



Relationship between stress, work environment and voice in children's Education and Fundamental Education I teachers

Relação entre estresse, ambiente de trabalho e voz em professores do Ensino Infantil e Ensino Fundamental I

Relación entre el estrés, el ambiente de trabajo y la voz en los maestros de Jardín de Infantes y Primaria

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Abstract

Introduction: The voice is the teacher's main work tool, so they are most likely to develop vocal problems. Stress is considered an important risk factor related to voice disorders, however, there are few studies with instruments with tools to identify stressors from the organizational diagnosis. **Objective:** To verify the relationship between stress, work environment and voice, in teachers of Kindergarten and Elementary School of the Municipal Education Network. **Methods:** Observational, cross-sectional study with a quantitative approach, with 36 public school teachers in the municipality of Maceió. The Teacher Vocal Production Condition Protocol-CPV-P, the Work Stress Scale questionnaire and the voice recording

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for auditory-perceptual analysis were applied. The data were analyzed in a descriptive and inferential manner, using the SPSS 25.0 software, as well as the Chi-square test and Pearson's Correlation Coefficient. **Results:** The stressful work environment acted as a trigger for vocal alteration and it is observed that noise contributes to the presence of stress. In addition, those teachers reported that they have complaints of vocal changes, are those who have an average global stress index. It was found that there is a positive correlation between the time of profession and stress level, with a p-value of 0.02, showing statistical significance. **Conclusion:** The study showed that there is a discreet relationship between the noisy work environment, occupational stress and vocal disorders in the teachers studied.

Keywords: Voice; Faculty; Occupational Stress; Dysphonia.

Resumo

Introdução: A voz é o principal instrumento de trabalho do professor, por isso eles estão mais propensos a desenvolverem problemas vocais. O estresse é considerado um fator de risco importante relacionado ao distúrbio de voz. No entanto, há poucos estudos com instrumentos voltados à identificação dos estressores a partir do diagnóstico organizacional. **Objetivo:** Verificar a relação entre estresse, ambiente de trabalho e voz, em professores do Ensino Infantil e Fundamental I da Rede Municipal de Ensino. **Métodos:** Estudo observacional, transversal, de abordagem quantitativa, com 36 professores da rede pública do município de Maceió. Foram aplicados o Protocolo Condição de Produção Vocal do Professor-CPV-P, o questionário Escala de Estresse no Trabalho, bem como foi realizado o registro de voz dos professores para análise perceptivo-auditiva. Os dados foram analisados de forma descritiva e inferencial, utilizando o software SPSS 25.0, assim como foram realizados o teste Qui-quadrado e o Coeficiente de Correlação de *Pearson*. **Resultados:** O ambiente de trabalho estressante atuou como um desencadeador de alteração vocal e pode-se observar que o ruído colabora para a presença de estresse. Além disso, os docentes que relataram apresentar queixas de alterações vocais são os que possuem índice de estresse global médio. Houve correlação positiva entre o tempo de profissão e o nível de estresse, com valor de $p = 0,02$, mostrando significância estatística. **Conclusão:** Este estudo demonstrou que há relação discreta entre o ambiente de trabalho ruidoso, o estresse ocupacional e a alteração vocal nos professores estudados.

Palavras-chave: Voz; Docentes; Estresse Ocupacional; Disfonia.

Resumen

Introducción: La voz es la principal herramienta de trabajo del docente, por lo que es más probable que desarrolle problemas vocales. El estrés es considerado un factor de riesgo importante relacionado con los trastornos de la voz, sin embargo, existen pocos estudios con instrumentos con herramientas para identificar los factores estresantes a partir del diagnóstico organizacional. **Objetivo:** Verificar la relación entre estrés, clima laboral y voz, en docentes de Infantil y Primaria de la Red Educativa Municipal. **Métodos:** Estudio observacional, transversal con enfoque cuantitativo, con 36 profesores de escuelas públicas del municipio de Maceió. Se aplicó el Teacher Vocal Production Condition Protocol-CPV-P, el cuestionario Work Stress Scale y la grabación de voz para análisis auditivo-perceptual. Los datos fueron analizados de manera descriptiva e inferencial, utilizando el software SPSS 25.0, así como la prueba de Chi-cuadrado y el Coeficiente de Correlación de *Pearson*. **Resultados:** El ambiente laboral estresante actuó como desencadenante de la alteración vocal y se observa que el ruido contribuye a la presencia de estrés. Además, esos docentes informaron que tienen quejas de cambios vocales, son los que tienen un índice de estrés global promedio. Se encontró que existe una correlación positiva entre el tiempo de profesión y el nivel de estrés, con un valor de p de 0.02, mostrando significancia estadística. **Conclusión:** El estudio mostró que existe una discreta relación entre el ambiente de trabajo ruidoso, el estrés laboral y los trastornos vocales en los profesores estudiados.

Palabras clave: Voz; Docentes; Estrés ocupacional; Disfonia.

Introduction

The Work-Related Voice Disorder (WRVD), defined as any form of vocal deviation related to workers that compromises or prevents their professional performance, has been one of the main causes of teachers being removed from their work activities, which represented 2,2 million Basic Education workers in Brazil in 2016^{1,2}.

According to the literature, teachers are considered the voice professionals with the greatest presence of vocal disorders, whose multifactorial etiology may involve: noisy environment, speech usually used at high intensity and without rest, long hours of work, excessive number of students per classroom and inadequate use of facilities and the use of chalk^{1,3}.

In addition to the factors mentioned above, stress is highlighted by several studies as being an important risk factor related to vocal problems in teachers^{2,5,6}. Being considered a physiological process resulting from responses to internal and external events, stress is gradual and begins with alert responses and continues until exhaustion, due to excessive demands or problems in coping with it^{7,8}. Occupational stress is caused by the interaction of working conditions and individual characteristics. This state leads to wear and tear that negatively implies the performance of work activities, decreasing the work capacity of the individual⁹.

The WRVD can cause several repercussions on the teachers professional activity, such as: vocal impact, which generates limitations in vocal expression; emotional impact, caused by stress and anxiety; and socioeconomic impact, which puts the worker career and survival at risk^{1,3,4,10}.

The stressors can be in the work environment, in interpersonal relationships and even in the superior ones, impacting on the subject general health, leading him to physical, psychological and behavioral symptoms¹¹. Thus, knowing the work environment in which the teacher is inserted, its organization and structure, as well as attesting the existence of stressors, becomes important for the elaboration of intervention strategies in the work environment. These strategies should aim to provide better quality of life and, consequently, better qualitative performance in professional activity.

Vocal disorders are influenced by several variables external and internal to the subject, such as socio-environmental, psychological and cultural

variables⁵. Teachers affected by vocal changes may experience tiredness or exertion when speaking, hoarseness, clearing or persistent cough, tightness or tightness in the throat, voice failures, among others⁴.

The relationship between stress and the teacher's voice has been a topic widely explored in Speech Therapy. Although there are several published works about the theme, this research aims to expand the existing knowledge by applying an instrument designed to verify the individual perception of the presence of stressors in the work environment. It is a tool for organizational diagnosis, submitted to tests and psychometric requirements, named the General Work Stress Scale - GWSS¹².

It is believed that knowing and understanding the relationship between work environment, voice and stress through a survey conducted not only by instruments in the field of Speech Therapy, allows to expand the discussion on the topic and the understand how these instruments, widely used by organizational psychology, can contribute to the understanding and planning of projects aimed to the vocal health of teachers.

The aim of the present study was to verify the relationship between stress, the work environment and the voice of teachers in Kindergarten and Elementary Schools in the Municipal Education, in addition to identifying the most prevalent stressors and the level of stress that affects these professionals.

Methods

The research was approved by the Research Ethics Committee of the Universidade Estadual de Ciências Médicas do Estado de Alagoas - Maceio – Alagoas, under number 2.617.755.

The developed study was descriptive and transversal type with a quantitative approach. The sample consisted of 36 teachers from kindergarten and elementary school I, from the Municipal Public Education Network of Maceio, in the state of Alagoas. Physical Education teachers were excluded from the research, as they have a different dynamic from the other teachers, since the classroom is not their exclusive working environment. Also excluded the teachers who had any impairment of the upper airway, colds or flu at the time of collection.

Initially, the participants received verbal and written information regarding the research goals.

Then, they signed the Informed Consent Form (ICF). The research was conducted in three stages, the first being the application of a questionnaire to collect sociodemographic data (gender, age, marital status, length of profession, number of schools of work, level of education) in order to characterize the sample. Based on the Condition of Vocal Production-Teacher (CVP-T)¹³, questions were raised related to the organization and the work environment, complaints regarding the voice, presence of vocal symptoms and information/guidance on the use of the voice in the teacher activity. The CVP-T¹³ is considered an important instrument to characterize the vocal profile of teachers and the conditions of the work environment. This instrument has responses on a Likert scale, in which the participant responds according to the gradation he deems pertinent, namely: never, rarely, sometimes or always.

The second stage of the research consisted of recording the voices. Each teacher was asked to perform a sustained emission of the vowel /a/ to record their voice in audio. The recording of the voices was performed on a Dell brand notebook, Inspiron model, with a Le Son pedestal microphone, model MP-68, attached to the notebook, obeying a distance of three centimeters from the mouth and an angle of 45° (suggested angle by professionals from audio recording studios to better capture the sound). At the time of recording, participants were in a quiet room and were comfortably seated facing the equipment. All records were made by the same researcher, following the established recording protocol.

After recording, the voices were edited using the Sound Forge 9.0 software. The initial three seconds and the vocal attack were discarded. To check the reliability between the evaluators, a file was generated with all the voices and an increase of 10% of random repetition. Thus, a CD was created with the database of voices to be analyzed. This CD was given to the three speech therapist judges with experience in voice, so that they conducted the evaluation.

The professionals performed the Comparing Voice Self-Assessment with Auditory Perceptual Analysis using the GRBASI¹⁴ scale, published by Hirano in 1981. This scale, used internationally, allows an assessment of vocal quality utilizing the parameters: roughness (R), breathiness (B), asthenia (A), tension (T) and vocal instability (I),

which, together, allow to classify the general degree of dysphonia (G) of the individual. Each evaluated parameter receives a severity rating ranging from 0 to 3, on a numerical scale, where 0 corresponds to the absence of changes; 1 corresponds to the slight change; 2, moderate change; and 3, severe change. The participants were grouped, according to the general degree of the alteration (G), in teachers with and without vocal alteration, considering as alteration of subject that has a value equal to or greater than 1 for the G parameter of the scale.

To verify the agreement between the evaluators, the Kappa (k) statistic was used, followed by the 95% confidence interval (95% CI), to give an idea of the accuracy of the estimate¹⁵. The agreement between the evaluators was interpreted as: weak agreement ($\leq 0,20$); regular (0,21 to 0,40); moderate (0,41 to 0,60); good (0,61 to 0,80) and very good (0,81 to 1,00). Thus, a good reliability was found among the evaluators (88,89%) with a Kappa index of 0,77 and 95% CI [0,53; 1,00]. The data from the most reliable evaluator were considered to be used in the study and correlated with the other variables.

In the third part of the research, the questionnaire General Work Stress Scale - GWSS¹² was applied, through which the level of stress in the context of the work environment was assessed, searching to know the organizational stressors and the related psychological emotions. The questionnaire consists of 23 items that are answered using a five-point Likert scale, in which: 1 corresponds to totally disagree; 2, disagree; 3, partly agree; 4, agree; and 5, I totally agree. The sum of the score assigned to each item results in stress scores. This time, the higher the score, the higher the stress level.

The GWSS is considered an alternative for empirical investigations in organizations, searching to know the greatest stressors at work according to view of the workers, and can guide measures aimed at the quality of life¹⁶. The interpretation of the level of stress perceived by the subject is classified, according to the average obtained from the responses, as: low, medium to high or very high. Thus, we have the following interpretation: for an average score of 1 to 2, the level of stress perceived as "low" is attributed; for points from 2,01 to 2,99, the medium to high stress level is attributed; and, for a score of 3 to 5, a very high stress level is attributed^{16,17}.

It is possible to calculate the general average of stress perceived by GWSS from the averages obtained for each response. Based on the result of the general average, the group general stress level can be classified as: “low”, for an average below 2,5 points; “Medium/considerable” corresponding to the average of 2,5; and, “high” when the average is greater than 2,5¹⁶.

In addition, the level of reliability of the GWSS responses made by the research participants was also investigated. For this purpose, the Cronbach Alpha index was utilized, which measures the consistency of a questionnaire, revealing a value of 0,94 (94%) of reliability internal data, demonstrating that the answers are coherent.

The collected data were stored in a standardized form and in an electronic data spreadsheet (Microsoft Excel® 2016. Redmond, WA, USA). Descriptive statistics were performed to characterize the sample, utilizing frequency, average, minimum value, maximum value, standard deviation.

The GWSS data were analyzed descriptively utilizing the mean and standard deviation. The scores for each question and the general stress level score were also calculated. The association between the variables of stress levels at work and age, time in the profession, work environment, work rhythm and presence of changes in self-reported voice were measured using the Chi-square test.

The Pearson correlation coefficient adopted considering the normality of the sample was used

in order to correlate the levels of stress variables at work with time profession and the presence of voice changes. The degree of correlation between the variables was considered greater the closer to -1 or 1, with positive or negative correlations, respectively.

All statistical calculations were performed utilizing the SPSS 15.0 software, with a significance level of 95%.

Results

36 teachers participated in the research, of which 30 (83,3%) were female. The average age among the participants was 44,5 (\pm 12,5) years, with an average time of profession of 19,32 (\pm 13,1) months, as well as 19 (52,8%) were married. As for education, it was observed that 27 (75%) had completed higher education. In addition, 21 (64%) of teachers reported that they currently teach only at one school.

The data regarding the organization and the work environment are described in Table 1. It is observed that the research subjects reported having a good relationship with their work colleagues and with the school management (40; 91,5%), even that this relationship does not always occur. More than half of the survey participants (35; 97,2%) reported having the freedom to plan their activities. However, the report of the existence of constant supervision in the work environment was unanimous.

Table 1. Sample distribution according to sociodemographic and functional variables.

Variable	n	%
Vocal alteration		
Yes	30	83.3
No	06	16.7
Total	36	100
Reason for vocal alteration		
Intense use of voice	17	47.1
Stress	10	22.5
Respiratory infection	02	4.5
Total	29	100
Symptoms		
Clearing	21	58.1
Hoarseness	20	56.2
Weak voice	19	53.6
Vocal guidance		
Yes	15	41.9
No	21	58.1
Total	36	100
Noise at school		
Yes	34	94.4
No	02	5.6
Total	36	100
Noise intensity		
Strong	32	88.9
Weak	04	11.1
Total	36	100
Noise location at school		
Schoolyard	29	80.6
Classroom	03	8.3
Other rooms	02	5.6
People's voice	02	5.6
Total	36	100
Classroom acoustics		
Satisfactory	17	47.2
Not satisfactory	19	52.8
Total	36	100
Calm working environment		
Never	07	19.4
Rarely	04	11.1
Sometimes	16	44.4
Always	09	25.0
Total	36	100
Freedom to plan activities		
Never	01	2.8
Rarely	01	2.8
Sometimes	13	36.1
Always	21	58.3
Total	36	100
Constant supervision		
Never	0	0
Rarely	02	5.6
Sometimes	11	30.6
Always	23	63.9
Total	36	100

(continue)

Variable	n	%
Stressful work pace		
Never	05	13.9
Rarely	03	8.3
Sometimes	20	55.6
Always	08	22.2
Total	36	100
Suitable room size		
Yes	26	
No	10	
Total	36	100
There is a resting place		
Yes	13	
No	23	
Total	36	100
Has a change in voice		
Never	04	11.1
Rarely	05	13.9
Sometimes	20	55.6
Always	07	19.4
Total	36	100
Voice change time		
No change	04	11.1
Up to 6 months	06	16.7
7 to 12 months	02	5.6
More than 12 months	19	52.8
Doesn't know how to inform	05	13.9
Total	36	100
Reason for change in voice		
No change	04	11.1
Exposure to noise	02	5.6
Respiratory infection	02	5.6
Intense use of voice	13	36.1
No apparent cause	02	5.6
Stress	08	22.2
Allergy	01	2.8
Constant flu	1	2.8
Don't know	03	8.3
Total	36	100

Legend: n = number; % = percentage.

As can be seen in Table 1, a total of 30 teachers (83,3%) reported having some change in their voice and believe that this change is due to the intense use of their voice (17; 47,1%). As for self-reported vocal symptoms, they were found to be more prevalent: throat clearing (21; 58,1%), hoarseness (20; 56,2%) and weak voice (19; 53,6%). In response to the question about having received guidance regarding voice care before starting to teach, most responded that they had never received guidance before (21; 58,1%).

The results of the Comparing Voice Self-Assessment with Auditory Perceptual Analysis, using the GRBASI scale, demonstrated that 28 (77,7%) teachers have vocal changes, with the degree of mild impairment for 25 (69,4%) of these. The roughness was present in 26 (72,2%) participants, 23 (63,9%) with a slight degree of alteration and 3 (8,3%) with a moderate degree of alteration. As for the other parameters, 3 (8,3%) presented breathiness, asthenia and instability, all with a slight degree of alteration. Only 9 (25%) had mild grade tension.

Table 2 demonstrates the means and standard deviation for each statement of the GWSS scale. The general average of the scale was 2,06 points, showing that the level of stress can be considered in general as low in the studied sample. The individual analysis of the questions revealed that 26 teachers had a low level of stress (72,2%), followed by 8 subjects (22,2%) with a moderate degree of stress and only 2 (5,6%) with a high degree of stress.

Among the stressor items, the most prevalent, according to the result obtained from the responses according to the average for each item, were: "Being irritated by being underestimated by my superiors" (average of 2,75 points), "The few prospects

for career growth have left me distressed" (average of 2,72 points), "I have been uncomfortable with the deficiency in training for functional capacity" (average of 2,58 points) and "The type of control that exists at my job irritates me" (average of 2,53 points) (Table 2).

The items considered less stressful are: "I feel uncomfortable with the communication between me and my superior" (average of 1,61 points), "The competition in my work environment has left me in a bad mood" (average of 1,61 points) and "The lack of communication between me and my colleagues makes me angry" (average of 1,64) (Table 2).

Table 2. Description of averages and standard deviation of stressors in the teacher's laboral environment.

Item	Average	DP
1 The way tasks are distributed in my area has made me nervous	2.42	0.96
2 The kind of control that exists in my work irritates me	2.53	1.15
3 The lack of autonomy in the execution of my work has been exhausting	2.28	0.97
4 I have been uncomfortable with my superior's lack of confidence in my work	1.75	1.05
5 I feel irritated by the deficiency in the dissemination of information about the service's decisions	2.17	1.13
6 I feel uncomfortable with the lack of information about my tasks at work	2.08	1.02
7 The lack of communication between me and my co-workers makes me angry	1.64	0.83
8 I feel uncomfortable that my superior treats me badly in front of coworkers	1.56	0.93
9 I feel uncomfortable having to perform tasks that are beyond my ability	2.11	1.14
10 Get in a bad mood for having to work for many hours straight	2.56	1.38
11 I feel uncomfortable having to perform tasks that are beyond my ability	1.61	0.99
12 I get irritated by discrimination / favoritism in my work environment	2.03	1.34
13 I have been uncomfortable with the deficiency in training for professional capacity	2.58	1.50
14 I get in a bad mood because I feel isolated at work	1.81	0.98
15 I am irritated by being underestimated by my superiors	2.75	1.36
16 The few prospects for career growth have distressed me	2.72	1.36
17 I have been uncomfortable working on tasks below my skill level	2.00	1.12
18 The competition in my work environment has put me in a bad mood	1.61	0.93
19 The lack of understanding of what my responsibilities are in this job has caused me irritation	1.92	1.15
20 I've been nervous that my superior gave me contradictory orders	1.81	1.14
21 Feel irritated by my superior covering up my job well done in front of other people	1.72	1.05
22 Insufficient time to do my workload makes me nervous	2.11	1.16
23 I am annoyed that my superior avoids taking on important responsibilities	1.69	0.85
Average	2.06	1.10

Legend: SD = standard deviation.

When crossing the stress levels found with the variables presented in Table 3, a statistically significant association is observed with the variables noise in the workplace and self-reported vocal alteration, respectively $p = 0,01$ and $p = 0,05$.

In Table 3, which refers to the description of what is believed to be the reason for the change in voice, the item stress was the second most in-

dicated. The stressful work environment can be a trigger for vocal alteration and, in this study; it is observed that noise contributes to the presence of stress. In addition, teachers who sometimes or who always complain of vocal changes are those with an average global stress index, which is considered the most prevalent.

Table 3. Association between stress level, gender, working environment, working conditions, self-referred vocal changes and working time.

	Stress level			Total	Value of p
	High	Low	Moderate		
Sex					
Feminine	2 (5.6%)	21 (58.3%)	7 (19.4%)	30 (83.3%)	0.73
Male	0 (0%)	5 (13.9%)	1 (2.8%)	6 (16.7%)	
Total	2 (5.6%)	26 (72.2%)	8 (22.2%)	36 (100%)	
Noise					
Yes	1 (2.8%)	25 (69.4%)	8 (22.2%)	34 (94.4%)	0.01*
No	1 (2.8%)	1 (2.8%)	0 (0%)	2 (5.6%)	
Total	2 (5.6%)	26 (72.2%)	8 (22.2%)	36 (100%)	
Calm environment					
Never	0 (0%)	5 (13.9%)	2 (5.6%)	7 (19.4%)	0.19
Rarely	0 (0%)	4 (11.1%)	0 (0%)	4 (11.1%)	
Sometimes	0 (0%)	11 (30.6%)	5 (13.9%)	16 (44.4%)	
Ever	2 (5.6%)	6 (16.7%)	1 (2.8%)	9 (25%)	
Total	2 (5.6%)	26 (72.2%)	8 (22.2%)	36 (100%)	
Relationship with management					
Never	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.87
Rarely	0 (0%)	1 (2.8%)	0 (0%)	1 (2.8%)	
Sometimes	0 (0%)	1 (2.8%)	1 (2.8%)	2 (5.6%)	
Ever	2 (5.6%)	24 (66.7%)	7 (19.4%)	33 (91.7%)	
Total	2 (5.6%)	26 (72.2%)	8 (22.2%)	36 (100%)	
Stressful work pace					
Never	1 (2.8%)	4 (11.1%)	0 (0%)	5 (13.9%)	0.56
Rarely	0 (0%)	2 (5.6%)	1 (2.8%)	3 (8.3%)	
Sometimes	1 (2.8%)	15 (41.7%)	4 (11.1%)	20 (55.6%)	
Ever	0 (0%)	5 (13.9%)	3 (8.3%)	8 (22.2%)	
Total	2 (5.6%)	26 (72.2%)	8 (22.2%)	36 (100%)	
Self-reported vocal alteration					
Never	2 (5.6%)	2 (5.6%)	0 (0%)	4 (11.1%)	0.05*
Rarely	0 (0%)	3 (8.3%)	2 (5.6%)	5 (13.9%)	
Sometimes	0 (0%)	15 (41.7%)	5 (13.9%)	20 (55.6%)	
Ever	0 (0%)	6 (16.7%)	1 (2.8%)	7 (19.4%)	
Total	2 (5.6%)	26 (72.2%)	8 (22.2%)	36 (100%)	
Teaching time (months)					
12 a 86	0 (0%)	8 (22.2%)	1 (2.8%)	9 (25%)	0.18
87 a 187	0 (0%)	7 (19.4%)	2 (5.6%)	9 (25%)	
188 a 264	0 (0%)	7 (19.4%)	3 (8.3%)	10 (27.8%)	
265 a 432	2 (5.6%)	4 (11.1%)	2 (5.6%)	8 (22.2%)	
Total	2 (5.6%)	26 (72.2%)	8 (22.2%)	36 (100%)	

Legend: * = statistically significant p-value. Chi-square test.

On the other hand, Table 4 shows the correlation between degree of voice disorder, general score of GWSS and professional time. It is observed that

there is a positive correlation between the time of profession and level of stress, with a value of $p = 0,02$, demonstrating statistical significance.

Table 4. Correlation between stress level, profession time and degree of vocal change.

	General degree of vocal alteration		Overall score EET	
	C	Value of p	C	Value of p
General degree of vocal alteration	-	-	0.166	0.33
Overall TSE score	0.166	0.33	-	-
Profession time	0.293	0.83	0.385	0.02*

Legend: C = Pearson's correlation; p = p value; * = significant p-value.

Discussion

The various researches in the field of voice, which address the theme related to the teacher voice, highlighted that in Elementary Education, there is a prevalence of women in the position of teacher. This situation was also evidenced in the present study, since 83,3% of those surveyed are teachers^{17,18}.

As determined by the Law of Directives and Bases of Education - Law number 9.394, of 1996, teachers must have Higher Education to teach from Basic Education. It is observed, in the studied sample, that 75% of the respondents have completed higher education. This result is in line with the results obtained in other published studies^{18,19}.

The high number of hours is a reality in the teaching activity, being highlighted by many studies as a risk factor for the appearance of vocal problems. In the presente research, the respondents reported having weekly hours of teaching activity totaling between 21 and 30h/week, with 41,7% of the sample in this situation^{19,20}.

However, although the high number of hours is an important factor to be considered in cases of vocal disorders in teachers, other factors may be associated, including the environment and working conditions, which makes the teacher vocal problematic being understood as having a multifactorial etiology.

The presence of noise in the studied school was identified as an indisputable factor by almost all participants. 94,4% of teachers perceive the presence of this noise, which can be a contributing factor for the presence of vocal complaints. Excessive noise compromises the auditory feedback of

the voice, providing an increase in vocal intensity, which can generate vocal fatigue, in addition to future pathologies^{17,18,19}.

Vocal self-perception is an important item in the work with the teaching population. Allowing the teacher to carefully perceive his vocal quality and evaluate it, according to his auditory perception, can assist him with his notion of his own voice and, thus, improve his judgment about it. In this study, 83,3% of the surveyed subjects reported having vocal changes and 47,1% believe that this change is related to the intense use of the voice.

Some teachers, during their training, receive guidance, classes or lectures on vocal use and production, as well as on the necessary care for vocal well-being and the guarantee of longevity for their voice. However, it was observed that this was not a reality present in the studied sample, since 21 teachers reported that they did not receive vocal guidance (58,1%). Some studies have shown that teachers are concerned with the functionality of the voice and not with the quality^{5,18,19}.

Clearing throat (58,1%), hoarseness (56,2%) and weak voice (53,6%) are the symptoms most reported by the research subjects. Literature shows that hoarseness is the most common symptom in teachers, in addition to suggesting that vocal abuse occurs due to the intense use of the voice. Likewise, the weak voice, throat clearing and hoarseness can be secondary to the vocal effort made by teachers when they are active^{3,14,19}.

The Comparing Voice Self-Assessment with Auditory Perceptual Analysis is a specific analysis, in which it was observed that the rugosity (R) is the most frequent alteration in the researched subjects, with the degree of vocal alteration being discrete. These data presented are inferior to the data of other

studies^{10,21}, since the moderate and intense degree are the most described in this population.

With regard to stress, it is noticeable that several studies have highlighted occupational stress as a factor that contributes to vocal changes in teachers, including stressors such as a noisy work environment, the presence of dust, professional demotivation, restless periods and disagreement with students^{5,9,18,19,22}. However, few studies demonstrate these results by means of specific scale scores to survey occupational stress in teachers. The use and choice of GWSS allows to know the perception of the worker, in the case of this study the teacher, regarding the stressors existing in his work environment. The instrument does not correspond to a psychological test, according to its authors¹⁶, but there is a questionnaire capable of identifying levels of stress individually and in the group, allowing to know how impactful this situation is in the performance of work activities.

Based on the general GWSS average, the stress rating for the studied group was 2,06, indicating that teachers, in general, have a low level of stress. However, when analyzing the mean for each question, it was possible to observe that the greatest stressors, in decreasing order of mean, correspond to irritation for being little valued by superiors; the few prospects for career growth, a fact that makes the teacher distressed; the discomfort with the deficiency in training for professional capacity and the existence of a type of control at work that makes them angry. These data can be seen in Table 2.

Both devaluation and pressure in the work environment, in this case the school, have an effect on the teachers self-esteem, causing it to be low, leading him to stress and, consequently, generating demotivation for work^{6,7,23}.

The lack of autonomy and training is indicated by teachers as a stressor (Table 2). Thus, training is understood as an activity that provides preparation and motivation for the professional to face their work activities²⁴.

As for the stress found in teachers, even at a relatively low level, its influence on the routine of these professionals is noticeable. The stressful pace of work associated with the level of stress demonstrate that 31 teachers (86,1%) consider the pace of work stressful. However, the majority (20; 55,6%) reported that this happens “sometimes”. Of these, 15 (41,7%) had a low stress level, with no statistical significance in the association (Table 3).

Furthermore, the relationship between the presence of noise in the workplace and occupational stress reported by most teachers is also reiterated in other studies^{16,23}.

It is important that these professionals pay attention to the signs of stress that their bodies present. Recognizing and dealing with the first signs of stress is essential, since the faster this identification is made, the faster and more effective the treatment will be.

When asked about the work environment, if it would be calm, 29 (80,5%) reported that it was; of these, 16 (44,4%) stated that “sometimes” and 11 (30,6%) had a low level of stress. The relationship between a calm work environment and stress levels did not result in a statistically significant association. Therefore, having a calm environment does not necessarily imply a reduced stress level.

The presence of noise in the workplace, reported by 25 teachers (69,4%), associated with the level of stress, showed statistical significance. However, the stress level remained low for most. The presence of a noisy work environment provides an increase in the vocal intensity of the teacher and this situation triggers the increase in stress^{5,9,18,19,22}. However, noise control in the school environment, in most cases, is difficult to achieve. The teacher is obliged to live with the presence of internal and/or external noise that makes him enter sound competition, causing an increase in loudness, vocal effort and, consequently, causing damage to his vocal health. Such situation may cause dysphonia^{22,23,24,25}.

When asked if they perceive the presence of any vocal alteration, 32 respondents (88,9%) reported that “yes”. Of these, 20 (55,6%) said they presented “sometimes”, with a significant work stress association.

The correlation between time of profession, degree of vocal alteration and stress scale at work demonstrated statistical significance only for the correlation between time of profession and level of stress ($p = 0,02$). Such correlation shows that the longer the profession, the greater the level of stress presented by the teacher. A study conducted with teachers from the interior of São Paulo identified that the period between 10 and 14,9 years of teaching seems to characterize a critical range of teaching performance, since there was a greater presence of stress in professionals with this teaching time²⁶.

Conclusion

This study demonstrated that there is a discreet relationship between the noisy work environment, occupational stress and vocal disorders in teachers. The presence of this relationship highlighted that it is necessary to plan conjunct actions between Speech Therapy and Psychology in order to minimize the risk factors of the environment and work organization and the vocal problems resulting from this stress.

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