1 consisted of six vocal signs and symptoms: hoarseness, voice tires or changes quality after short use, discomfort while using voice, effort to talk, sore throat and voice instability or trembling (Table 1). Sliwinska-Kowalska et al. showed that the symptoms of voice instability, hoarseness, and effort to talk were correlated with incomplete glottis closure, verified by laryngological exams, in Polish teachers<sup>23</sup>. In addition, it also confirmed the significance of neck muscle hypertension, voice instability, and vocal effort as risk indicators for the development of occupational vocal disorders<sup>23</sup>, it is validating the hypothesis that all of these symptoms may be associated with adaptations due to remote work during the pandemic, which is a teaching method that requires greater demand from the teacher in relation to body posture, time using the computer, and tasks resulting from activities in distance education.

A cross-sectional study carried out with university professors<sup>13</sup> sought to investigate pain or irritation in the throat. In it, 61.4% of the teachers with this symptom also presented hoarseness, as well as 78.8% of the participants with hoarseness, complained of a sore throat, demonstrating that these two symptoms are associated<sup>13</sup>.

Vocal fatigue is mainly characterized by tiredness when speaking and can be defined by several symptoms that belong to group 1. It is often related to feelings of effort to speak, vocal instability, sore throat, hoarseness, and tension in the neck and shoulders. These symptoms occur due to several risk factors that teachers are exposed to. Research has shown that using the voice regularly at high intensity can cause vocal fatigue and lead to the development of vocal disorders<sup>6</sup>.



Group 2 consisted of two variables: trouble speaking or singing softly and Difficulty singing high-pitched. In agreement with the findings of this study, Behlau et al. obtained these two symptoms as the main contributors in the group<sup>6</sup>. However, other symptoms, defined by them as phonatory<sup>26</sup>, are in this same grouping, which can lead to the interpretation that the difficulties and problems in singing may result from the vocal load of the other symptoms found.

Group 3 was formed by three elements: dry throat, throat-clearing and acidic and/or bitter taste in the mouth. According to study<sup>30</sup>, these symptoms are often associated with Laryngopharyngeal reflux (LPR). The most common vocal symptoms in individuals with LPR are dry throat, hoarseness, and throat clearing<sup>30</sup>. Another study found, among the symptoms most reported by female teachers with the presence of signs suggestive of LPR, dry throat and throat-clearing<sup>30</sup>. When compared to teachers without suggestive signs, the symptom clearing throat was not frequent<sup>30</sup>, suggesting that clearing throat may be linked to the LPR.

Group 4 integrated two symptoms: difficulty projecting voice and monotone voice. Rodrigues et al. indicated that vocal tension in teachers was similar to the difficulty projecting voice, discomfort, and the effort to talk<sup>25</sup>. The symptom swallowing difficulties was not allocated to any group, but it is found in the literature as related to the LPR<sup>30</sup>.

One of the limitations of the study was that it was carried out only in the State of Rio Grande do Sul and another was the completion of the form in a virtual manner, which would be preferable in person because even with support for filling out the form, there was no request for this assistance. The research analyzed the vocal signs and symptoms self-reported by professors in the practice of online activities while considering the adverse demands of this scenario. The results found evidenced the importance of developing targeted vocal health programs. For future research, a speech-language pathology assessment is suggested at the time of the professor's work in loco, to observe the frequency that these signs and symptoms appear and analyze the reason for such occurrence.

## Conclusion

University professors self-reported physical and functional vocal symptoms during the CO-

VID-19 pandemic period, with a prevalence of dry throat sensation and difficulty in high-pitched singing. These results lead to the design of speech therapy interventions with assertive strategies for the vocal demand of this population in the context of distance education.

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