

The working conditions and schools teachers voice of public and private

Condições de trabalho e de voz em professores de escolas públicas e privadas

Cíntia Naiara Januário de Freitas¹ , Anna Alice Almeida² , Danilo Augusto de Holanda Ferreira¹ ,
Camila Macêdo Araújo de Medeiros¹ , Maria Fabiana Bonfim de Lima Silva¹ 

ABSTRACT

Purpose: To identify whether there is a correlation between the Screening Index for Voice Disorder and working conditions of public and private school teachers, and compare them with teachers from both groups. **Methods:** 183 teachers participated in the study, 122 from public schools and 61 from a private school. They responded to the questionnaire Teacher's Vocal Production Condition, which consists of 81 questions. However, only the questions related to personal information, functional situation, and vocal and working conditions were analyzed. Descriptive and inferential statistical analyses were performed. **Results:** In terms of voice conditions, most public school teachers reported voice complaints. The Screening Index for Voice Disorder showed more voice symptoms of public school teachers than of private school teachers. Furthermore, the public school teachers reported worse working conditions than the private school teachers. **Conclusion:** There is a negative correlation between the Screening Index for Voice Disorder and the working conditions of the public and private school teachers. Comparing with the private school teachers, the public school teachers reported worse working conditions, more prevalence of voice disorders and higher scores in the Screening Index for Voice Disorder.

Keywords: Language and hearing sciences; Voice; Noise; Faculty; Voice disorders; Working conditions

RESUMO

Objetivo: Identificar se existe correlação entre o Índice de Triagem para Distúrbio de Voz e as condições de trabalho de professores das escolas públicas e privadas e compará-las entre os professores das duas redes de ensino. **Métodos:** Participaram 183 professores, sendo 122 de escolas públicas e 61 de uma escola privada, que responderam ao questionário Condição de Produção Vocal do Professor, composto por 81 questões. Destas, entretanto, foram analisadas as questões referentes à identificação pessoal, funcional, condições vocais e de trabalho. Foi realizada análise estatística descritiva e inferencial. **Resultados:** Quando analisados em relação às condições vocais, a maioria dos professores das escolas públicas relatou queixa vocal. O Índice de Triagem para Distúrbio de Voz dos professores das escolas públicas correspondeu a mais sintomas vocais do que os da escola privada. Além disso, os docentes das escolas públicas relataram piores condições de trabalho, em relação aos docentes da escola privada. **Conclusão:** Existe uma correlação negativa entre o Índice de Triagem para Distúrbio de Voz e as condições de trabalho dos professores de escola pública e particular. Os professores das escolas públicas relataram piores condições de trabalho do que os da escola privada, bem como referiram maior ocorrência de distúrbio da voz e apresentaram maior pontuação no Índice de Triagem para Distúrbio de Voz.

Palavras-chave: Fonoaudiologia; Voz; Ruído; Docentes; Distúrbios da voz; Condições de trabalho

Study carried out at Curso de Fonoaudiologia, Universidade Federal da Paraíba – UFPB – João Pessoa (PB), Brasil.

¹Universidade Federal da Paraíba – UFPB – João Pessoa (PB), Brasil.

²Instituto Federal de Educação, Ciência e Tecnologia da Paraíba – IFPB – João Pessoa (PB), Brasil.

Conflict of interests: No.

Authors' contribution: All authors contributed significantly to the construction and development of this work. CNJF and CMAM contributed with data collection, tabulation, analysis and interpretation; AAA participated in the interpretation of the data and revision of the manuscript; MFBL and DAHF supervised the research, performed the statistical analysis, assisted in the interpretation of the data and the revision of the manuscript.

Funding: None.

Corresponding author: Maria Fabiana Bonfim de Lima Silva. E-mail: fbl_fono@yahoo.com.br

Received: February 23, 2019; **Accepted:** August 07, 2019

INTRODUCTION

Due to a number of factors related to predisposition and working conditions (vocal use and environmental and organizational factors)^(1,2), teachers are highlighted as the potential category to develop the Work-Related Voice Disorder (WRVD), when compared with workers that use the voice professionally.

In this sense, highlighted as risk factors for voice disorders such as unfavorable environmental conditions of schools in relation to noise levels, cleanliness, ventilation, lighting and temperature, sum of unsatisfactory work organization, with performance of activities, absence moments of rest and excessive supervision^(3,4). Such factors impair the physical and mental health of teachers, and together contribute to the triggering of likely voice disorders^(5,6).

A scientific survey⁽⁷⁾ in private and public elementary schools of São Paulo, Brazil, showed significant differences of working conditions between public and private school teachers. Public institution teachers had a worse assessment of the physical conditions of the environment and better evaluations regarding eating habits and hydration, compared to those of the private institution. In this sense⁽⁸⁾, other research indicates that the capacity of a classroom significantly affects the amount of vocal fatigue reported by teachers, which is much larger in the public school where there is a high number of students per classroom.

Recent studies^(6,9) indicate that schools in Northeast Brazil have an extremely noisy work environment and no acoustic treatment. One of these studies observed correlation between teachers' voice intensity and noise levels in the classroom. Additionally, voice intensity also correlated with vocal tract discomfort when assessed before and after classes⁽⁹⁾.

The most common symptoms reported in this population were hoarseness, voice loss, vocal fatigue, pain and discomfort when using the voice, dry throat, persistent cough and difficulty for voice projection⁽¹⁰⁻¹²⁾. These symptoms hamper optimal occupational activities and may lead to absence from work or labor readaptation. The large range of symptoms and the demanding working conditions make of teachers a risk group for the development of voice disorders⁽⁵⁾.

From this perspective, the validation of an instrument⁽¹³⁾ was justified – the Screening Index for Voice Disorder (SIVD), which can reliably predict the chances of an individual manifest or not voice disorders. SIVD is a validated instrument for vocal screening of teachers with a high degree of sensitivity. It is a simple and quick screening, based on the answers to 12 questions about vocal symptoms according to the Teacher's Vocal Production Condition (VPC) questionnaire⁽¹⁴⁾. Therefore, its use may help in mapping the teacher's voice disorder, as well as in the planning of public health actions and the design of public policies regarding the teacher's vocal health⁽¹³⁾.

Hence, considering the unfavorable working conditions of teachers towards the development of voice disorders, some questions arise: is there a relation between the working condition of public and private school teachers and their score in the SIVD? Are the voice and working conditions similar between public and private school teachers? Are the public school teachers more prone to develop voice disorders than private school teachers?

Based on the exposed, the present study aimed to test the correlation between the Screening Index for Voice Disorder and the working condition of private and public school teachers and compare the outcomes between both.

METHODS

An observational, cross-sectional and quantitative research was performed following the criteria of the local Committee of Ethics in Research (protocols 466/12 and 091/13).

This study is from an extension project from an academic institution that aims at providing vocal health to public and private school teachers. However, there were limitations in relation to the participation of private schools, since they were not interested in the project. On the other hand, the partnership with the Secretary of Education and Culture from the city resulted in more participation of public schools. Therefore, by convenience, four public schools and one private school from the city of João Pessoa – PB, participated in the study. The selection criteria of the schools were: large schools that attended, in the three shifts, elementary and high school students.

After the acceptance of participation by the school administration (public and private), all the teachers from those five schools (n = 220) were invited to participate in the research. Afterwards, 37 teachers were excluded from the sample because they were not able to participate in all research steps (n = 17) or were temporarily absent from work (n = 20). Therefore, 183 teachers from the five schools were sampled in the present study. All the teachers worked exclusively in private or public schools and signed the Informed Consent Form.

The Teacher's Vocal Production Condition questionnaire⁽¹⁴⁾ of self-perception was applied to the teachers. The questionnaire consists of 81 questions structured in the following parts: identification; functional situation; general health aspects; voice habits and voice aspects.

The present study aimed to explore the demographic data (e.g. age, sex, level of education, marital status and workload), working condition (e.g. noisy school; strong noise; unpleasant noise; satisfactory acoustic classroom; presence of echo, dust, smoke or humidity in the working environment; temperature; calm environment; stressing working rhythm; available resting place; stress always present at work; environment factors affect in personal life and health), voice complaints (e.g. presence of voice disorder in the present), voice symptoms (hoarseness, voice loss, breaking voice, shortness of breath, high-pitched voice, low-pitched voice, high-low pitch variations in voice and weak voice) and laryngopharyngeal symptoms (e.g. dry throat, dry cough, pain when speaking, pain when swallowing and difficulty swallowing).

Regarding the voice condition of teachers, twelve symptoms were chosen out of the 21 initially available in the questionnaire⁽¹⁵⁾ (hoarseness, voice loss, breaking voice, low-pitched voice, dry throat, dry cough, throat cough, fatigue, cough with secretion/phlegm, secretion/phlegm in the throat, pain when speaking, pain when swallowing) that supports the use of SIVD – which is a simple quantification of the symptoms reported previously described.

Scores were given to self-reported working and voice conditions. Dichotomic questions were scored with de 0

Table 1. Absolute and relative frequencies of teachers based on their weekly workload and type of school

| School | | Weekly workload | | | | | Total |
|---------|-------|-----------------|------------|------------|------------|----------|-------------|
| | | <10h | 10-20h | 20-30h | 30-40h | >40h | |
| Public | n (%) | 13 (10.7%) | 39 (32.0%) | 35 (28.7%) | 27 (22.1%) | 8 (6.6%) | 122 (100%) |
| Private | n (%) | 8 (13.1%) | 16 (26.2%) | 18 (29.5%) | 14 (23.0%) | 5 (8.2%) | 61 (100.0%) |

Workload expressed in hours (h); n = numerical distribution; % = percentage

(worst condition) and 100 (better condition). Questions with up to four answers (Likert scale: *never*, *rarely*, *sometimes* and *always*) were gradually scored using 0, 33.3, 66.7 and 100 points. Next, the mean value was taken from the scoring for both voice and working conditions.

Statistical analyses were performed with SPSS 20.0 (IBM Analytics, Armonk, NY, USA) software package. The data was explored with descriptive and inferential statistics. Kolmogorov-Smirnov test was used to assess sample normality. Spearman correlation coefficient was used to correlate working conditions and the scores obtained with the SIVD. Chi-square test associated the self-reported voice disorders (presence or absence) and the types of school (public or private). Odds Ratio was applied to this association. The distribution of the scores of SIVD in public and private schools was assessed with Many-Whitney test. Significance and confidence levels were set at 5 and 95%, respectively.

RESULTS

The final sample consisted of 183 school teachers, out of which 122 worked in public schools and 61 worked in private schools. Most of the teachers were females (73.2%, n = 134), both in public (76.2%, n = 93) and private (67.2%, n = 41) schools. The mean age of the teachers reached 42 years.

The mean time of experience with teaching reached 16 years and 8 months in the total sample, those from private school, on average, 19 years and 5 months, and those from public school for 15 years and one month. This difference in working time in the profession was significant (p = 0.006).

Most of the public school teachers (32%) had a weekly workload between 10 and 20 hours, while in private schools the weekly workload ranged mostly between 20 and 30 hours (29.5%) (Table 1). Thus, the private school teachers under analysis have more time of teaching experience and higher workload than the public school teachers.

Hoarseness (79.2%, n=145), breaking voice (60.1%, n=110) and low-pitched voice (50.8%, n=93) were the most prevalent symptoms reported by the teachers, while dry throat (74.9%, n=137), dry cough (71.0%, n=130) and phlegm were the most prevalent laryngopharyngeal sensations (66.1%, n=121) (Table 2).

Most of the teachers in public schools (86.89%; n = 106) reported history of voice alterations. In the private school, the prevalence of previous history of voice alterations reached 63.93% (n = 34). Statistically significant association was observed between the self-reported voice disorders and the type of elementary school (p < 0.001). Public school teachers presented 3.74 times more chances of reporting voice alterations compared to private school teachers (Table 3).

Table 2. Absolute and relative frequencies of the voice symptoms and the laryngopharyngeal sensations reported by teachers

| Variable | | n | % |
|-------------------------------------|--------------------------|------------|-------------|
| Voice symptoms | Hoarseness | 145 | 79.2% |
| | Failure | 110 | 60.1% |
| | Thick voice | 93 | 50.8% |
| | Lack of breath | 82 | 44.8% |
| | Loss of voice | 82 | 44.8% |
| | Weak voice | 79 | 43.2% |
| | Thick/thin voice | 60 | 32.8% |
| | Thin voice | 43 | 23.5% |
| | Other | 15 | 8.2% |
| Laryngopharyngeal sensations | Dry throat | 137 | 74.9% |
| | Dry coughing | 130 | 71.0% |
| | Mucous secretion | 121 | 66.1% |
| | Fatigue | 120 | 65.6% |
| | Effort to speak | 110 | 60.1% |
| | Burning throat | 105 | 57.4% |
| | Coughing with secretion | 103 | 56.3% |
| | Throat secretion | 99 | 54.1% |
| | Sting in the throat | 81 | 44.3% |
| | Pain in speaking | 68 | 37.2% |
| | Pain in swallowing | 68 | 37.2% |
| | Lump in the throat | 64 | 35.0% |
| | Sand in the throat | 61 | 33.3% |
| | Difficulty in swallowing | 61 | 33.3% |
| Other | 14 | 7.7% | |
| Total | | 183 | 100% |

Subtitle: n = numerical distribution; % = percentage

The teachers from the private school had, in most of the questions, better scores when compared to the public school teachers. Statistically significant differences were found for most of the variables related to working conditions, except for the presence of dust, humidity and stress. Both the public and private school teachers reported worse working environmental conditions than working organizational conditions. The overall scoring of working conditions of the public school teachers 52.27 (SD = 13.03) was lower (p < 0.001) than of the private school teachers 62.40 (SD = 12.97) (Table 4).

The SIVD presented a statistically significant difference between the teachers of the different schools (p = 0.017). More specifically, the SIVD score was higher among the public school teachers than among the teachers from the private school (Table 5).

Figure 1 consists of a dispersion diagram of the scorings in the correlation analysis. Statistically significant correlations were not observed (r=0.014; p=0.856) between the time of teaching experience and the SIVD. Oppositely, a negative and statistically significant correlation (r=-0.264; p<0.001) was observed between the type of school and the SIVD.

Table 3. Absolute and relative frequencies of voice disorders reported by public and private school teachers

| School | Voice disorder | | | p* | Odds Ratio |
|---------|----------------|-------------|------------|--------|------------|
| | Present | Absent | Total | | |
| Public | 106 (86.89%) | 16 (13.11%) | 122 (100%) | <0.001 | 3.74 |
| Private | 39 (63.93%) | 22 (36.07%) | 61 (100%) | | |

*Chi-square test considering a significance rate of 5%.

Table 4. Scorings related to the working conditions in each question following a scale from 0 (worse condition) to 100 (best condition)

| Questions | Scoring – Working condition | | | | |
|--|-----------------------------|-------|---------|-------|--------|
| | Public | | Private | | p* |
| | Mean | SD | Mean | SD | |
| Is the school noisy? | 72.79 | 10.46 | 89.17 | 12.08 | <0.001 |
| Is the noise strong? | 67.21 | 11.87 | 73.81 | 10.37 | <0.001 |
| Is the noise unpleasant? | 69.40 | 12.31 | 79.26 | 11.95 | <0.001 |
| Does the room have acoustic treatment? | 43.98 | 16.24 | 71.23 | 13.51 | <0.001 |
| Does the room have echo? | 30.22 | 14.73 | 47.37 | 14.44 | <0.001 |
| Does the school have dust? | 70.49 | 14.05 | 71.15 | 13.30 | 0.761 |
| Does the school have smoke? | 19.11 | 8.51 | 29.51 | 14.62 | <0.001 |
| Is the school humid? | 33.67 | 13.52 | 38.58 | 13.22 | 0.021 |
| Is the temperature of the school pleasant? | 54.10 | 15.36 | 73.48 | 11.48 | <0.001 |
| Is your working environment calm? | 54.37 | 13.52 | 65.65 | 9.38 | <0.001 |
| Is the working rhythm stressful? | 58.95 | 14.40 | 68.91 | 7.42 | <0.001 |
| Does the school have a resting place for teachers? | 47.79 | 19.90 | 57.72 | 19.83 | <0.001 |
| Is the stress constantly present in your job? | 68.49 | 13.73 | 62.71 | 10.64 | 0.004 |
| Do you think the environmental aspects of your work influence in your personal life of health? | 41.15 | 14.31 | 45.11 | 14.40 | 0.081 |
| General scoring | 52.27 | 13.03 | 62.40 | 12.97 | <0.001 |

*Mann-Whitney test considering a significance of 5%

Subtitle: SD = Standard deviation

Table 5. Comparison of the scorings in the Screening Index for Voice Disorders between public and private school teachers

| Type of School | SIVD | | | | | p* |
|----------------|------|--------|--------------------|---------|---------|--------|
| | Mean | Median | Standard deviation | Minimum | Maximum | |
| Public | 4.88 | 5 | 3.03 | 0 | 12 | 0.017* |
| Private | 3.69 | 3 | 3.08 | 0 | 11 | |

*Mann-Whitney test considering a significance rate of 5%

Subtitle: SIVD = Screening Index for Voice Disorder

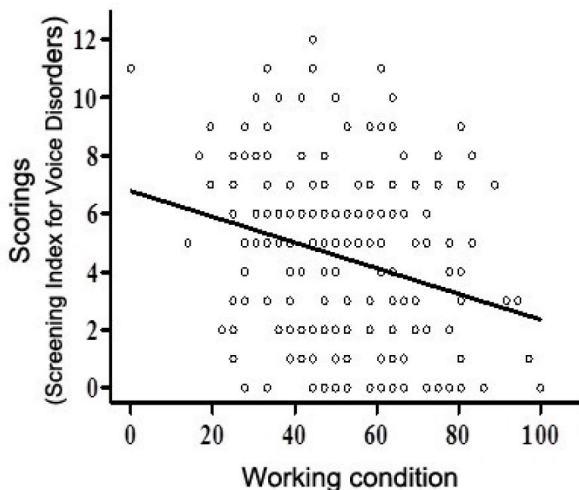


Figure 1. Scatter plot of scores reported by the teachers
 Subtitle: SIVD = Screening Index for Voice Disorder

DISCUSSION

The present study was founded on the application of a questionnaire of self-perception of voice⁽¹⁴⁾ adapted from CPV-P among elementary and high-school teachers from four public and one private school from João Pessoa, Paraíba, Brazil. Based on the obtained data, a correlation was found between the working condition and the SIVD reported by the teachers.

The individuals sampled in the present study was similar to populations previously sampled the scientific literature. Similarly to the previous literature, the discrepancy in sample sex is justified by the higher prevalence of females working in the education field^(2,6,15). Possibly, females are more prone to this field due to maternal instincts. In this context, teaching represents a natural gift⁽¹⁶⁾.

Additionally, according to the scientific literature⁽³⁾, women might show a high prevalence of voice disorders due to changes in the glottal arrangement during prolonged phonation and

loudness, which may occur because of anatomical differences that favor voice disorders.

The mean age of the teachers sampled in this study is compatible with the final vocal efficiency for most individuals⁽²⁾, which might be an indication for risk of voice disorder.

The time of teaching experience among the teachers sampled in this study was higher than previous studies^(3,7). Additionally, a statistically significant difference was observed in the time of experience between public and private school teachers. The present findings indicate a longer time of experience among private school teachers. Teachers in private school start their career with a mean age of 22 years, while in public schools they start working at the mean age of 26 years. These data are consistent with a study⁽⁷⁾ conducted with teachers from Campinas - SP.

The differences between public and private school teachers extended to the weekly workload, which was reduced among public school teachers. On the other hand, a higher number of self-reported voice alterations was observed among public school teachers. These outcomes confirm previous studies⁽¹⁷⁾ that showed no direct relation between the prevalence of voice disorders and workload. Differently, other authors⁽¹⁸⁾ sampled teachers absent from the classroom that had a weekly workload of 40 hour or higher. Their opposite outcomes support a controversial scenario in relation of voice alterations and teaching workload.

The most prevalent voice symptoms were hoarseness, breaking voice and low-pitched voice. The same symptoms were also reported in previous studies⁽⁶⁾. According to previous studies, the presence of these symptoms can be explained by the inappropriate and/or excessive use of voice, as well as by speaking in high intensity due to the presence of internal and external noise in the school^(9,19). Hoarseness is a highly frequent symptom in surveys with teachers^(2,15) and is also the symptom most explored in campaigns to alert the society on the importance of voice care and prevention to avoid future disorders⁽²⁰⁾. Several authors associate this symptom with the intense use of voice. However, studies also show that it also may be related to the lack of hydration and resting, limited mouth opening, pre-existing voice disorders and the presence of nodules or incomplete glottal closure^(2,20).

Additionally, dry cough and throat and phlegm also were highlighted as prevalent self-reported laryngopharyngeal sensations by public and private school teachers. Dry cough and throat also were detected in a previous study⁽¹⁵⁾ and they may be associated with the lack of hydration and working environmental conditions. The exposure to an unfavorable working environment may lead to the intense use of voice and consequently phonation overload^(1,9).

In terms of self-reported voice disorders, the public school teachers (86.89%, n = 106) showed a higher prevalence of voice disorder than the private school teachers (63.93%, n = 34). Moreover, the association between self-reported voice disorders and the type of school was statistically significant ($p < 0.001$). The public school teachers were 3.74 times more likely to report a vocal disorder than the private school teachers. These outcomes are opposite to a previous study⁽⁷⁾ that found no differences statistically significant between teachers of public and private schools. In this study the report of voice disorders was equally high.

In general, in relation to the score of working conditions, the private school teachers in this study showed better scores than the public school teachers. Statistically significant differences between schools were observed for each aspect analyzed, expect

for the presence of dust, humidity and stress in the classroom. Although they have more time of teaching experience and higher workload, they have fewer risk factors than the public school teachers.

The presence of several unfavorable environmental factors in the workplace, such as temperature, humidity, lack of acoustic treatment and noise, may contribute directly to the development of voice disorders⁽²¹⁾.

The worst scorings for the environmental aspects investigated in this study were the presence of smoke, echo, humidity and acoustics in both the public and private schools. The presence of smoke may be related to the geographic location of the schools sampled. Most of the schools were located in avenues with constant vehicle trafficking and several shopping facilities. Constant exposure to smoke may lead to respiratory diseases, such as allergies, bronchitis, asthma and rhinitis⁽²²⁾.

The classroom acoustics was usually indicated by the public school teachers as unsatisfactory, which is consistent with a study⁽²³⁾ in which most teachers mentioned the dissatisfaction in relation to the classroom acoustics. On the other hand, the teachers from the private school under analysis indicated better scores in this item.

When comparing environmental factors reported by the teachers of this study, the adequate temperature in the classroom was indicated by a higher number of the private school teachers than of the public school teachers. This difference is due to the presence of air conditioning in most private school classrooms, while in the public schools fans are more frequent. Therefore, variation in temperature and humidity can cause the lack of hydration of the pharyngeal and laryngeal mucosa, which triggers more intense vocal fold friction⁽²⁴⁾ and becomes a risk factor.

Regarding the voice conditions, the comparison between the SIVD between public and private school teachers resulted with a statistically significant difference. Higher (worse) scores were obtained by public schools teachers. Furthermore, the mean of SIVD from the public school teachers was equal to the SIVD cut-off point found and reported by the previous study⁽¹³⁾. In specific, the study shows that individuals that scored 5 or higher have risk for developing voice disorders⁽¹³⁾.

Finally, a negative correlation between voice and working conditions of public and private school teachers was observed. In corroboration, authors⁽²⁵⁾ suggest that the vocal health of teachers is closely related to occupational aspects. Working conditions (when precarious) compromise teachers' health and lead to the occurrence of several diseases⁽²⁶⁾.

Another study with public schools teachers from Criciúma - SC⁽²⁷⁾ showed no significant correlation between structural conditions at working environment and the occurrence of voice disorders. However, a direct relation was found between the voice disorders and the lack of strategies to prevent them among teachers.

Authors stated that the professionals exposed to excessive vocal demand for long periods need basic and periodic instructions about voice production and voice care⁽²⁸⁾. Thus, these instructions should be included in the course curriculum of licentiate degree courses.

On the other hand, vocal orientations are already observed in teacher training courses and in actions to promote teachers' vocal health both in Brazil and in other countries. There is a need for intervention programs that contribute to a better perception and recognition of their own voice, its variations and transformations, as well as the recognition of its importance in

the teaching-learning process. In addition, they drew attention to the teachers' lack of information about the importance of vocal training before starting the work routine, which can favor effortless vocal production, avoiding possible future vocal fold injuries, since it provides a previous work of heating the laryngeal structures before intense vocal work⁽²⁸⁾.

According to the findings of this research, it is important to emphasize that vocal health promotion actions should also focus on educational strategies and actions that address topics related to the organization's conditions and the teacher's working environment so that this professional can get a broader view of the health-disease process and a better understanding of health, work and quality of life relationships, with a view to building healthy public policies as well as promoting health.

Although a limitation of this study is the small number of public and private schools from the sample, the findings provide relevant information to teachers, school managers, and health professionals, in terms of Work-Related Voice Disorder (WRVD). However, since this is a preliminary study, other studies should be conducted with a representative sample in order to further investigate those findings.

CONCLUSION

In this research, the precarious working conditions are related to a higher SIVD in the participants. The public school teachers from this study reported worse working conditions than the teachers from the private school under analysis, as well as a higher occurrence of voice disorder and a higher SIVD. The public school teachers were 3.74 times more likely to report a voice disorder than those from the private school.

REFERENCES

1. Ferreira LP, Giannini SPP, Alves NLL, Brito AF, Andrade BMR, Latorre MRDO. Voice disorder and teaching work ability. *Rev CEFAC*. 2016;18(4):932-40. <http://dx.doi.org/10.1590/1982-0216201618423915>.
2. Lima-Silva M, Ferreira L, Oliveira I, Silva M, Ghirardi A. Distúrbio de voz em professores: autorreferencia, avaliação perceptiva da voz e das pregas vocais. *Rev Soc Bras Fonoaudiol*. 2012;17(4):391-7. <http://dx.doi.org/10.1590/S1516-80342012000400005>.
3. Santos M, Marques A. Condições de saúde, estilo de vida e características de trabalho de professores de uma cidade do sul do Brasil. *Cien Saude Colet*. 2013;18(3):837-46. <http://dx.doi.org/10.1590/S1413-81232013000300029>. PMID:23546210.
4. Kristiansen J, Lund S, Persson R, Shibuya H, Nielsen PM, Scholz M. A study of classroom acoustics and school teachers' noise exposure, voice load and speaking time during teaching, and the effects on vocal and mental fatigue development. *Int Arch Occup Environ Health*. 2014;87(8):851-60. <http://dx.doi.org/10.1007/s00420-014-0927-8>. PMID:24464557.
5. Silva BG, Chammas TV, Zenari MS, Moreira RR, Samelli AG, Nemr K. Analysis of possible factors of vocal interference during the teaching activity. *Rev Saude Publica*. 2017;51:124. <http://dx.doi.org/10.11606/S1518-8787.2017051000092>. PMID:29236878.
6. Silva GJ, Almeida AA, Lucena BTL, Silva MFBL. Sintomas vocais e causas autorreferidas em professores. *Rev CEFAC*. 2016;18(1):158-66. <http://dx.doi.org/10.1590/1982-021620161817915>.
7. Oliveira IB. Desempenho vocal do professor: avaliação multidimensional [tese]. Campinas: Pontificia Universidade Católica de Campinas; 1999.
8. Banks R, Bottalico P, Hunter E. The effect of classroom capacity on vocal fatigue as quantified by the vocal fatigue index. *Folia Phoniatr Logop*. 2017;69(3):85-93. <http://dx.doi.org/10.1159/000484558>. PMID:29232686.
9. Mendes ALF, Lucena BTL, De Araújo AMGD, Melo LPF, Lopes LW, Silva MFBL. Teacher's voice: vocal tract discomfort symptoms, vocal intensity and noise in the classroom. *CoDAS*. 2016;28(2):168-75. <http://dx.doi.org/10.1590/2317-1782/20162015027>. PMID:27191881.
10. Pellicani AD, Fontes A, Santos F, Pellicani A, Aguiar-Ricz L. Fundamental frequency and formants before and after prolonged voice use in teachers. *J Voice*. 2018;32(2):177-84. <http://dx.doi.org/10.1016/j.jvoice.2017.04.011>. PMID:28645445.
11. Nusseck M, Richter B, Spahn C, Echternach M. Analysing the vocal behaviour of teachers during classroom teaching using a portable voice accumulator. *Logoped Phoniatr Vocol*. 2018;43(1):1-10. <http://dx.doi.org/10.1080/14015439.2017.1295104>. PMID:28635402.
12. Hunter EJ, Banks R. Gender differences in the reporting of vocal fatigue in teachers as quantified by the vocal fatigue index. *Ann Otol Rhinol Laryngol*. 2017;126(12):813-8. <http://dx.doi.org/10.1177/0003489417738788>. PMID:29078706.
13. Ghirardi A, Ferreira L, Giannini S, Latorre M. Screening Index for Voice Disorder (SIVD): development and Validation. *J Voice*. 2013;27(2):195-200. <http://dx.doi.org/10.1016/j.jvoice.2012.11.004>. PMID:23280383.
14. Ferreira L, Giannini S, Latorre M, Zenari M. Distúrbio de voz relacionado ao trabalho: proposta de um instrumento para avaliação de professores. *Distúrb Comun*. 2007;19(1):127-37.
15. Caporossi C, Ferreira L. Sintomas vocais e fatores relativos ao estilo de vida em professores. *Rev CEFAC*. 2011;13(1):132-9. <http://dx.doi.org/10.1590/S1516-18462010005000099>.
16. Lelis I. Profissão docente: uma rede de histórias. *Rev Bras Educ*. 2001;17(2):5-10.
17. Porto L, Reis I, Andrade J, Nascimento C, Carvalho F. Doenças ocupacionais em professores atendidos pelo Centro de Estudos da Saúde do Trabalhador (CESAT). *Rev Baiana Saúde Pública*. 2004;28(1):33-49.
18. Provenzano L, Sampaio T. Prevalência de disfonia em professores do ensino públicos estaduais afastados de sala de aula. *Rev CEFAC*. 2010;12(1):97-108. <http://dx.doi.org/10.1590/S1516-18462010000100013>.
19. Assad J, Gama A, Santos J, Castro M. The effects of amplification on vocal dose in teachers with dysphonia. *J Voice*. 2019;33(1):73-9. <http://dx.doi.org/10.1016/j.jvoice.2017.09.011>.
20. Ferreira L, Latorre M, Giannini S, Ghirardi A, Karmann D, Silva E, et al. Influence of abusive vocal habits, hydration, mastication, and sleep in the occurrence of vocal symptoms in teachers. *J Voice*. 2010;24(1):86-92. <http://dx.doi.org/10.1016/j.jvoice.2008.06.001>. PMID:19135852.
21. Calas M, Verhulst J, Lecoq M, Dalleas B, Seilhean M. La pathologie vocale chez l'enseignant. *Rev Laryngol*. 1989;110(4):397-406.
22. Mello A, Siqueira C, Cielo C, Bastilha G, de Moraes Lima J, Christmann M. Saúde geral, sensações vocais, diagnóstico otorrinolaringológico e tempo de uso vocal de professores. *Distúrb Comun*. 2016;28(3):404-414.
23. Rabelo A, Guimarães A, Oliveira R, Fragoso L, Santos J. Avaliação e percepção docente sobre os efeitos do nível de pressão sonora na sala de aula. *Distúrb Comun*. 2015;27(4):715-724.
24. Scalco M, Pimentel R, Pilz W. A saúde vocal do professor: levantamento junto às escolas particulares de Porto Alegre. *Rev Pró-Fono*. 1996;8(2):25-31.

25. Luchesi K, Mourão L, Kitamura S, Nakamura HY. Problemas vocais no trabalho: prevenção na prática docente sob a ótica do professor. *Rev Saude Soc.* 2009;8(4):673-81. <http://dx.doi.org/10.1590/S0104-12902009000400011>.
26. Chong EY, Chan A. Subjective health complaints of teachers from primary and secondary schools in Hong Kong. *Int J Occup Saf Ergon.* 2010;16(1):23-39. <http://dx.doi.org/10.1080/10803548.2010.11076825>. PMID:20331916.
27. Lemos S, Rumel D. Ocorrência de disfonia em professores de escolas públicas da rede municipal de ensino de Criciúma-SC. *Rev Bras Saúde Ocup.* 2005;30(112):7-13. <http://dx.doi.org/10.1590/S0303-76572005000200002>.
28. Oliveira Bastos P, Hermes E. Effectiveness of the Teacher's Vocal Health Program (TVHP) in the Municipal Education Network of Campo Grande, MS. *J Voice.* 2018 Nov;32(6):681-8. <http://dx.doi.org/10.1016/j.jvoice.2017.08.029>. PMID:29032128.