

# The Brazilian speech-language pathology publication's scenario in teacher's voice area: a scoping review

## Cenário da publicação fonoaudiológica brasileira na área voz do professor: uma revisão de escopo

## Escenario de la publicación brasileña de terapia del habla y el lenguaje en el área de la voz del docente: una revisión de alcance

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### Abstract

**Introduction:** Teachers are the professional category at greatest risk for dysphonia, being the most studied in speech therapy literature, in the area of voice, which shows the importance of knowing more about their vocal aspects and raising existing gaps so that future researches can fill. **Objective:** To map and characterize primary research in the area of teacher voice, published in national journals of speech-language pathology and audiology, from 2011 to March 2021. **Methods:** a scoping review, carried out in LILACS, SciELO databases, and a complementary search in the references of the included articles and journal websites. Articles from primary studies published between January 2011 and March 2021 were collected. The electronic search resulted in 247 articles, of which only 78 were included in this review.

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#### Authors' contributions:

MAS: Responsible for data collection, tabulation of results, analysis, and organization of the manuscript.

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**Received:** 19/11/2021

**Accepted:** 08/08/2022

**Results:** the studies were mostly observational (65.4%), with the highest publication peak (20.5%) in 2016; with 53.8% of the studies conducted in the Southeast region, with the largest publication in the state of São Paulo (34.6%). With regard to thematic categories, correlation/association studies were more prevalent (24.4%), followed by self-perception (12.8%) and symptomatology (11.5%). **Conclusion:** During the search period, 78 studies were found in the area of the teacher's voice, published in national journals of Speech-Language Pathology and Audiology. There is a prevalence of quantitative studies, especially those with observational design, the highest peak of publications was in 2016 and the Southeast region leads the number of publications.

**Keywords:** Teachers; Professors; Dysphonia; Voice

## Resumo

**Introdução:** Os professores são a categoria profissional com maior risco para a disfonia, sendo a mais estudada na literatura fonoaudiológica na área da voz, o que mostra a importância de conhecer mais sobre os seus aspectos vocais e levantar as lacunas existentes para que pesquisas futuras possam preenchê-las satisfatoriamente. **Objetivo:** Mapear e caracterizar as pesquisas primárias na área da voz do professor, publicadas em periódicos nacionais de Fonoaudiologia, no período de 2011 a março de 2021. **Métodos:** Trata-se de uma revisão de escopo, realizada nas bases de dados LILACS, SciELO, além de uma busca complementar nas referências dos artigos incluídos e sites dos periódicos, foram levantados artigos de estudos primários publicados entre janeiro de 2011 e março de 2021. A busca eletrônica resultou em 247 artigos, dos quais apenas 78 foram incluídos na presente revisão. **Resultados:** Os estudos foram, em sua maioria, do tipo observacional (65,4%), com maior pico de publicação (20,5%) no ano de 2016; sendo 53,8% dos estudos conduzidos na região Sudeste, com maior publicação no estado de São Paulo, 34,6%. No que se refere às categorias temáticas, os estudos de correlação/associação foram mais prevalentes (24,4%), seguidos dos estudos que versam sobre autopercepção (12,8%) e sintomatologia (11,5%). **Conclusão:** No período da busca foram encontrados 78 estudos na área da voz do professor, publicados em periódicos nacionais de Fonoaudiologia. Há uma prevalência de estudos quantitativos, principalmente, aqueles com desenho observacional, o maior pico de publicações foi em 2016 e a região sudeste lidera o número de publicações.

**Palavras-chave:** Professor; Docente; Disfonia; Voz.

## Resumen

**Introducción:** Los docentes son la categoría profesional con mayor riesgo de disfonía, siendo los más estudiados en la literatura logopédica, en el área de la voz, lo que demuestra la importancia de conocer más sobre sus aspectos vocales y plantear los vacíos existentes para que las investigaciones futuras puedan llenar. **Objetivo:** Mapear y caracterizar la investigación primaria en el área de la voz docente, publicada en revistas nacionales de Terapia del lenguaje, desde 2011 a marzo de 2021. **Métodos:** Se trata de una revisión de alcance, realizada en LILACS, bases de datos SciELO, además de una búsqueda complementaria en las referencias de los artículos incluidos y sitios web de revistas. Se recopilaron artículos de estudios primarios publicados entre enero de 2011 y marzo de 2021. La búsqueda electrónica dio como resultado 247 artículos, de los cuales solo 78 se incluyeron en esta revisión. **Resultados:** Los estudios fueron en su mayoría observacionales (65,4%), con el pico de publicación más alto (20,5%) en 2016; siendo el 53,8% de los estudios realizados en la región Sudeste, con la mayor publicación en el estado de São Paulo, el 34,6%. En cuanto a las categorías temáticas, los estudios de correlación / asociación fueron más prevalentes (24,4%), seguidos de la autopercepción (12,8%) y la sintomatología (11,5%). **Conclusión:** Durante el período de búsqueda, se encontraron 78 estudios en el área de la voz del docente, publicados en revistas nacionales de Patología del Habla y el Lenguaje. Existe una prevalencia de estudios cuantitativos, especialmente aquellos con diseño observacional, el pico más alto de publicaciones fue en 2016 y la región Sudeste lidera el número de publicaciones.

**Palabras clave:** Profesor; Afonía; Voz.

## Introduction

The voice allows the individual to reflect his personality, give tone to words and messages, express his feelings and socially relate in his daily life<sup>1,2</sup>. An alteration that prevents the natural production of this voice is called dysphonia, compromising social and professional communication, with voice professionals being the most susceptible to this type of alteration<sup>3,4</sup>.

According to studies<sup>5,6</sup>, teachers are the voice professionals with a higher prevalence of dysphonia when compared to non-teachers, corresponding to 11,6% to 7,5%, respectively<sup>6</sup>. Another study, conducted with 317 elementary and high school teachers, found that 81% of the participants had dysphonia<sup>7</sup>.

Teachers are, therefore, the professional category at most significant risk for dysphonia and the most studied in the speech-language pathology literature in the area of voice, a factor that certifies the importance of knowing more about this group of workers and their vocal aspects. Among the topics studied, a previously published study pointed to self-perception, symptom assessment, verbal assessment, and knowledge of the work environment and its influences on voice health<sup>8</sup>.

It should be noted that, despite new research, they were carried out more than 10 years ago. Therefore, it is necessary to update the findings that have already been found, as well as the discovery of gaps in the area. For the authors, many professors in Brazil and the accessibility to this population may be the reason for the great products in this area.

From the vast number of publications, it is possible to perceive an even better behavior of professors; they still seek to know the challenges of university professors, still seek the challenges of university professors, in addition to studies, in addition to meeting the behavior problems of teachers.

In a preliminary search in the LILACS databases (via VHL), Medline (via PubMed), JBI Database of systematic reviews and implementation reports, and OSF Registries, only the publication of a scoping review protocol<sup>9</sup> was found, which addresses the topic related to the promotion of occupational health of higher education teachers. This review of studies presents a broad proposal, aiming at a thematic characterization of scientific studies of specific studies on the theme “teacher’s voice,” related to all levels of education.

The choice for this type of review arose because it is a study that allows mapping, following a rigorous and transparent method, the state of the art of a particular thematic area and analyzing it descriptively, being able to glimpse both a previous study for the conduction of other studies, as well as a systematic review or a primary study<sup>10</sup>. Thus, the adoption of this proposed method, in the review, makes it possible to map the main concepts, explain specific areas of research and identify knowledge gaps<sup>11</sup>.

Given the above, the objective of the present study was to map and characterize the primary research in the area of the teacher’s voice, published in national journals of Speech-Language Pathology and Audiology, from 2011 to March 2021, through a scoping review.

## Methods

This is a scope review study, conducted by the recommendations of the Joanna Briggs Institute Reviewer’s Manual<sup>11</sup> and the PRISMA extension for Scoping Review (PRISMA-ScR)<sup>12</sup> respecting what was proposed in the protocol<sup>13</sup>, registered in the OSF Registration, under-identification [osf.io/7uf8d](https://osf.io/7uf8d).

The research question developed for this review respected the PCC acronym (P – participant, C – concept and C – context) with the following question: “How is Brazilian research on the teacher’s voice, published in Speech-Language Pathology journals, characterized?, in the period from January 2011 to March 2021?”

Respecting the PCC, teachers of any level of education (Child Education, Elementary, Middle or Higher Education, as well as Youth and Adult Education) were included as participants, in any age group and gender, regardless of the time of work and service ( public or private), whether or not they had voice-related complaints. Regarding the concept, studies published in national speech therapy journals were included and the context considered corresponded to national studies on the teacher’s voice, in a public or private environment.

As for the types of studies included, primary research studies were chosen in the specifics of scientific articles from interventional or observational studies, with quantitative, qualitative (regardless of study design) or mixed approaches. Preliminary studies carried out with teachers from other teach-

ing modalities (singing, music, performing arts) and the same review type (narrative, systematic, scope, or any other) were excluded.

The research was characterized considering: the study design, region and state in which the study was developed, level of education and themes, involving interventions or observations, or even case or experience reports, with approaches that ranged from health promotion vocal until the rehabilitation process.

An initial survey was carried out in LILACS (via VHL), to identify the words in the titles and

abstracts of the articles, to be used in the construction of the search strategy with the indexed descriptors (DeCS). Then, an extended search was carried out in the LILACS database (via VHL) and in the Scientific Electronic Library Online (SciELO), which store national journals in Speech-Language Pathology and Audiology. Finally, an additional search was carried out on the journals' websites and the references of the studies selected for the review. The descriptors and search strategy used can be seen in Chart 1.

**Chart 1.** Search strategies used in the databases.

Basis Strategy Number of articles retrieved	Basis Strategy Number of articles retrieved	Basis Strategy Number of articles retrieved
LILACS (via BVS)	((("professor" OR "professores" OR "docente" OR "docentes") AND ("voz" OR "distúrbios da voz" OR "disfonia")) AND ( db:("LILACS") AND la:("pt") AND year_cluster:("2011" OR "2012" OR "2015" OR "2014" OR "2016" OR "2017" OR "2019" OR "2013" OR "2020" OR "2018")) AND (year_cluster:[2011 TO 2021])	117
SciELO	("professor" OR "professores" OR "docente" OR "docentes") AND ("voz" OR "distúrbios da voz" OR "disfonia")	95

Limits were established regarding the period of publication: January 2011 to March 2021, aiming at identifying studies produced in the last decade and because a review of a different nature was published in 2010, seeking research until 2008. The limit, as for the language, is because the interest is only in studies published in Brazilian Speech-Language Pathology and Audiology journals.

After the search, the records were imported to a reference manager, Mendeley (from Elsevier) to check for duplicates and select them. The selection of studies was carried out by two reviewers (MA; EM) in two stages, the first stage consisted of reading titles and abstracts, and the second consisted of reading the studies in total. The authors performed the reading independently and, in cases of disagreement, a third author (VP) arbitrated on the inclusion or not of the studies, in both phases of the selection.

For eligible studies, two authors (MA; LC) independently extracted information using a data

extraction form designed for the present review. The form included information regarding the type of study, year of publication, sample, region and state of the study, and the topic of interest to the researchers. The form was calibrated with ten of the studies included in this review, through a pilot test, by two authors (VP; EM). Conflicting data were resolved by consensus; thus, the final protocol for the collection was adjusted.

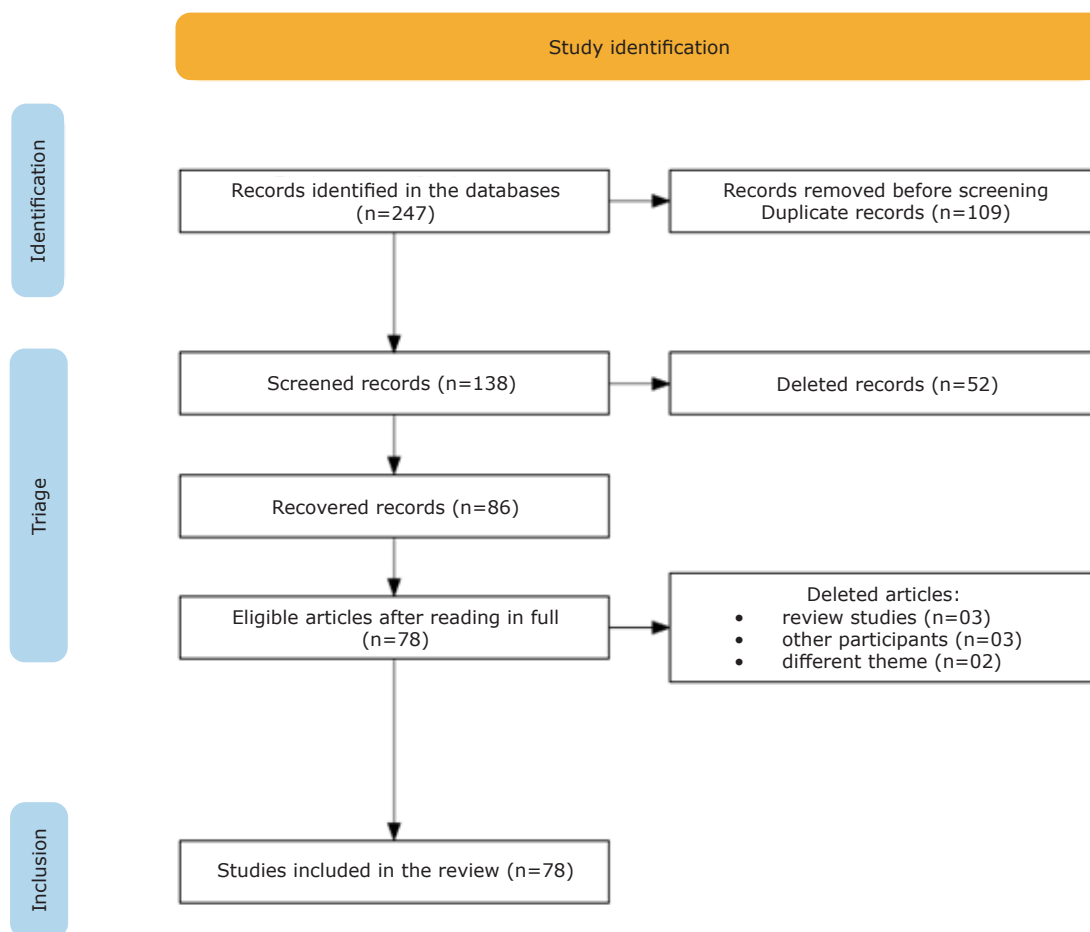
The results are presented in figures, charts and tables, accompanied by descriptive and narrative analysis. Nominal qualitative variables are presented using absolute and relative frequency, and calculations are performed using SPSS 17.0 software. The characterization of the studies, in terms of objectives, sample and thematic category, is presented in Chart 2.

Seeking to preserve the identity of the journals, they were identified by the letters A, B, C, D, E and F.

## Results

The electronic search resulted in 247 articles, of which 78 were included in the present review. After reading in total, the articles were excluded

due to review studies, as they addressed other types of participants, other than those eligible for the present research, and disagreed with the theme prioritized in this research. The article selection process is described in Figure 1.



**Figure 1.** Flow diagram, adapted from Page et al. (2021)<sup>12</sup>, presentation of the selection process of the included studies.

As for the characteristics of the included studies, these are described in Chart 2. In Table 1, the studies are characterized in quantity by journal, state thematic category and study design. Study designs were grouped as observational (for all descriptive and analytical studies), interventional

(clinical trials, quasi-randomized, before and after and randomized controlled trials), and experience/case reports. Qualitative approaches (for any qualitative category) and mixed approaches (those with quantitative and qualitative approaches) and quantitative studies were considered.

**Chart 2.** Characterization of publications regarding the year, study location, objectives, teachers' education levels, article theme and main conclusions

Author (year)/State	Aim	Level of education	Theme of the article
CAVALCANTE (2020) <sup>51</sup> Nordeste (AL)	To verify the relationship between stress, work environment and voice, in teachers of Kindergarten and Elementary School I of the Municipal Education Network.	Kindergarten and Elementary School I	Organizational working conditions
CERCAL (2020) <sup>43</sup> Sul e Sudeste	To characterize and compare the perception of vocal fatigue in university professors at the beginning and end of the school year.	University education	Symptomatology
DORNELLAS (2020) <sup>59</sup> Nordeste (SE)	To analyze the immediate effect of the air-sucking exercise on the vocal quality and vocal self-assessment of teachers.	Fundamental	Intervention effect
MACEDO FILHO (2020) <sup>60</sup> Nordeste (CE)	To report the speech therapy experience of fifteen health education actions through guidance and vocal preparation for teachers.	Kindergarten and Elementary Education	Vocal health and well-being
TONON (2020) <sup>56</sup> Sudeste (MG)	To describe the profile of self-reported personal behavior by university professors, and to verify the association of these profiles with the self-assessment of communicative aspects and vocal symptoms	University education	Correlation/Association between the findings
MASSON (2019) <sup>61</sup> Nordeste (BA)	To verify the effects of a warm-up (AV) and vocal cool-down (DV) strategy in teachers	High school	Intervention effect
ABOU-RAFÉE (2019) <sup>34</sup> Sudeste (SP)	To verify the self-perception of vocal fatigue of dysphonic teachers in teaching activities who seek speech therapy.	Kindergarten, Elementary and Secondary Education	Self-perception
DEPOLLI (2019) <sup>44</sup> Sudeste	To verify the fatigue index and vocal symptoms in university professors and to correlate the Vocal Fatigue Index (IFV) and Vocal Symptoms Scale (VSE) protocols	University education	More than one category
GIMENEZ (2019) <sup>35</sup> Sudeste (SP)	To verify the relationship between self-reported shyness and perceived voice handicap in Kindergarten and Elementary Education I and II teachers.	Early Childhood Education and Elementary Education I and II.	Self perception
LIMOIRO (2019) <sup>45</sup> Sudeste (RJ)	To analyze and compare the occurrence of voice signs and symptoms and vocal tract discomfort in teachers from different levels of education.	Kindergarten, Elementary and Middle School.	Symptomatology
FERREIRA (2019) <sup>62</sup> Sudeste (MG)	To analyze the impression of the participants of a course included in the Vocal Welfare Program, aimed at teachers from the network of a municipality, offered in the form of Distance Education (DE).	No information	Intervention effect
SANTOS (2019) <sup>37</sup> Sem informação	To identify public school teachers' perception of their voices and the type and focus of coping strategies they use when they perceive vocal changes.	Early Childhood Education and Elementary School I and II	Self-perception
PAULA (2019) <sup>36</sup> Sul (PR)	To analyze the perception of fatigue in university professors according to the level of knowledge about vocal health and hygiene.	University education	Self-perception
FREITAS (2019) <sup>17</sup> Nordeste (PB)	To identify whether there is a correlation between the Screening Index for Voice Disorders and the working conditions of teachers in public and private schools and to compare them between teachers from both schools.	No information	Correlation/Association between the findings
CAVALCANTI (2018) <sup>63</sup> Sudeste (SP)	To analyze the effects of the Comprehensive Vocal Rehabilitation Program (PIRV) and the motivational stages during voice therapy in teachers with behavioral dysphonia.	No information	Intervention effects
NOGUEIRA (2018) <sup>64</sup> Sudeste (MG)	After participating in the Comprehensive Vocal Rehabilitation Program, verify the changes in vocal habits and the perception of the work environment of teachers with behavioral dysphonia.	No information	Intervention effects
AMARAL (2017) <sup>38</sup> Sudeste (SP)	To verify the vocal tract discomfort self-reported by teachers, compared with the vocal self-assessment, in the moments of pre-workday, post-period of four hours and post-period of eight hours of class.	Early Childhood Education and Teaching	Self-perception
DORNELAS (2017) <sup>39</sup> Nordeste (SE)	To correlate voice disorder self-report with habits that influence voice production and situations of violence experienced by teachers.	Elementary School	Self-perception
DORNELAS (2017) <sup>40</sup> Nordeste (SE)	To know the self-perception of teachers' glottic function and voice handicap and to identify whether there is a correlation and association between these two variables.	Elementary School	Self-perception
SOUZA (2017) <sup>65</sup> Nordeste (BA)	To verify the effects of the phonation exercise in a commercial straw on the voice of teachers.	Early childhood education to the Youth and Adult Education Program – EJA	Intervention effects

Author (year)/State	Aim	Level of education	Theme of the article
CHRISTMANN (2017) <sup>66</sup> Sul (RS)	To verify vocal acoustic, auditory-perceptual and videolaryngostroboscopic measures in dysphonic teachers from two study groups, before and after a brief and intensive therapy program with the finger kazoo technique, comparing them with each other and with the respective control groups.	University education	Intervention effects
SOUZA (2017) <sup>67</sup> Sudeste (MG)	To analyze the adhesion and satisfaction of teachers participating in a Comprehensive Vocal Rehabilitation Program – PIRV.	Kindergarten to higher education	More than one category
ANDRADE (2016) <sup>47</sup> Sudeste (SP)	To analyze the relationship between the presence of video laryngoscopic signs suggestive of laryngopharyngeal reflux (LPR) and voice disorder (VD) in teachers.	No information	Symptomatology
CARREGOSA (2016) <sup>21</sup> Nordeste (SE)	To correlate auditory-perceptual analysis data and self-perception of the glottic function of teachers from municipal schools.	Any level of education.	Correlation/Association between the findings
CIELO (2016) <sup>52</sup> Sul (RS)	To characterize and relate the vocal, occupational and general health profile of elementary school teachers in Santa Maria/RS.	Elementary School	Organizational working conditions
CRUZ (2016) <sup>46</sup> Sudeste (SP)	To evaluate the effect of the dynamic free field system, in the day, in the vocal symptoms and the vocal quality of a teacher in the classroom.	Elementary School	Symptomatology
FERREIRA (2016) <sup>20</sup> Sudeste (SP)	To analyze the association between voice disorders and workability in teachers from the municipal school system in São Paulo.	Kindergarten, Elementary and Secondary Education	Correlation/Association between the findings
GAMA (2016) <sup>68</sup> Sudeste (MG)	To calculate the phonation time and the cyclic dose of teachers with dysphonia and teachers without voice alteration during the teaching activity.	Elementary School	Vocal performance
GIANNINI (2016a) <sup>18</sup> Sudeste (SP)	To compare the answers referring to vocal symptoms in two versions of the Vocal Production Condition – Teacher (CPV-P) questionnaire, with responses on a Likert scale and a visual analog scale (VAS), to assess which is the best way to measure.	No information	More than one category
GIANNINI (2016b) <sup>69</sup> Sudeste (MG)	To analyze the definition of the concept of voice disorder through the presence of alterations in the voice auditory-perceptual and larynx visual-perceptual exams, the self-reference of vocal symptoms and the impact of the voice disorder disadvantage on the subject.	No information	Correlation/Association between the findings
GOMES (2016) <sup>33</sup> Sudeste (MG)	To investigate the perception of the environmental and psychosocial aspects of the work of teachers from public elementary schools and to relate them to the symptoms of vocal discomfort.	Elementary School	Correlation/Association between the findings
HERMES (2016) <sup>70</sup> Centro-oeste (MS)	Outline the epidemiological panorama on the teacher's voice in the Municipal Education Network of Campo Grande/MS, verifying the prevalence of self-reported vocal symptoms in this population.	Elementary School	Epidemiological profile
MENDES (2016) <sup>53</sup> Nordeste (PB)	To identify the correlation between the teachers' vocal intensity and the noise in the classroom, as well as between the vocal intensity and the symptoms of vocal tract discomfort, before and after the class.	Elementary School I.	Organizational working conditions
MEDEIROS (2016a) <sup>71</sup> Sudeste (MG)	To verify the number of vocal symptoms reported by teachers and the relationship with the self-perception of limitations in daily activities associated with voice, personal, occupational and clinical aspects.	No information	More than one category
MEDEIROS (2016b) <sup>41</sup> Sem informações	The aim of this study was to compare the social representations about voice disorders and coping with the problem, developed by teachers undergoing speech therapy.	Kindergarten, Elementary and Middle School	Self-perception
MELLO (2016) <sup>19</sup> Sul (RS)	To verify and correlate data on general health, vocal sensations, otorhinolaryngological diagnosis and time of vocal use in the work of a group of teachers from a medium-sized city in the interior of the state.	all levels	Correlation/Association between findings
POMPEU (2016) <sup>72</sup> Sudeste (SP)	To report the shared experience of building a health education project, through an intervention carried out at a distance, whose focus is health promotion, teacher awareness of vocal care and prevention of voice-related injuries.	No information	Intervention effects
SILVA (2016) <sup>73</sup> Nordeste (PB)	To associate vocal symptoms and their possible self-reported causes by public school teachers.	Elementary and high school	More than one category
ANHAIA (2015) <sup>74</sup> Sul (RS)	To verify the association between teaching time and vocal self-assessment in university professors.	University education	
SERVILHA (2015) <sup>42</sup> Sudeste (SP)	To investigate vocal knowledge and its importance as a pedagogical resource in university professors.	University education	Self-perception

Author (year)/State	Aim	Level of education	Theme of the article
CIELO (2015a) <sup>23</sup> Sul (RS)	To correlate the voice quality of life (QVV), auditory-perceptual and acoustic vocal assessment of teachers with vocal complaints.	Elementary School	Correlation/Association between findings
CIELO (2015b) <sup>24</sup> Sul (RS)	To describe and correlate spectrographic vocal measurements, presence of vocal complaints and occupational data of elementary school teachers.	Elementary School	Symptomatology
CIELO (2015c) <sup>25</sup> Sem informações	To describe the occurrence, correlate and associate the signs and symptoms of voice-related autonomic dysfunction with the occupational characteristics, vocal complaints, sex and age of a group of teachers.	Elementary School	Correlation/Association between findings
CIELO (2015d) <sup>22</sup> Sul (RS)	To associate and correlate voice handicap index, quality of life and vocal symptoms with gender, presence of vocal complaints and professional characteristics of teachers in Santa Maria (RS/Brazil).	Elementary School	Correlation/Association between the findings
FERRACCIU (2015a) <sup>25</sup> Nordeste (AL)	To verify the association between vocal disorder and sociodemographic characteristics, vocal aspects, types of coping strategies and the vocal impact on daily activities in teachers from the state education network in Alagoas.	Elementary School	Correlation/Association between the findings
FERRACCIU (2015b) <sup>76</sup> Nordeste (AL)	To verify the association between voice disorders and sociodemographic and organizational data (situations of violence) of teaching work, and between loss of work ability and psychosocial stress at work.	Elementary School	Correlation/Association between the findings
LIMA (2015) <sup>54</sup> Sul (RS)	To characterize and compare the self-assessment of speech quantity and voice volume, at work and outside work, and correlate it with teachers' vocal symptoms.	Elementary School	More than one category
PASCOTINI (2015) <sup>48</sup> Sul (RS)	To analyze the voice of elementary school teachers with vocal complaints according to the school system.	Elementary School	Symptomatology
ANHAIÁ (2014) <sup>77</sup> Sul (RS)	To compare the effects of perilyngeal manual massage and traditional vocal training in teachers with vocal complaints.	University education	Intervention effects
AZEVEDO (2014) <sup>78</sup> Sudeste (MG)	To study the communicative performance of a university professor, through the auditory-perceptual and acoustic analysis of prosodic aspects of voice and speech, and the analysis of gestures, investigating the interaction of these resources as expressive strategies.	University education	Communicative aspects
ARAGÃO (2014) <sup>79</sup> Sudeste (MG)	To analyze, from the auditory-perceptual point of view, the effects of professional and social voice use on the vocal quality of women, in a time interval of 2 hours and 30 minutes.	No information	Vocal performance
MACHADO (2014) <sup>49</sup> Sudeste (SP)	To verify the relationship between voice disorders and symptoms of temporomandibular disorders (TMD) in elementary school teachers.	Elementary School	Symptomatology
SERVILHA (2014a) <sup>26</sup> Sudeste (SP)	Correlate environmental conditions, work organization, self-reported vocal symptoms by university professors and speech therapy assessment.	University education	Correlation/Association between the findings
SERVILHA (2014b) <sup>27</sup> Sudeste (SP)	To relate self-reported perception of noise in the classroom and voice disorders in teachers.	University education	Correlation/Association between the findings
PAES (2014) <sup>50</sup> Sudeste (RJ)	To compare general and voice-related signs of autonomic dysfunction in teachers with and without vocal complaints.	Elementary and high school	Symptomatology
RIBAS (2014) <sup>80</sup> Centro-oeste (GO)	To verify the impact of a speech therapy action on the quality of life in the voice of teachers.	Elementary School	Intervention effect
COSTA (2013) <sup>81</sup> Nordeste (PB)	To analyze the interference of risk and emotional factors in the voice of teachers with and without complaints.	No informations	Epidemiological profile
SERVILHA (2013) <sup>82</sup> Sudeste (SP)	To evaluate the effect of speech therapy advice offered to university professors.	University education	Intervention effects
KARMANN (2013) <sup>83</sup> Sudeste (SP)	To identify, through reports of elementary school teachers, conditions that interfere, directly or indirectly, in their vocal performance and in the circumstances of their work.	Elementary School	More than one category
SANTOS (2013) <sup>84</sup> Sudeste (MG)	To study the possible factors associated with adherence to speech therapy for dysphonia in female teachers from the Municipal Education Network of Belo Horizonte.	No informations	Adherence to speech therapy
PIZOLATO (2013) <sup>85</sup> Sudeste (SP)	To assess risk factors for dysphonia in teachers and to associate them with the presence of voice disorders.	Elementary and high school	Epidemiological profile
XAVIER (2013) <sup>86</sup> Nordeste (PE)	To present an action to promote the vocal health of teachers from three municipal schools located in the Sanitary District III, in Recife-PE, within the scope of Primary Health Care - APS.	No information	More than one category



Author (year)/State	Aim	Level of education	Theme of the article
GAMA (2012) <sup>87</sup> Sudeste (MG)	To investigate the adherence to speech therapy guidelines of teachers from the municipal school system who were treated at the Voice Outpatient Clinic of the Hospital das Clínicas of the Federal University of Minas Gerais and who were discharged from speech therapy.	all levels	Adherence to speech therapy
FERREIRA (2012a) <sup>88</sup> Centro-Oeste (GO)	To survey teachers' knowledge about the predisposing factors for vocal well-being, in addition to verifying the use of practices that favor vocal well-being, according to teaching time.	No informations	Vocal health and well-being.
FERREIRA (2012b) <sup>58</sup> Sudeste (SP)	Assess voice quality, loudness and pitch variation, syllable lengthening, speech rate, pause and articulation, present in the speech of four high school teachers.	High school	Communicative aspects
GUIDINI (2012) <sup>28</sup> Sudeste (SP)	To identify whether there is a correlation between environmental noise inside the classroom, voice intensity and presence of voice disorders in teachers.	Elementary School I	Correlation/Association between the findings
LIMA-SILVA (2012) <sup>29</sup> Sudeste (SP)	To analyze the presence of voice disorders in teachers in the agreement between self-reference, perceptual assessment of voice and vocal folds.	Elementary and high school	Correlation/Association between the findings
LUCHESE (2012) <sup>89</sup> Sudeste (SP)	To analyze phonoarticulatory parameters of teachers, pre and post-program of vocal improvement.	Elementary School	Intervention effects
MEDEIROS (2012) <sup>90</sup> Sudeste (MG)	To know the factors associated with the search for vocal assistance among teachers.	Elementary School	Adherence to speech therapy
MORAIS (2012) <sup>30</sup> Nordeste (AL)	To evaluate the vocal quality, self-assessment and quality of life in voice in elementary school teachers from the 1st to the 5th year and to correlate the findings.	Elementary School	Correlation/Association between the findings
SERVILHA (2011) <sup>55</sup> Sudeste (SP)	To investigate the correlation between noise in the work environment and auditory and extra-auditory symptoms mentioned by university professors.	University education	Organizational working conditions
BASSI (2011) <sup>91</sup> Sudeste (MG)	To present sociodemographic, health, work and vocal characteristics of teachers with dysphonia at the Municipal School.	No information	Epidemiological profile
CAPOROSI (2011) <sup>16</sup> Sudeste (SP)	To identify the vocal habits self-reported by teachers, and to associate them with the presence of hoarseness, tiredness when speaking, dry throat and voice alteration, also self-reported.	Elementary and high school	Self-perception
DRAGONE (2011) <sup>92</sup> Sudeste (SP)	To describe a Vocal Health Program developed from 2002 to 2005, composed of basic voice groups offering practical theoretical knowledge of vocal care, with screening of the participants' voice quality; advanced groups seeking to reorganize phonation processes and vocal use in the classroom.	Kindergarten and elementary school	Vocal health and well-being
RICARTE (2011) <sup>31</sup> Nordeste (AL)	To analyze the vocal impact on daily activities in high school teachers. Correlate the findings of the self-perception of the vocal problem with the aspects: effects at work, daily communication, social communication and emotions.	High school	Correlation/Association between the findings
SERVILHA (2011) <sup>93</sup> Sudeste (SP)	To investigate the correlation between health problems and life and voice habits mentioned by teachers.	Elementary, High School and EJA	Correlation/Association between the findings
TUTYA (2011) <sup>94</sup> São Paulo (SP)	To verify how the impact of dysphonia in teachers is characterized by the protocols QVV (Quality of Life in Voice), VHI (Vocal Handicap Index) and VAPP (Profile of Participation and Vocal Activities), and to analyze the correspondence of the information obtained by these instruments.	No information	Correlation/Association between the findings

**Table 1.** Description in number and percentage of the distribution of publications by journals, State, study design and thematic category..

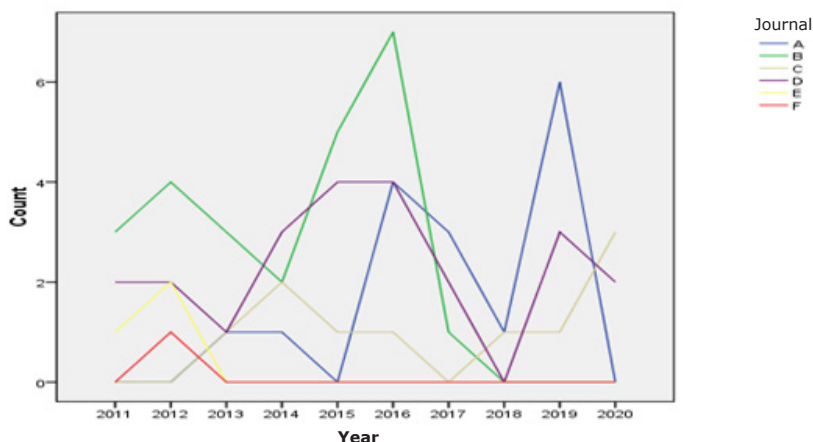
<b>Quantitative by journals</b>	<b>n</b>	<b>%</b>
Periodical A	16	20,5
Journal B	25	32,1
Journal C	10	12,8
Journal D	23	29,5
Journal I	03	3,8
Journal F	01	1,3
Total	78	100,0
<b>Distribution of publications by State</b>	<b>n</b>	<b>%</b>
São Paulo (SP)	27	34,6
Minas Gerais (MG)	12	15,4
Rio de Janeiro (RJ)	2	2,6
Espírito Santo (ES)	1	1,3
Pernambuco (PE)	1	1,3
Paraíba (PB)	5	6,4
Sergipe (SE)	4	5,1
Alagoas (AL)	5	6,4
Bahia (BA)	2	2,6
Ceará (CE)	1	1,3
Rio Grande do Sul (RS)	11	14,1
Goiás (GO)	2	2,6
Mato Grosso do Sul (MS)	1	1,3
Paraná (PR)	1	1,3
No information	3	3,8
Total	78	100
<b>Study design</b>	<b>n</b>	<b>%</b>
<b>As for the approach</b>		
- Quantitative	59	75,6
- Qualitative	07	9,0
- Mixed	01	1,3
- No information	11	14,1
Total	78	100
<b>As for the type</b>		
- Observational	51	65,4
- Interventional	06	7,7
- Other types	08	10,3
- No information	13	16,7
Total	78	100
<b>Regarding the control of interventional studies</b>		
- Controlled	01	16,6
- Not controlled	05	83,4
Total	06	100
<b>Thematic category</b>	<b>n</b>	<b>%</b>
Symptomatology	09	11,5
Self-perception	10	12,8
Intervention effects	12	15,4
Communicative aspects	03	3,8
Work conditions and organization	04	5,1
Correlation/association of findings	19	24,4
Vocal health and well-being	03	3,8
Epidemiological profile	04	5,1
treatment adherence	03	3,8
vocal performance	02	2,6
more than one category	09	11,5
Total	78	100
<b>Quantitative by type of education studied</b>	<b>n</b>	<b>%</b>
- Exclusive elementary education	21	26,9
- Elementary education 1 exclusive	2	2,6
- Exclusive high school	2	2,6
- University education	13	16,7
- Kindergarten and elementary school	5	6,4
- Kindergarten and elementary school 1	1	1,3
- Elementary and high school	05	6,4
- Various types of teaching	27	34,5
- No information	2	2,6
Total	78	100

**Caption:** n = number of publications; % = percentage of publications.

**Source:** survey data.

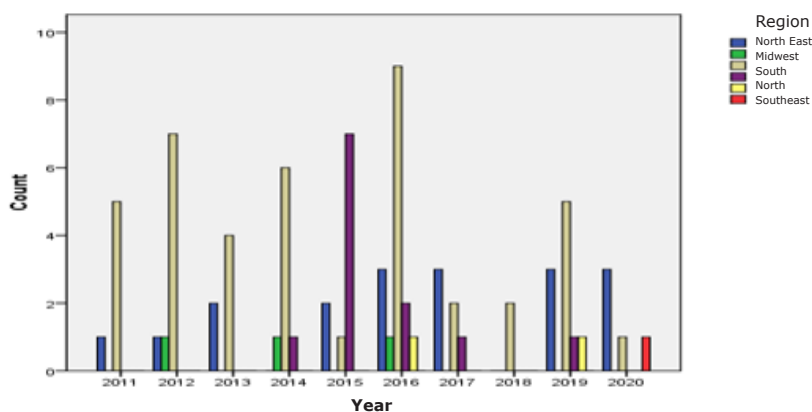
During the study, it was also noticed that some articles do not inform the type of research carried out (11; 14,1%). The highest occurrence, regarding the kind of inference, is for observational studies

(51; 65,4%), as shown in Table 1. Through Figures 2 and 3, it is possible to verify the distribution of publications by journals and region over the years.



Source: Research data.

**Figure 2.** Distribution of the number of articles published over the years, by journals.



Source: Research data.

**Figure 3.** Distribution of the number of articles published over the years, by Brazilian region.

Figure 2 shows that the highest peak of publications occurred in 2016 (16; 20,5%), with most publications concentrated in journal B. In 2019, after a period of decline in publications, the peak rose again (10; 12,8%). However, in 2020, there was a drop, with only five (6,4%) primary research articles published. From January to March 2021, no publications of preliminary studies were identified.

The quantitative analysis of journal publications showed journals B and D with the highest numbers of published primary studies. Two journals (E and F) were canceled after 2012, replaced by two others, thus resulting in a low rate of publications in this category.

Among the regions that published the most in the last 10 years are the Southeast region (42;



53,8%), the Northeast region (18; 23,1%) and the South region (12; 15,4%). A published article reported that the study was carried out with samples from two regions: South and southeast, and, therefore, not counted together with the quantitative per region. The states of São Paulo, Minas Gerais and Rio Grande do Sul lead the number of publications, respectively 27 (34,6%), 12 (15,4%) and 11 (14,1%).

## Discussion

The teaching activity is the highest risk for the development of voice-related disorders, with the theme “teacher’s voice” being widely studied in the Brazilian scientific literature. Denoting, by this bias, the concern of speech-language pathologists, who study the voice of the teacher, the relevance of covering this theme more, whether considering raising the profile of this population or identifying the most effective interventions to minimize the risks of developing a problem vocal.

A total of 78 primary studies developed between the periods from 2011 to March 2021, which leads to approximately eight publications per year. A previously mentioned study<sup>8</sup> surveyed 500 publications, from 1994 to 2008, in the area of teacher’s voice and identified 69 articles, which amounts to an approximate average of five articles per year, considering 15 years. There appears to be a significant increase in this publication average when comparing the literature survey period in the two studies.

The years 2015 and 2016 showed an essential peak of publications, but it began to fall, after that period, returning to reestablish itself, however, in 2019; but it did not remain high, falling, once again, until the end of the year 2020. This fact was probably caused by the moment of the Covid-19 pandemic, which negatively impacted the performance of primary studies, primarily in developing studies that involved direct contact with the participants, such as the field research.

The Southeast region led in the number of publications, with 42 (53.8%) studies, which can be explained by the greater concentration of teaching and research institutions in this region<sup>14</sup>. Similarly, a growing number of studies developed in the Northeast region which, except for the year 2018, maintained an average of three studies published per year, after 2016.

It should also be noted that most of the studies carried out focus on women, which can be justified by the fact that many studies have targeted teachers of kindergarten and elementary school I, in which, in general, a greater quantitative Female is acting. This gender is pointed out as the one with the highest prevalence of dysphonia, which can be explained by the anatomy physiological aspects and issues related to the different roles assumed by these women, making them more susceptible to the emergence of a vocal disorder<sup>5,6,85</sup>.

As for the possible risk factors for a voice disorder in teachers, it is attested that voice disorders are multifactorial, occurring, in most cases, due to poor working conditions, in addition to the excessive demand for weekly class hours and high voice intensity in the face of inadequate acoustics in classrooms and loud noises<sup>15,16</sup>.

In this research, it appears that most studies are from a single center; however, what proves to be more significant is the performance of multicenter studies, as it allows for expanding the sample, and collecting different information about this target population, in different regions. Distinct so that their results can be better interpreted and generalized.

Collecting more consistent data on the incidence by sex, age, length of profession, workload, exposure to risk factors for dysphonia among this audience and knowing the organizational environment in which the teacher is inserted, can be better analyzed in more extensive studies. These gaps in research with the teacher’s voice are harmful to the detail and consistency of the work carried out, and there is also a scarcity of interventionist studies with more robust designs to prove the effects of interventions.

Cross-sectional observational studies provide a momentary snapshot of the situation being studied and, over time, end up not providing robust data for clinical practice. However, they are the fastest, least expensive study designs and are the most commonly found in research with professors.

On the other hand, regarding the design of the studies, there is still a high occurrence of cross-sectional observational studies within Speech-Language Pathology and Audiology, especially on the subject of the teacher’s voice, which can be justified due to the fact that this is a faster study design to be carried out, and at a lower cost for the researcher.

The quantitative approach stands out, with both observational and interventional study designs, the latter still in small numbers. In addition, there is still a significant portion of articles that do not report, or do not fully detail, the type of study developed, limiting themselves to reporting only the segment cut (longitudinal or cross-sectional). The transparency and detailed description of the research development method allow clarity and guarantee security in its replication.

Thus, the literature mapping led to the identification and distribution of studies into 11 thematic categories (Symptomatology, Self-perception (report, teacher's own opinion), Intervention Effects, Communicative Aspects, Organizational work conditions, Correlation/association studies between the findings, Vocal health and well-being, Epidemiological profile (clinical, sociodemographic and occupational characteristics), Adherence (treatment / Participation in the program / speech therapy guidelines), Vocal performance and more than one category), presenting the different objectives existing in research with teachers. In a previous review<sup>8</sup>, involving several publication sources, not just articles, carried out from 1994 to 2008, the following categories of studies with the highest number of publications were evidenced: evaluation studies (70,6%) and bibliographic studies, theoretical or documentary, with 10,8%. The subcategories by perspective of analysis of the predominant assessments were: self-reported (52,4%) and auditory-perceptual (15,3%). Such findings are close to the results found in the present scoping review, even with a smaller number of mapped references.

Through the findings, it can be observed that correlation/association studies are more prevalent<sup>17-33</sup> (19; 24,4%), followed by those that studied self-perception<sup>16,34-42</sup> (10; 12,8%) and symptomatology<sup>24, 43-50</sup> (9; 11,1%), with these themes also associated.

Currently, it is possible to find, in the literature, several self-perception/self-assessment protocols that allow mapping symptoms, occupational aspects and quality of life, being widely used in research with the teacher's voice and, perhaps, being the reason for the prevalent amount of studies of correlation and self-perception.

Many studies have sought to associate symptoms, self-perception and work environment<sup>20,21,33,41,51-55</sup>. Remarkable aspects in studies on the teacher's voice, since, in the first symptoms

installed, it is verified how teachers self-evaluate or perceive a vocal problem, as well as how their work impacts on this difficulty and how they can help to prevent an increase in severity of the problem.

Communicative aspects begin to emerge among the themes of work with the teacher's voice<sup>56-58</sup>, highlighting the need to take a closer look at the communicative competences necessary for the work activity of teachers. Speech rate, use of pauses, voice quality and vocal intensity were aspects valued by students and determinants in choosing the order of preference of teachers, according to one of the studies carried out<sup>58</sup>. This finding shows the need to expand this research theme, also seeking to work on these communicative aspects among professors.

The present review made it possible to know what has already been explored in the literature on the subject and, thus, to reflect on future proposals for studies aimed at the vocal problem of the teacher, which include a comprehensive thematic approach that stands out from the point of view of health promotion and vocal well-being until the rehabilitation process, with studies that are methodologically well designed and capable of presenting evidence regarding the proposed interventions.

It is evident, then, through this research, that gaps, such as multicenter studies, clinical studies with longitudinal or even controlled segments, in addition to those focused on organizational aspects, may be necessary and conducted in future research.

Although it is recognized that the present study has limitations, which may have occurred due to the search strategy used to survey the studies to be included, as well as in relation to the distribution of studies by thematic categories, it should be emphasized, however, that the mapping allowed knowing the national publication scenario in the chosen area.

## Conclusion

From January 2011 to March 2021, 78 studies were found in the area of the teacher's voice, published in national Speech-Language Pathology and Audiology journals, in which the prevalence of quantitative studies and, among these, those with an observational design, should be emphasized, also, studies in which the authors do not provide clear information regarding the study design performed.

There was an amount of almost eight publications per year. The highest peak of publications was in 2016. The Southeast region leads the number of publications, emphasizing the states of São Paulo and Minas Gerais, which account for more than half of the publications mapped here.

The survey made it possible to know the different interests of researchers, emphasizing research that seeks to study correlations/associations between variables and teachers' vocal self-perception. The primary aspect, therefore, relevant for this study, should also be highlighted, the research focused on communicative aspects that, potentially, can bring results that improve more effective communication strategies for the teacher during their work activities.

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