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Voice disorder and quality of life in teachers: a case-control

Distúrbio de voz e qualidade de vida em professores: um estudo caso-controle

Trastorno de la voz y calidad de vida en docentes: un estudio de casos y controles

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Abstract

Introduction: the individual's perception of their voice and impacts on their daily lives has been the object of studies that seek the relationship between quality of life and well-being. **Objective**: to analyze the relationship between quality of life and the presence of voice disorder in teachers from the municipal network of São Paulo. **Method**: case-control study, paired by school, with 272 teachers from the municipal education network of São Paulo (167 cases and 105 controls) using questionnaires Vocal Production Condition-Teacher, World Health Organization Quality of Life/bref, speech therapy and otorhinolaryngological assessment, test of Chi-square association, logistic regression models to calculate the crude and adjusted Odds Ratio to assess risks in relation to the independent variables of interest. **Results**: the groups were similar in terms of sociodemographic data, functional situation, work environment and organization, and different in terms of self-reference to vocal symptoms, confirming the nature of a case-control study. In the descriptive analysis of each of the WHOQOL/bref domains, the one referring to the environment had the worst average, followed by the physical, psychological and social relationships. The physical domain was statistically significant when compared to the other

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domains, followed by the psychological and environmental domains. There was no significant difference on social relationships. **Conclusion**: there was an association between the presence of voice disorder and impairment of the physical domain of quality of life, with an increase of almost three times the chances of those who have voice disorder to have low scores in that domain.

Keywords: Voice Disorders; Faculty; Quality of Lfe; Working Condition; Epidemiology; Worker's Health.

Resumo

Introdução: percepção do indivíduo sobre sua voz e impactos no cotidiano tem sido objeto de estudos que buscam a relação entre qualidade de vida e bem-estar. **Objetivo:** analisar a relação entre qualidade de vida e presença de distúrbio de voz em docentes da rede municipal de São Paulo. **Método:** estudo do tipo caso-controle, pareado por escola, com 272 professoras da rede municipal de ensino de São Paulo (167 casos e 105 controles), responderam questionários Condição de Produção Vocal-Professor e World Health Organization Quality of Life/bref, avaliados fonoaudiológica e otorrinolaringológicamente. Foi realizado teste de associação de Qui-quadrado para análise entre a presença de distúrbio de voz e os domínios do WHOQOL/bref. e modelos de regressão logística para calcular a Razão de Chances bruta e ajustada para avaliar riscos em relação às variáveis independentes de interesse. **Resultados**: os grupos mostraram-se semelhantes quanto a dados sociodemográficos, situação funcional, ambiente e organização de trabalho, e diferentes na autorreferencia a sintomas vocais, confirmando a natureza de estudo caso-controle. Na análise descritiva de cada um dos domínios do WHOQOL/bref, o referente ao meio ambiente apresentou pior média, seguido pelo físico, psicológico e relações sociais. O domínio físico apresentou significância estatística se comparado aos outros domínios, seguido pelo psicológico e do meio ambiente. Não houve diferença significativa sobre as relações sociais. **Conclusão**: houve associação entre presença de distúrbio de voz e comprometimento do domínio físico da qualidade de vida, havendo um aumento de chances de quase três vezes de quem tem distúrbio vocal apresentar baixos escores no referido domínio.

Palavras-chave: Distúrbios da Voz; Docentes; Qualidade de Vida; Condições de Trabalho; Epidemiologia; Saúde do Trabalhador.

Resumen

Introducción: la percepción que tiene el individuo de su voz y los impactos en su vida diaria ha sido objeto de estudios que buscan la relación entre calidad de vida y bienestar. **Objetivo**: analizar la relación entre la calidad de vida y la presencia de trastorno de la voz en docentes de la red municipal de São Paulo. **Método**: estudio de casos y controles, pareado por colegio, con 272 docentes de la red de educación municipal de São Paulo (167 casos y 105 controles), respondieron los cuestionarios Condición de Producción Vocal-Docente y Calidad de Vida de la Organización Mundial de la Salud / bref y evaluaron logopedia y otorrinolaringología. El análisis estadístico incluyó la prueba de asociación de chi-cuadrado y modelos de regresión logística. **Resultados**: en los grupos, similitudes en cuanto a datos sociodemográficos, situación funcional, ambiente, organización del trabajo y diferencias en la autorreferencia a los síntomas vocales, confirmando la naturaleza de un estudio de casos y controles. En el análisis descriptivo de los dominios WHOQOL / bref, el medio ambiente tuvo el peor promedio, seguido de las relaciones físicas, psicológicas y sociales. Para el dominio físico, significación estadística en comparación con los otros dominios, seguido de psicológico y ambiental. En las relaciones sociales, no hubo diferencia significativa. **Conclusión**: hubo asociación entre la presencia de trastorno de la voz y el deterioro del dominio físico de la calidad de vida, con un aumento de casi tres veces las posibilidades de que quienes tienen trastorno de la voz tengan puntuaciones bajas.

Palabras clave: Trastornos de la voz; Profesores; Calidad de vida; Condiciones de trabajo; Epidemiología; Salud del Trabajador.

Introduction

The concept of quality of life is not limited to a health condition[1]. In this sense, there are quality of life assessment instruments that make it possible to establish a relationship with the measurement of complaints presented by individuals. This type of assessment helps to understand the issues related to a given disorder and the impact of the disorder on the subject's quality of life.

Knowing the individual's perception of their voice and their reactions to voice issues and their daily lives[2] has been the objective of some Brazilian[3,7] and international studies[8,9] that investigate the relationship between quality of life and vocal well-being.

It is known that teachers are the professionals involved in the largest number of studies among professionals who have their voices as an essential tool of communication and viability of their work[10,11]. The intensive use of voice during the work routine and adverse environmental[12,13] and work organization[14,15,16] conditions impact the physical and mental health of teachers and lead to a greater predisposition to vocal alterations, as recorded in several studies[16,17].

A systematic review[18] showed that there are only a few published articles on the quality of life related to the voice of teachers, with uneven distribution between levels of education and types of school. In addition, the studies found that the Voice-Related Quality of Life (V-RQOL) was the most used instrument, and that the physical domain had the most negative impact on the subjects surveyed. In this context, this instrument was used to characterize the population or assess the impact of an intervention.

Among these studies, there was a significant study[5] that investigated the V-RQOL data completed by 73 teachers of primary school with vocal complaints and it found a negative correlation between the teachers' vocal self-assessment and the V-RQOL, which means that the worse the quality of life recorded, the higher the score with regard to vocal complaints.

Another study[19] that aimed to verify the impact of a speech-language pathology action on the quality of life in the voice of teachers with vocal complaints, after carrying out the action, found an increase in voice perception, a decrease in some complaints and a slight improvement in the Voice-Related Quality of Life, considering the physical domain and the total score of the V-RQOL.

Aiming to investigate the impact of voice interventions of an educational nature on the quality of life and voice of teachers, the researchers[8] monitored 70 randomly selected teachers in 11 public schools. Thus, all participants were instructed on vocal hygiene habits and 40 (experimental group) were also submitted to an educational intervention with vocal training exercises. The evaluation of the study included the application of the V-RQOL before the intervention and three months after its conclusion.

Although subjects in the control and experimental groups of this study[8] reported signs and symptoms of voice disorders, the researchers did not consider these to have a negative impact on quality of life. After the intervention, teachers in both groups recorded higher scores in the total score of the V-RQOL and a statistically significant difference was found for the physical score, both for the control and experimental groups. Although no intra- and inter-group differences were found for each V-RQOL question, a pattern of change was found through the records of higher percentages for the categories.

In addition to using the V-RQOL instrument, other studies apply other instruments such as: Vocal Signs and Symptoms Questionnaire (QSSV, *Questionário de Sinais e Sintomas Vocais*); Voice Handicap Index (VHI); and Profile of Participation in Vocal Activities (PPAV, *Perfil de Participação em Atividades Vocais*), among others.

A study[7] that compared vocal and emotional characteristics in groups of teachers and non-teachers with low and high anxiety, using the QSSV, V-RQOL and VHI instruments, found that subjects with high anxiety had greater emotional, vocal and quality of life impairment, especially those who use their voices as a work tool, such as the teachers in the study.

Another study[9] that associated V-RQOL and PPAV scores to sociodemographic characteristics, vocal complaints, health and work conditions recorded that the mentioned characteristics associated with V-RQOL and PPAV scores had a significant association. This means that the scales showed high agreement, which makes it possible to conclude that the instruments are similar for the assessment of quality of life.

Although the studies listed here include instruments that contemplate characteristics pointing to quality of life conditions, the researchers understood that it would be pertinent to refer to the World Health Organization Quality of Life-bref (WHOQOL-bref) as it is an instrument that can be used, for example, in clinical practice as a resource for evaluating and comparing physical, psychological, social relationships and environment aspects. In addition, the use of this instrument makes it possible to compare the findings of this study to other studies that analyzed other disorders with teachers.

Even with a small sample, conducting a study using the WHOQOL-bref[31] made it possible to compare the quality of life among nursing professors from three universities in the context of the four domains, thus enabling the achievement of the objective. The methodology used proved to be adequate to obtain the main findings presented, highlighting the relevance of the study and potential field of research with the referred professionals in several other aspects.

Another study[32] that applied the WHOQOL-bref questionnaire to assess the quality of life of patients undergoing cardiac surgery followed by physical therapy rehabilitation showed that the instrument is suitable for mapping aspects related to physical health (78.57±10.10), psychological health (81.25±8.33), social relationships (104.17±9.96) and environmental health (90.23±10.88) domains, with emphasis on the social relationship domain (105.21±10.85). The results measured by the aforementioned instrument increased confidence in the patient's discharge. Although this specific study does not involve teachers, it does show that the properties of the questionnaire are able to detail quality of life in a more integrated way[33,34,35].

In this sense, the quality of life of teachers from Community Higher Education Institutions in the State of Rio Grande do Sul was also the subject of an investigation using the WHOQOL-bref questionnaire[36]. The study investigated the quality of life of teachers with more than 40 years of experience and with more than ten thousand students in the State of Rio Grande do Sul. To this end, the study included 203 professors, representing 17% of the total number of professors at the three institutions analyzed. When analyzing the quality of life index according to the professors' degrees, the 22 Specialists had the highest score in the psychological health domain and the lowest score in the social relationships domain. In turn, the highest scores recorded among the 125 professors with a Master's Degree and 43 with a Doctoral Degree were in the physical health domain, while the lowest scores were recorded in the environmental health domain. In summary, the teachers' quality of life index was classified as good in all analyzed domains, with no statistically significant difference between them.

A cross-sectional study with elementary school teachers from the municipal public network in the capital of the State of Mato Grosso[37] used the WHOQOL-bref, as well as the Teacher Vocal Production Condition, Screening Index for Voice Disorder, the Self-Reporting Questionnaire and the Nordic Musculoskeletal Questionnaire. The study analyzed data from 326 teachers, with a mean age of 43.01 years and 87.12% were female. The results showed that the quality of life had lower scores in the "environmental health" domain and some domains differed in terms of gender, education, time spent commuting from home to work, workload and employment relationship. It should be noted that the presence of voice disorders, common mental disorders and complaints of musculoskeletal symptoms had an impact on teachers' quality of life.

This study aims to deepen the understanding of quality of life issues in teachers from the municipal network of São Paulo, with the hypothesis that the worsening of quality of life may determine a greater chance for the development of voice disorders in teachers. In addition to self-reports, which is common in most studies[5,7,9,19], this study has the advantage of having included voice and laryngeal quality assessments by speech-language pathologists and physicians, respectively.

Method

This study was conducted from a database of data collected for the study with teachers of 226 schools of the public education system of São Paulo[20]) and it was approved by the Research Ethics Committee of the Pontifícia Universidade Católica de São Paulo under the opinion No. 050/2011. All participants received elucidation and signed the free and informed consent.

The selection of subjects considered the formation of two groups: case and control groups. The case group included female teachers working in early education and elementary school, who sought out the Speech-Language Pathology and Audiolo-

gyi Department of the Hospital do Servidor Público Municipal (HSPM). As women represent the vast majority in the Brazilian elementary school teaching population, the researchers decided to include only female participants. In order to control aspects of the environment and work organization, the control group consisted of female teachers without voice complaints from the same school and who teach at the same level of education as the teachers of the case group.

Among the many variables recorded in the database, the researchers included those referring to the completion of instruments, as follows: Vocal Production Condition - Teacher (VPC-T)[10] and World Health Organization Quality of Life-bref (WHOQOL-bref)[21]; voice quality assessment performed by a speech-language pathologist; and anatomo-functional evaluation of the larynx by an otorhinolaryngologist.

The VPC-T[10] instrument has been used in several studies in Brazil, as it is understood to be easy to understand and fill, in addition to being able to be used in its entirety or in parts, according to the researchers' needs. The questionnaire consists of questions that refer to sociodemographic data, functional status, work environment and organization, general health aspects, life habits and vocal aspects. Most questions require the respondent to mark the alternative according to the frequency of its occurrence, on a four-point Likert scale: Never, Rarely, Sometimes, and Always.

The following characteristics were considered in this study: sociodemographic characteristics (age and educational level); functional status (time in the profession and hours/class per week); lifestyle habits (smoking and alcohol consumption); work environment (peaceful work environment, existence of a resting place, presence of noise, dust, smoke, humidity, pleasant temperature, room size adequate for the number of students, adequate lighting, satisfactory cleaning, use of irritating chemical products in cleaning, and if the material is suitable and sufficient); and organization of work (good relationship with colleagues, the management and the students, freedom to plan, presence of constant supervision, if the work pace is stressful, if there is time to carry out all the activities in the school, if it is easy to leave the room, if the employees are committed to the organization, if there is satisfaction in the job, if the work is monotonous, if the work is repetitive, and if there is stress at work).

The answers were classified in two categories: Absence/No, for the answers in the options "Never" and "Rarely"; and Presence/Yes for the answers in the options "Sometimes" and "Always".

As for the assessment of quality of life, the researchers decided on the proposal presented by the WHOQOL group, which assesses the subject's perception of their quality of life. At first, the instrument had 100 questions based on the comprehensive definition of the term "quality of life" and on the multiple applications of this concept in various everyday situations[21]. This instrument was developed by 15 research centers, from five continents, which have different characteristics based on cultural, economic development, basic sanitation, health, schooling, religiosity, and self-perception aspects, among other relevant and distinct aspects, for the definition of quality of life[1].

The need for a shorter and faster-to-fill instrument that could maintain the same necessary psychometric characteristics of the WHOQOL-100 led to the development of the WHOQOL-bref[21], as a result of a partnership with 20 research centers in 18 countries[1].

The WHOQOL-bref[21] consists of 26 questions, two of which refer to quality of life, while the other questions represent each of the 24 facets that make up the original instrument. The instrument consists of four domains, namely: Physical Health Domain (pain and discomfort; energy and fatigue; sleep and rest; mobility; activities of daily living; dependence on medication or treatments); Psychological Health Domain (positive feelings; thinking, learning, memory and concentration; self-esteem; body image and appearance; negative feelings; spirituality/religion/personal beliefs); Social Relationships Domain (personal relationships; social support; sexual activity; ability to work); and Environmental Health Domain (safety and protection; home environment; financial resources; health and social care: availability and quality; opportunities to acquire new information and skills; participation and opportunities for recreation/ leisure; physical environment (pollution/ noise/ traffic/weather); and transport).

Responses are presented on a Likert scale from one to five, in which one represents the worst condition, and five represents the best[22].

The VPC-T and WHOQOL-bref instruments were completed in the classroom, while the professors waited for the detailed procedures to follow. If

there were any doubts, the researcher or research assistants repeated the question aloud. This step took approximately 45 minutes to complete.

At first, the speech sample was recorded in an acoustically treated booth, with recording of two productions of the vowel /a/ and the fricative sounds /s/ and /z/, from a spontaneous speech sample (simulation of explanation of the subject taught – average duration of 60 seconds) and of standardized reading of text with predominance of audible sounds. This recording was performed in a sound editing software (Sony Sound Forge 8.0), directly on a laptop (Acer Aspire 3680), using a head microphone (Plantronics Audio 50) positioned at a 45º angle and an average distance of 5 cm from the participant's mouth.

Then, this material was evaluated using the GRBASI scale[23,24], which evaluates the vocal quality in terms of the general Grade (G) and in the presence of Roughness (R), Breathiness (B), Asthenia (A), Strain (S) and Instability (I). All these parameters were recorded using a scale from 0 to 3 (no change=0; slight change=1; moderate change=2; and severe change=3). Since most teachers have voice with changes, although many in a mild degree, the voice was classified as WITH VOCAL CHANGE, when the change was classified as moderate (grade 2) or intense (grade 3), and WITHOUT VOCAL CHANGE when the change was classified as normal (grade 0) or mild (grade 1).

Data collection related to the larynx was performed by an otorhinolaryngologist and phoniatrician who performed videolaryngoscopy and classified the subjects as WITH CHANGES, in the presence of vocal fold injury, irritative, structural alteration or vocal fold coaptation; and WITHOUT CHANGES, in the absence of any visible damage or alteration.

In turn, the teachers were classified as: NO CASE: no change in the auditory-perceptual assessment of the voice and no change in vocal folds; CASE I: with changes in the auditory-perceptual assessment of the voice and no changes in the vocal folds; CASE II: no changes in the auditory-perceptual assessment of the voice and with changes in the vocal folds; and CASE III: with changes in the auditory-perceptual assessment of the voice and also with changes in vocal folds.

Data from 272 teachers were selected, 105 from the NO CASE group (with no change in the auditory-perceptual assessment of the voice and no visual change in the vocal folds), which were included as the control group, while 167 participants from the CASE III group (with changes in the auditory-perceptual assessment of the voice and also with visual changes in vocal folds) were included as the case group.

The presence of voice disorders, sociodemographic characteristics (age and marital status) and functional status (education, number of schools, time in the profession, employment relationship and hours/class per week) were considered as variables. The dependent variable of the study was the presence of voice disorder; while the independent variable of interest was the WHOQOL-bref and its domains (Physical Health, Psychological Health, Social Relationships and Environmental Health). The independent control variables were as follows: sociodemographic characteristics; functional status; lifestyle; work environment and organization.

Data were double-entered and validated using the Epi Info v6.04 software, while the SPSS for Windows v16.0 was used for statistical analysis and association measures. In addition, the Chi-Square Test for Association was used for univariate analysis, with Yates correction, in order to determine the association between the presence of voice disorders and the WHOQOL-bref domains.

The WHOQOL-bref scores in each domain had the following Cronbach's alpha coefficients: Physical Health=0.80; Psychological Health=0.78; Social Relationships=0.74 and Environmental Health=0.75, which shows a good reliability index of the instrument.

Logistic regression models were estimated to calculate the crude and adjusted Odds Ratio (OR) in order to assess the risks in relation to the independent variables of interest. The independent control variables that had a significance level lower than 0.10 ($p<0.10$) in the univariate analysis were selected for the multiple analysis. Variables that remained significant after adjustment were maintained in the model. The Hosmer-Lemeshow test (1989) was used to assess the adjustment of the final multiple models.

Results

Table 1 shows the characteristics related to sociodemographic data and lifestyle; workplace; and work organization. In this context, it can be noticed that most teachers are between 30 and 49

years of age, have completed higher education, up to 20 years of experience, teach 21 to 40 hours a week, do not smoke and drink rarely or never. As the age variable had $p<0.10$, this value was selected as a control variable in the multiple models.

When reading the aspects related to the physical environment of the school, there was no statistically significant difference in any of the characteristics evaluated, which confirms the similarity between the groups, and the control of these variables: peaceful environment, existence of a resting place, presence of noise, dust, smoke, humidity, pleasant temperature, room size, lighting, school cleanliness, use of irritating chemical products in cleaning, and adequate and sufficient material.

In addition to the environment, there was no significant difference between the groups in terms of organizational aspects of teaching work, which also shows the control for these variables. The teachers understand that they have good relationships with colleagues, management and students, freedom to plan, there is constant supervision, the pace is stressful, there is time to develop all activities at school, it is easy to leave the room if necessary, the employees are committed to the maintenance of the school, there is a satisfaction in the performance of the function, the work is monotonous, repetitive, and there is stress at work.

Table 1. Distribution of case and control groups, according to sociodemographic and lifestyle characteristics; workplace; and work organization.

		Control Group (n=105)		Case Group (n=167)		p-value (X^2)
		n°	%	n°	%	
Sociodemographic Characteristics						
Age	20-29 years old	15	14.3	21	12.6	0.092
	30-39 years old	38	36.2	50	29.9	
	40-49 years old	33	31.4	77	46.1	
	50-65 years old	19	18.1	19	11.4	
Educational level	Incomplete higher education	4	3.8	13	7.8	0.187
	Complete higher education and above	101	96.2	154	92.2	
Time in Profession	≤10 years	33	31.7	40	24.0	0.244
	11-15 years	23	22.1	29	17.4	
	16-20 years	29	27.9	62	37.1	
	≥21 years	19	18.3	36	21.5	
Classes per week	≤10 hours	14	13.3	29	17.4	0.187
	11-20 hours	16	15.2	22	13.2	
	21-30 hours	32	30.5	31	18.6	
	31-40 hours	24	22.9	48	28.7	
	≥41 hours	19	18.1	37	22.1	
Smoking	Non-smoker	84	80.0	132	79.0	0.875
	Former smoker	11	10.5	16	9.6	
	Smoker	10	9.5	19	11.4	
Alcohol consumption	Never	46	43.8	78	46.7	0.696
	Rarely	43	41.0	60	35.9	
	Sometimes	16	15.2	29	17.4	
Work environment						
Peaceful work environment	Yes	67	64.4	100	62.5	0.751
	No	37	35.6	60	37.5	
There is a resting place	Yes	19	18.4	27	16.3	0.644
	No	84	81.6	139	83.7	
Noisy school	Yes	99	97.1	162	97.6	0.791
	No	3	2.9	4	2.4	

		Control Group (n=105)		Case Group (n=167)		p-value (X^2)
		n°	%	n°	%	
Dust	Yes	94	90.4	155	92.8	0.476
	No	10	9.6	12	7.2	
Smoke	Yes	85	83.3	131	79.9	0.483
	No	17	16.7	33	20.1	
Humidity	Yes	78	76.5	123	75.9	0.919
	No	24	23.5	39	24.1	
Pleasant temperature inside the school	Yes	80	78.4	125	75.3	0.557
	No	22	21.6	41	24.7	
Classroom size suitable for the number of students	Yes	51	49.0	76	45.5	0.571
	No	53	51.0	91	54.5	
Adequate lighting	Yes	98	93.3	158	94.6	0.663
	No	7	6.7	9	5.4	
Satisfactory school cleanliness	Yes	89	84.8	146	87.4	0.533
	No	16	15.2	21	12.6	
School cleaning products cause irritation	Yes	81	77.1	135	81.3	0.404
	No	24	22.9	31	18.7	
Appropriate material	Yes	88	83.8	151	90.4	0.104
	No	17	16.2	16	9.6	
Enough material	Yes	87	82.9	147	88.6	0.183
	No	18	17.1	19	11.4	
Work organization						
Good relationship with colleagues	Yes	105	100.0	165	99.4	0.426
	No	0	0	1	0.6	
Good relationship with management	Yes	101	98.1	164	98.8	0.627
	No	2	1.9	2	1.2	
Good relationship with students	Yes	104	99.0	165	99.4	0.743
	No	1	1.0	1	0.6	
Freedom to plan	Yes	104	100.0	162	98.2	0.167
	No	0	0	3	1.8	
Constant supervision	Yes	90	89.1	145	86.8	0.582
	No	11	10.9	22	13.2	
Stressful work pace	Yes	104	99.0	163	98.8	0.843
	No	1	1.0	2	1.2	
Time to develop all activities	Yes	86	81.9	127	77.4	0.379
	No	19	18.1	37	22.6	
Ease of leaving the classroom	Yes	73	69.5	98	59.0	0.081
	No	32	30.5	68	41.0	
Employee commitment	Yes	94	90.4	153	91.6	0.728
	No	10	9.6	14	8.4	
Satisfaction in the performance of the role	Yes	101	96.2	160	96.4	0.934
	No	4	3.8	6	3.6	
Monotonous work	Yes	69	72.6	117	74.1	0.804
	No	26	27.4	41	25.9	
Repetitive work	Yes	84	81.6	132	80.5	0.829
	No	19	18.4	32	19.5	
Stress at work	Yes	93	92.1	159	95.8	0.202
	No	8	7.9	7	4.2	

The distribution of the two groups regarding the presence of vocal symptoms at the time of the study is shown in Table 2. In the case group, there was a greater report of hoarseness, loss of voice, fatigue when speaking, effort when speaking, dry throat and throat clearing.

Table 2. Distribution of case and control groups, according to vocal symptoms.

Symptoms		Control Group (n=105)		Case Group (n=167)		p-value (X^2)
		n°	%	n°	%	
Hoarseness	Yes	52	51.0	156	93.4	< 0.001
	No	50	49.0	11	6.6	
Loss of voice	Yes	21	20.4	95	57.6	< 0.001
	No	82	79.6	70	42.4	
Fatigue when speaking	Yes	51	50.0	144	86.7	< 0.001
	No	51	50.0	22	13.3	
Effort when speaking	Yes	54	52.4	143	86.1	< 0.001
	No	49	47.6	23	13.9	
Dry throat	Yes	67	65.0	143	86.1	0.001
	No	36	35.0	23	13.9	
Throat clearing	Yes	68	64.8	136	82.4	0.011
	No	37	35.2	29	17.6	

The descriptive analysis of each of the WHOQOL-bref domains according to case and control groups (Table 3) shows that the Environmental Health domain has the worst average, followed by the Physical Health domain, Psychological Health domain and Social Relationships domain.

Table 3. Descriptive analysis of WHOQOL-bref domains, by case and control groups.

Domains of WHOQOL-bref	Groups		Mean (SD)		Median		Minimum and maximum values	
	Control Group	Case Group	Control Group	Case Group	Control Group	Case Group	Control Group	Case Group
1st Domain Physical Health	103	167	67.09 (14.84)	59.15 (14.69)	67.85	57.14	32.14 100.00	7.14 92.86
p-value				<0.001				
2nd Domain Psychological Health	105	167	66.74 (16.46)	64.42 (13.26)	70.83	62.50	16.67 95.83	20.83 95.83
p-value				0.080				
3rd Domain: Social Relationships	105	167	67.69 (18.44)	65.31 (17.50)	66.66	66.66	8.33 100.00	16.67 100.00
p-value				0.252				
4th Domain: Environmental Health	105	167	54.79 (13.54)	51.13 (13.36)	56.25	50.00	25.00 84.38	18.75 90.63
p-value				0.019				

Table 4 shows that the Physical Health domain has statistical significance when compared to the other domains of the WHOQOL-bref (p=0.004), followed by the Psychological Health domain (p=0.013) and the Environmental Health domain (p=0.036). In turn, no significant difference was found between the groups in the Social Relationships domain (p=0.585).

Table 4. Number and percentage of teachers, according to WHOQOL-bref domains and case and control groups.

Domain of QOL		Control Group		Case Group		p-value (X^2)
		n°	%	n°	%	
Physical Health*	1st	27	26.2	69	41.3	0.004
	2nd	27	26.2	51	30.5	
	3rd	49	47.6	47	28.2	
Psychological Health	1st	32	30.5	54	32.3	0.013
	2nd	32	30.5	74	44.3	
	3rd	41	39.0	39	23.4	
Social Relationships	1st	38	36.2	71	42.5	0.585
	2nd	44	41.9	63	37.7	
	3rd	23	21.9	33	19.8	
Environmental Health	1st	35	33.3	66	39.5	0.036
	2nd	31	29.5	63	37.7	
	3rd	39	37.2	38	22.8	
Total		105	100.0	167	100.0	

* Those with unknown information were excluded.

Table 5 shows the analysis of the univariate association performed with all the independent variables of interest associated with the voice disorder, with emphasis on the Physical Health domain, which had an odds ratio of 2.9 (p=0.013).

Table 5. Multiple analysis of factors associated with voice disorders.

Factors Associated with Voice Disorder		1st Model OR[1] (p)
Physical Health	1st tertile	2.9 (0.013)
	2nd tertile	1.5 (0.297)
	3rd tertile	1.0
Psychological Health	1st tertile	0.9 (0.793)
	2nd tertile	1.6 (0.202)
	3rd tertile	1.0
Environmental Health	1st tertile	1.2 (0.670)
	2nd tertile	1.6 (0.154)
	3rd tertile	1.0
Age Range	20-29 years old	1
	30-39 years old	0.9 (0.744)
	40-49 years old	1.5 (0.331)
	50-65 years old	0.7 (0.420)

Discussion

This study investigated the association between quality of life and the presence of voice disorders in female teachers, using a paired case-control study design.

It should be noted that the selection of subjects to compose the case and control groups proved to be complex. Thus, in order to reduce possible selection bias, the researchers decided to include teachers from the same schools in the control group, ensuring maximum similarity with the case group, since they had the same probability of exposure to physical, chemical and biological risk factors in the school work environment.

Table 1 shows that there was no significant difference in the variables evaluated between the case and control groups in relation to sociodemographic characteristics, functional status, life habits, work environment and organization, which confirms that the groups are comparable.

The results confirmed the impairment of quality of life among teachers and are in line with the results of other studies carried out with the WHOQOL-bref[3] or similar instrument, such as the V-RQOL[4,9,18].

When comparing with studies in which the WHOQOL-bref was applied in other areas, such as nursing, physiotherapy and psychology, with other professionals, it can be noticed that better scores were found in comparison with the scores of this study.

In this sense, authors[25] who investigated the quality of life of health professionals in a university hospital reported that the best scores were found in physical therapists, while the worst scores were found in nurses, who had the following outcomes: 66.73 for the Physical Health domain, 66.75 for the Physical Health domain, 70.41 for the Social Relationships domain and 58.29 for the Environmental Health domain.

In addition, a study[26] that included nurses also reported better scores compared to this study, as it found the following scores: 66.3 for the Physical Health domain; 65.2 for the Psychological Health domain; 66.7 for the Social Relations domain and 57.6 for the Environmental Health domain. It was similar to the study, since this study investigated nurses who worked in shifts and showed that there is a tendency among professionals to have a worse score in the Environmental Health domain, regardless of the time of the shift[27].

Therefore, these studies are in line with data from the Environmental Health domain, which was more fragile, even though it is the domain related to professional life (low pay, dissatisfaction with the organization of work, and precarious work environment).

The findings in Table 2 of this study show that all the vocal symptoms surveyed had a statistically significant difference, which reinforces that the groups are distinguished by the self-reported presence of voice disorders. Data referring to vocal symptoms mentioned by teachers in another study[6], which included 44 teachers who completed the V-RQOL and VHI instruments, are similar to the findings of this research, as well as in the study[5] carried out with 73 elementary school teachers from public schools. Such studies reported hoarseness, fatigue when speaking and dry throat as vocal symptoms.

Vocal and emotional characteristics in groups of teachers and non-teachers with low and high anxiety were compared using the QSSV, V-RQOL and VHI instruments. In this sense, the authors[7] reported that teachers with high anxiety have a greater number of vocal symptoms, greater impairment of Voice-Related Quality of Life and a high Voice Handicap Index. In the aforementioned study[7], the socioemotional domain (87.8) had the highest V-RQOL score for the group of teachers with high anxiety, which is similar to the present study.

Table 3 shows a significant difference between the case and control groups in the Physical Health and Environmental Health domains. With regard to the case group, Table 3 also shows that the Environmental Health domain has the lowest average (51.13), while the Social Relationships domain has the highest average (65.31). Although a different instrument was used, these data are in line with findings from other studies, which reported a higher score value in the socioemotional domain of V-RQOL, with 75.5[4] and 80.5[5] in teachers with vocal complaints.

The social relationships domain was positively evaluated by most of the participants of this study, which shows that subjectivity, private life and extracurricular relationships contribute to improving the quality of life of these professionals[12].

However, the issues that make up the Environmental Health domain had different results in the two groups. It should be noted that this domain

covers different situations. Studies have reported an association with voice disorder and some aspects, especially noise, acoustics and dust[13,16].

In turn, the findings referring to the Physical Health domain (Table 4) are in line with the reflections of other researchers who reported health problems associated with teaching work[28,29], as well as inadequate habits, such as sleep[14]. A study that evaluated the consumption of medication among professors[30] found the constant use of analgesics in this population, which is probably associated with the presence of different pain problems, referring to several diseases. This condition leads the teacher to the loss of the ability to exercise their professional role with compromised social relationships. The findings also showed that subjects with lower scores are 2.9 times more likely to have voice disorders (Table 5). Since the Physical Health domain measures pain and discomfort; energy and fatigue; sleep and rest; mobility; Activities of Daily Living; dependence on medication or treatment and ability to work, low scores in the domain show changes in some of these aspects mentioned and, consequently, that teachers are vulnerable to voice disorders.

It should be noted that it was possible to explore all the information in the database regarding the application of the WHOQOL-bref. The use of this instrument made it possible to analyze the quality of life in a comparative way in relation to other disorders that can impact the health of teachers, such as musculoskeletal symptoms..

Thus, this study aimed to analyze the impact of voice disorders on quality of life, allowing the speech-language pathologist, together with other health professionals, to broaden their view, aiming to better understand the complexity of managing voice (and other) disorders in teachers. Finally, this study recommends the use of the International Classification of Functioning[37], as an instrument that would enable this better understanding.

Conclusion

This study showed that the values related to quality of life, assessed using the WHOQOL-bref instrument, show that there is an association between the presence of voice disorders and impairment of the physical health domain of the evaluated quality of life. In this sense, the findings show that there is an almost three-fold increase in the chances of those with voice disorders having low scores in that domain.

References

1. The WHOQOL Group. The World Health Organization quality of life assessment (WHOQOL): position paper from the World Health Organization. Soc. Sci. Med., Oxford. 1995; 41(10): 1403-09.

2. Fabricio MZ, Kasama ST, Martinez EZ. Qualidade de vida relacionada à voz de professores universitários. Rev. CEFAC. 2010, 12 (2): 280-87.

3. Penteado RZ, Bicudo-Pereira IMT. Avaliação do impacto da voz na qualidade de vida de professores. Rev Soc Bras Fonoaudiol. 2003; 8(2): 19-28.

4. Tutya AS, Zambon F, Oliveira G, Behlau M. Comparação dos escores dos protocolos QVV, IDV e PPAV em professores. Rev Soc Bras Fonoaudiol. 2011; 16(3): 273-81.

5. Morais EPG, Azevedo RR, Chiari BM. Correlação entre voz, autoavaliação vocal e qualidade de vida em voz de professoras. Rev. CEFAC. 2012; 14(5): 892-900.

6. Costa DB, Lopes LW, Silva EG, Cunha GMS, Almeida LNA, Almeida AAF. Fatores de risco e emocionais na voz de professores com e sem queixas vocais. Rev. CEFAC. 2013; 15(4): 1001-10.

7. Almeida LNA, Lopes LW, Costa DB, Gonçalves Silva EG, Cunha GMS, Almeida AAF. Vocal and emotional features of teachers and non-teachers with low and high anxiety. Audiol Commun Res. 2014; 19(2): 179-85.

8. Pizolato RA, Rehder MIBC, Meneghim MC, Ambrosano GMB, Mialhe FL, Pereira AC. Impact on quality of life in teachers after educational actions for prevention of voice disorders: a longitudinal study. Health and Qual Life Outcomes. 2013; 11: 28.

9. Cutiva LCC, Burdorf A. Factors associated with voice-related quality of life among teachers with voice complaints. J Commun Disord. 2014; 52: 134–42.

10. Ferreira LP, Giannini SPP, Latorre MRDO, Zenari MS. Distúrbio da voz relacionado ao trabalho: proposta de um instrumento para avaliação de professores. Distúrb Comun. 2007; 19(1): 127-37.

11. Dragone MLS, Ferreira LP, Giannini S, Simóes-Zenari, Vieira VP, Behlau M. Voz do Professor: 15 anos de contribuição fonoaudiológica. Rev. Soc. Bras. Fonoaudiol. 2010; 15: 289-96.

12. Giannini SPP, Latorre MRDO, Ferreira LP. Distúrbio de voz e estresse no trabalho docente: um estudo caso- controle. Cad. Saud Public. 2012; 28(11): 2115-24.

13. Simões-Zenari M, Bitar ML, Nemr NK. Efeito do ruído na voz de educadoras de instituições de educação infantil. Rev Saud Public. 2012; 46(4): 657-64.

14. Ferreira LP, Latorre MRDO, Giannini SPP, Ghirardi ACAM, Karmann DF, Silva EE, Figueira S. Influence of Abusive Vocal Habits, Hydration, Mastication, and Sleep in the Occurrence of Vocal Symptoms in Teachers. J Voice. 2010; 4(1): 86-92.

15. Servilha EAM, Arbach MP. Queixas de saúde em professores universitários e sua relação com fatores de risco presentes na organização do trabalho. Distúrb Comum. 2011; 23(2): 181-91.

16. Servilha EAM, Correia JM. Correlações entre condições do ambiente, organização do trabalho, sintomas vocais autorreferidos por professores universitários e avaliação fonoaudiológica. Distúrb Comun. 2014; 26(3): 452-62.

17. Martins RHG, Pereira RBN, Hidalgo CB, Tavares ELM. Voice Disorders in Teachers. A Review. J Voice. 2014; 28(6): 716-24.

18. Ribas TM, Penteado RZ, García-Zapata MTA. Qualidade de vida relacionada à voz de professores: uma revisão sistemática exploratória da literatura. Rev. CEFAC. 2014; 16(1): 294-306.

19. Ribas TM, Penteado RZ, García-Zapata MTA. Qualidade de vida relacionada à voz: impacto de uma ação fonoaudiológica com professores. Rev. CEFAC. 2014; 16(2): 554-65.

20. Giannini SPP. Distúrbio de voz relacionado ao trabalho docente: um estudo caso-controle. [doutorado]. São Paulo: Universidade de São Paulo, 2010.

21. Fleck MPA, Louzada S, Xavier M, Chachamovich E, Vieira G, Santos L, Pinzon V. Application of the Portuguese version of the abbreviated instrument of quality life WHOQOL-bref. Rev Saud Public 2000; 34(2): 178-83.

22. Fleck, MPA. O instrumento de avaliação de qualidade de vida da Organização Mundial da Saúde (WHOQOL-100): características e perspectivas. Ciênc saúde coletiva. 2000; 5(1): 33-8.

23. Hirano, M. Clinical examination of voice. New York: Springer-Verlag.1981, p. 8-14.

24. Dejonckere PH, Leback J. Acoustic, perceptual, aerodynamic and anatomical correlations in voice pathology. ORL J Otorhinolaryngol Relat Spec. 1996; 58(6): 326-32.

25. Spiller APM, Dyniewicz AM, Slomp MGFS. Qualidade de vida de profissionais da saúde em hospital universitário. Cogitare enferm. 2008; 13(1): 88-95.

26. Palhares VC, Corrente JE, Matsubara BB. Associação entre qualidade do sono e qualidade de vida de profissionais de enfermagem que trabalham em turnos. Rev Saud Public 2014; 48(4): 594-601.

27. Martins MM. Qualidade de vida e capacidade para o trabalho dos profissionais em enfermagem no trabalho em turnos. [mestrado] Florianópolis: Universidade Federal de Santa Catarina, 2002.

28. Sandhi SMG, Assunção MBAA. O professor, as condições de trabalho e os efeitos sobre sua saúde. Educação e Pesquisa. 2005; 31(2): 89-199.

29. Assunção AA, Oliveira DA. Intensificação do trabalho e saúde dos Professores. Educ. Soc. 2009, 30(107): 349-72.

30. Starling LC. Consumo de medicamentos pela população de docentes da Universidade Federal de Minas Gerais. [mestrado]. Minas Gerais: Universidade Federal de Minas Gerais. 2004.

31. Rodrigues MC, Costa MS, Almeida, Souza AMA, Cavalcante MBPT, Alves MDS. Qualidade de vida do enfermeiro no trabalho docente: estudo com o Whoqol-bref. Esc. Anna Nery. 2012; 16 (2).

32. Tamiozzo D, Dallazen F, Cruz DT, Windmöller P, Winkelmann ER, Roseli E. Qualidade de vida de pacientes submetidos à cirurgia cardíaca: Aplicação do Questionário WHOQOL-bref. Rev Contex Saud. v. 11 n. 20. 2013.

33. Raquel ACS, Kuroishi RCS, Mandrá PP. Qualidade de vida de estudantes de fonoaudiologia. Rev CEFAC. 2016; 18 (5).

34. Almeida-Brasil CC, Silveira MR, Silva KR, Lima MG, Faria CDCM, Cardoso CL, Menzel HJK, Ceccato MGB. Qualidade de vida e características associadas: aplicação do WHOQOL-BREF no contexto da Atenção Primária à Saúde. Cienc Saud Colet. 2017; 22 (5).

35. Flores-Gomes G, Gomes FRH, Gaspatetto GS, Oliveira V, Vagetti GC. Qualidade de vida de idosos: efeitos de um protocolo de inclusão digital no sul do Brasil. Research, Society and Development. 2020; Vol 9, No 7.

36. Koetz L, Rempel C, Périco E. Qualidade de vida de professores de Instituições de Ensino Superior Comunitárias do Rio Grande do Sul. Cienc Saud Colet. 2013; 18(4): 1019-1028.

37. Santos EC, Espinosa MM, Marcon SR. Qualidade de vida, saúde e trabalho de professores do ensino fundamental. Acta Paul Enferm. 2020; 33: eAPE20180286.

38. Classificação Internacional de Funcionalidade, Incapacidade e Saúde (Centro Colaborador de Organização Mundial da Saúde para a Família de Classificações Internacionais, org.: coordenação da tradução Cassia Maria Buchalla). São Paulo: Editora da Universidade de São Paulo, 2003.