

Actor's voice: environmental conditions and work organization

Voz do ator: condições ambientais e de organização de trabalho

Voz del actor: condiciones ambientales y de organización del trabajo

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Abstract

Introduction: The occurrence of vocal symptoms is often associated with factors present in the environment or in organization of work of various professionals. **Objective:** to analyze the environmental conditions and work organization in actors associated with vocal symptoms reference, after the adaptation of an instrument previously used with teachers. **Method:** actors with a minimum of two years of theatrical experience answered questionnaire regarding aspects of vocal production environment, work organization and functionality. Data were analyzed descriptively and inferentially (association between variables – Chi-squared-test; $p < 0.05$). **Results:** 100 actors, 56% male, mean age of 30.8 years ($SD = 8.6$) and professional experience of 8.9 years ($SD = 6.1$). 49 subjects sought complementary activity that also demanded vocal demand for not being financially able to keep themselves as an actor. The main vocal symptom was clearing throat (68), followed by dry throat (54) and rough voice (45). Significant statistical association between stressful work and weak voice moral harassment ($p = 0.030$ and $p = 0.048$, respectively) was observed. Actors who admit interference of work matters in their health presented this relationship as a protective factor for secretion cough ($OR = 0.40$, $p = 0.044$), dry throat ($OR = 0.42$, p

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= 0.042) and hoarseness (OR = 0.30, $p = 0.011$) symptoms. **Conclusion:** dust and noise were the main environmental factors cited, intense physical effort and stressful rhythm among those related to work organization. The most commonly reported symptoms were throat clearing, dry throat, rough voice and dry cough, with clearing directly associated with noise.

Keywords: Voice; Voice disorders; Art; Worker's health

Resumo

Introdução: Frequentemente associamos a ocorrência de sintomas vocais a fatores presentes no ambiente ou na organização de trabalho dos diversos profissionais. **Objetivo:** após a adaptação de instrumento utilizado anteriormente com professores, analisar as condições de ambiente e de organização do trabalho em atores, associadas à referência a sintomas vocais. **Método:** atores com mínimo de dois anos de vivência teatral responderam questionário com foco nos aspectos do ambiente, organização do trabalho e funcionais da produção vocal. Os dados foram analisados de forma descritiva e inferencial (associação entre variáveis - teste do Qui-quadrado; $p < 0,05$). **Resultados:** 100 atores, sendo 56% do sexo masculino, idade média de 30,8 anos ($dp=8,6$) e tempo de atuação profissional de 8,9 anos ($dp=6,1$). 49 sujeitos procuraram atividade complementar que também exigia demanda vocal por não conseguirem se manter financeiramente como ator. O principal sintoma vocal foi o pigarro (68), seguido por garganta seca (54) e voz grossa (45). Observou-se associação estatística significativa entre ritmo de trabalho estressante e o assédio moral com a voz fraca (respectivamente, $p=0,030$ e $p=0,048$). Atores que admitem interferência das questões de trabalho em sua saúde apresentaram essa relação como fator protetor para os sintomas tosse com secreção (OR=0,40; $p=0,044$), garganta seca (OR=0,42; $p=0,042$) e rouquidão (OR=0,30; $p=0,011$). **Conclusão:** poeira e ruído foram os principais fatores ambientais citados e esforço físico intenso e ritmo estressante dentre os relacionados à organização do trabalho. Os sintomas mais referidos foram pigarro, garganta seca, voz grossa e tosse seca, sendo que o pigarro foi diretamente associado ao ruído.

Palavras-chave: Voz; Distúrbios da voz; Arte; Saúde do trabalhador.

Resumen

Introducción: A menudo asociamos la aparición de síntomas vocales a factores presentes en el ambiente o en la organización del trabajo de los diversos profesionales. **Objetivo:** después de adaptar el instrumento utilizado anteriormente con profesores, analizar las condiciones del ambiente y de la organización del trabajo de actores, asociadas con la referencia a síntomas vocales. **Método:** actores con mínimo de dos años de vivencia teatral respondieron a un cuestionario con foco en los aspectos del ambiente, de la organización del trabajo y funcionales relativos a la producción vocal. Los datos fueron analizados de forma descriptiva e inferencial (asociación entre variables - prueba del Chi-cuadrado, $p < 0,05$). **Resultados:** 100 actores, siendo 56% del sexo masculino, edad media de 30,8 años ($dp=8,6$) y tiempo de actuación profesional de 8,9 años ($dp=6,1$). 49 sujetos buscaron actividad complementaria que también exigía demanda vocal por no conseguir mantenerse financieramente como actor. El principal síntoma vocal fue el carraspeo (68), seguido garganta seca (54) y voz gruesa (45). Se observó asociación estadística significativa entre ritmo de trabajo estresante y el acoso moral con la voz débil (respectivamente, $p=0,030$ y $p=0,048$). Actores que admiten la interferencia de cuestiones de trabajo en su salud, presentan esa relación como factor de protección para los síntomas: tos con secreción (OR=0,40; $p=0,044$), garganta seca (OR=0,42; $p=0,042$) y ronquera (OR = 0,30, $p=0,011$). **Conclusión:** polvo y ruido fueron los principales factores ambientales citados y esfuerzo físico intenso y ritmo estresante entre los relacionados a la organización del trabajo. Los síntomas más referidos fueron carraspeo, garganta seca, voz gruesa y tos seca, siendo que el carraspeo fue directamente asociado al ruido.

Palabras clave: Voz; Trastornos de la voz; El arte; Salud del trabajador.

Introduction

Voice professionals are individuals who need to produce a specific vocal quality and have an average or high demand in their professional activity. These workers can be divided into those who use the voice in an artistic (singers, actors, voice actors, among others) and non-artistic (teachers, religious leaders, telemarketers, salesmen, etc.) way, both of which require care to maintain a healthy voice^{1,2}.

Singers and actors have a high vocal demand, since it should sound excellent, and depending on the job, it will require adjustments to a greater or lesser extent¹. Musical theater artists specifically present similarities in vocal demand; however, the singing voice requires harmony between musical notes, melody and a specific rhythm for each song^{3,4}. Actors, in particular, need intensity and vocal projection, as well as good coordination, agility, plasticity and constitution of poetic voice, which are required for the performance of a character⁵.

There are few scientific productions nationwide with the actor as subject⁶, while only 7 (seven) of which were published from 1970 to 2013, and they addressed topics such as the preparation of the actor and the role of the speech-language pathologist in the theater, vocal well-being, voice constitution in creation with the theatrical make, and vocal symptoms. Among these studies, the most significant⁷ aimed to know the occurrence of voice disorder in actors and applied the Voice Disorder Screening Index (VDSI), which was developed for teachers⁸, in 173 actors, thus noting that a quarter of the participants (25.43%) were likely to develop voice disorders and that hoarseness was a symptom reported by 34 subjects (19.65%), as “sometimes” or “always”.

The occurrence of vocal symptoms in discussions is often associated with adverse factors present in the environment or in organization of work of various professionals. In particular, an instrument called Vocal Production Condition -Teacher (CPV-T)⁹ was developed for teachers, including aspects related to the environment and work organization, as well as issues related to the functional situation, general health of the individual and vocal aspects.

As with other voice professionals, it is believed that there may be a direct relationship between working conditions and possible vocal damages. A study¹⁰ conducted with 48 actors about vocal health aspects or self-related voice quality, general health,

organization and working environment, indicated that all participants considered vocal health important for theater actors; 83.3% reported to perform prior vocal training, 35% reported to have difficulty maintaining vocal quality on a day to day basis and that the Italian stage seems to be more related to pneumophonatory incoordination when compared to the arena theater.

The scarcity of instruments aimed at the actor is evidenced and few researches are focused on the association of the presence of vocal symptoms and risk factors. Therefore, this study aimed to analyze the environmental conditions and work organization in actors associated with vocal symptoms reference, after the adaptation of an instrument previously used with teachers.

Method

This observational, prospective and cross-sectional study was approved by the Ethics Committee of the Pontifical Catholic University of São Paulo – PUC/SP under the no. CAAE 45416915.7.0000.5482.

The sample of the study consisted of 100 actors with at least two years of theater experience, which was understood as acting professionally or attending any acting school. All those who agreed to participate in the research provided the data collected through the signature of the free, prior and informed consent (FPIC).

The CPV-T questionnaire was designed in order to explore environmental issues and organization at work among teachers⁹, and this research was adjusted according to the professional context of performing arts.

Originally, this instrument consisted of 77 questions divided into five areas: identification, functional situation, general aspects of health, habits and vocal aspects. However, in order to be applied in this study, the final version was adapted in three stages:

1st Stage: the first version was conducted, considering the context of the actor, and then it was submitted to the analysis of three teachers doctors with knowledge in the preparation and handling of questionnaires, and the addition of the answers was to suggest, which initially included only four frequencies (never, rarely, sometimes, always), since the “usually” option was included to enhance the sensitivity of the instrument.

2nd Stage: Development of the second version after the suggestions provided in the 1st Stage and submission (separately) to four voice specialists speech-language pathologists with at least five years of experience with direct involvement in the training of actors and vocal preparation for concerts. All the various suggestions were duly analyzed and incorporated into the instrument so as not to compromise the objective and proposal of the study.

3rd Stage: the questionnaire has been properly introduced and programmed in the Google Drive[®] storage service and submitted to a pilot version with five actors. An annotation space has been provided in case of difficulty understanding any of the questions or in case of any other issue when answering. However, none of the participants reported any difficulty with the questionnaire.

After the adaptation process to actors, the instrument became the Vocal Production Condition - Actor CPV-A (Appendix 1), composed of 56 questions in total, of which five with respect to participant's identification (1-5), seven related to functional status (6-12), 14 concerning the work environment (13-26), 14 concerning work organization (27-40) and the last 16 related to vocal aspects, habits and lifestyle (41-56). 22 symptoms are presented in the latter (and the choice to select 'other') and responses were recorded using a *likert* scale: 0- never, 1- rarely, 2- sometimes, 3- usually, and 4- always.

The final version was uploaded in a storage service, Google Drive[®], and its link was submitted either by email or by groups of social networks to potential participants. The questionnaire could be accessed by this link only after acceptance by the actor to participate in the survey and by signing the FPIC.

After answering the questionnaire, the actors could inform an email address to contact in order to receive a feedback. The free, prior and informed consent also explained that if any participant showed signs of some vocal vulnerability

(mainly based on vocal symptoms), he/she would be contacted to be freely referred to a health care institution.

Questionnaire responses were classified into 'no' (questions answered as 'never', 'rarely' and 'sometimes') and 'yes' (questions answered as 'usually' and 'always') in order to conduct the descriptive statistical analysis before the calculation of absolute and relative frequencies, central tendency (mean and median) and dispersion (standard deviation, minimum and maximum).

The Chi-square test was used to analyze the association between the independent variables and the "vocal symptoms" endpoint. A multiple binary logistic regression analysis was applied to endpoints that presented more than fifteen actors with an event, statistical significance in the dependent variables and independent variables with a <0.20 p-value.

A 95% descriptive level ($p < 0.05$) was assumed for statistical significance. Data were using the 22.0 version of SPSS software for Windows, from the Excel file generated by the Google Drive[®]

Results

100 actors were evaluated, most of them male (56%), single (75%), with an undergraduate degree (61%). The average age of the sample was 30.8 years ($SD=8.6$) and the average career length was 8.9 years ($SD=6.1$). Among these, 64.0% also perform other activities that require their voices, in addition to acting, while 55.0% reported that acting is their only profession. The most frequent function performed by actors in the theater was acting in plays (99%), followed by setting/dismantling of scenic objects, lighting or sound equipment (72%) and producing (64%).

Table 1 shows that 75% of the actors reported that there is dust in the rehearsal space, while 71% reported that the rehearsal and presentation space is noisy, and 48% that the rehearsal space has an echo.

Table 1. Percentage and numerical distribution according to main work environment factors.

Variable	Category	n	(%)
Are your rehearsals and presentations usually in the same environment?	No	40	(40.0)
	Yes	60	(60.0)
Is your rehearsal and presentation space noisy?	No	29	(29.0)
	Yes	71	(71.0)
Is the noise strong?	No	53	(53.0)
	Yes	47	(47.0)
Is acoustics satisfactory?	No	29	(29.0)
	Yes	71	(71.0)
Does the environment have an echo?	No	52	(52.0)
	Yes	48	(48.0)
Is there dust on the place?	No	25	(25.0)
	Yes	75	(75.0)
Is there smoke on the place?	No	77	(77.0)
	Yes	23	(23.0)
Is the temperature of the place pleasant?	No	12	(12.0)
	Yes	88	(88.0)
Is there humidity on the place?	No	56	(56.0)
	Yes	44	(44.0)
Is cleaning satisfactory?	No	10	(10.0)
	Yes	90	(90.0)
Are bathrooms properly sanitized?	No	4	(4.0)
	Yes	96	(96.0)
Do cleaning products cause irritation?	No	86	(86.0)
	Yes	14	(14.0)
Are scenarios, props and costumes suitable to your physical constitution? (height and weight)	No	5	(5.0)
	Yes	95	(95.0)
Do scenarios, props and costumes undermine your performance?	No	82	(82.0)
	Yes	18	(18.0)
Total		100	(100.0)

Table 2 shows that 78% of the actors reported to perform intense physical effort, 62% frequently carry weight, 63% reported that the

work rate is stressful, while 49% feel stressed out due to work and 11% consider that their work is monotonous.

Table 2. Percentage and numerical distribution according to work organization factors.

Variable	Category	n	(%)
Do you have a good relationship: With your colleagues who work on the play (actors, production and technical staff)	No	3	(3.0)
	Yes	97	(97.0)
With the management	No	4	(4.0)
	Yes	96	(96.0)
Are you free to create and provide suggestions throughout the process?	No	3	(3.0)
	Yes	97	(97.0)
Is there a regular monitoring from direction?	No	2	(2.0)
	Yes	98	(98.0)
Have you ever felt any kind of harassment from the management?	No	81	(81.0)
	Yes	19	(19.0)
Is the work rate stressful?	No	37	(37.0)
	Yes	63	(63.0)
Is there enough budget to produce the plays?	No	62	(62.0)
	Yes	38	(38.0)
In your opinion, is your work monotonous?	No	89	(89.0)
	Yes	11	(11.0)
Do you perform intense physical effort?	No	22	(22.0)
	Yes	78	(78.0)
Do you carry weight often?	No	38	(38.0)
	Yes	62	(62.0)
Is the group committed to the maintenance and organization of the workplace?	No	9	(9.0)
	Yes	91	(91.0)
Are you satisfied with your role?	No	2	(2.0)
	Yes	98	(98.0)
Do you feel stressed because of your work?	No	51	(51.0)
	Yes	49	(49.0)
Do work factors impact your health?	No	50	(50.0)
	Yes	50	(50.0)
Total		100	(100.0)

With respect to vocal symptoms, Table 3 shows that 68% of the actors presented clearing throat, which was the most common symptom, followed

by dry throat (54%), rough voice (45%) and dry cough (39%).

Table 3. Percentage and numerical distribution according to self-reported vocal symptoms.

Variable	Category	n	(%)
Hoarseness	No	66	(66.0)
	Yes	34	(34.0)
Loss of voice	No	96	(96.0)
	Yes	4	(4.0)
Failing voice	No	76	(76.0)
	Yes	24	(24.0)
Rough voice	No	55	(55.0)
	Yes	45	(45.0)
Thin voice	No	83	(83.0)
	Yes	17	(17.0)
Voice ranging from rough to thin	No	82	(82.0)
	Yes	18	(18.0)
Weak voice	No	88	(88.0)
	Yes	12	(12.0)
Stinging sensation in throat:	No	76	(76.0)
	Yes	24	(24.0)
Feeling of sand in throat	No	87	(87.0)
	Yes	13	(13.0)
Feeling of lump in the throat	No	79	(79.0)
	Yes	21	(21.0)
Clearing throat	No	32	(32.0)
	Yes	68	(68.0)
Dry cough	No	61	(61.0)
	Yes	39	(39.0)
Secretion cough	No	67	(67.0)
	Yes	33	(33.0)
Pain when speaking	No	92	(92.0)
	Yes	8	(8.0)
Pain when swallowing	No	91	(91.0)
	Yes	9	(9.0)
Difficulty swallowing	No	91	(91.0)
	Yes	9	(9.0)
Burning sensation in the throat	No	79	(79.0)
	Yes	21	(21.0)
Secretion in the throat	No	73	(73.0)
	Yes	27	(27.0)
Dry throat	No	46	(46.0)
	Yes	54	(54.0)
Fatigue when speaking	No	77	(77.0)
	Yes	23	(23.0)
Effort when speaking	No	78	(78.0)
	Yes	22	(22.0)
Shortness of breath	No	82	(82.0)
	Yes	18	(18.0)
Total		100	(100.0)

Concerning voice care strategies, almost all the participants warm up their voices (97%), while only one-third (32%) reported to cool down their voices.

As for working environment factors, 'thin voice' symptom reports were associated with the presence of strong noise ($p=0.032$), unpleasant temperatures ($p=0.005$) and unsatisfactory cleaning ($p=0.012$) (Table 4).

The 'voice ranging from rough (low-pitched voice) to thin (high-pitched voice)' endpoint presented a statistically significant association with the presence of smoke on place ($p=0.028$); unsatisfactory cleaning ($p=0.016$) and, when scenery, props and/or costumes undermine acting ($p=0.018$) (Table 4).

The 'weak voice' endpoint presented a statistically significant association with the temperature and scenarios, props and costumes that undermine the performance ($p=0.038$), as well as with unpleasant temperatures (33.3% vs. 9.1 %; $p=0.036$) (Table 4). There was also an association between the presence of a stressful work rate and harassment (respectively, $p=0.030$ and $p=0.048$).

The 'feeling of sand in the throat' endpoint presented a statistically significant association with

the presence of dust on the place (28.0% vs. 8.0%; $p=0.017$); as well as with the presence of humidity on the place ($p=0.049$) and the absence of warming up techniques ($p=0.044$).

Table 4 also shows a statistically significant association of the presence of the 'feeling of lump in throat' symptom and the 'absence of echo in the environment' variable ($p=0.013$). The group's commitment with the workplace maintenance and organization was associated ($p=0.028$) to 'clearing throat' symptom, as well as the absence of work factors that impact with health ($p=0.032$).

The presence of 'pain when speaking' symptom presented a statistically significant association with the 'strong noise' variable (14.9% versus 1.9%; $p=0.024$). The 'pain when swallowing' endpoint presented a statistically significant association with the 'rehearsals and presentations usually in the same environment' independent variable ($p=0.010$).

The 'burning sensation in the throat' symptoms showed a statistically significant association with the 'presence of smoke at location' ($p=0.021$) and 'having enough budget to produce plays' ($p=0.042$) variables.

In turn, 'dry cough' showed a statistically significant association with not feeling stressed ($p=0.004$), as well as with the lack of work factors that impact health ($p=0.008$) (Table 5).

'Secretion in the throat' presented a statistically significant association with the presence of the stressful work rate when compared to absence of it (34.9% versus 13.5%; $p=0.020$), and similarly, with the presence of physical effort ($p=0.032$) (Table 5).

Regarding the 'dry throat' symptom, the absence of irritation caused by cleaning products showed a statistically significant association with this endpoint ($p=0.040$) as well as the lack of work factors that impact health ($p=0.016$) (Table 5).

There was a greater likelihood of presenting shortness of breath among actors who do not cool down their voices (23.5% versus 6.3%; $p=0.036$) (Table 5).

Concerning the association between work organization factors and self-reported vocal symptoms, it can be observed for the variable "work factors that impact in health", and mention of hoarseness among the actors who recorded "no" (48.0% versus 20.0%, $p=0.003$), while the rough voice symptom was associated with the report of not performing another activity, besides acting (63.9% versus 34.4%, $p=0.004$) (Table 5). The same table also shows the association of work organization factors and the record of thin voice and the sense of some harassment on the part of the direction (36.8% versus 12.3%, $p=0.018$), intense physical efforts ($p=0.020$) and dissatisfaction with the function (100.0% versus 15.3%, $p=0.027$).

An association can be noticed between the symptoms and the variables as independent pro-

TECTIVE factors: for hoarseness, the 'work factors impact your health?' variable presented an odds ratio (OR) of 0.30 and a 95% confidence interval (95% CI) from 0.1 to 0.8 ($p=0.011$); while for rough voice, the "besides acting, do you perform other activities that require the use of voice?" variable (OR=0.27, $p=0.005$); and for thin voice, the 'is the temperature of the place pleasant?' variable were protective factors (OR=0.13, $p=0.004$) (Table 5).

Two models were created for the 'voice ranging from rough to thin' endpoint. In model 1, the presence of smoke in the place is presented as an independent factor to 'voice ranging from rough to thin' symptom (OR=3.21; $p=0.043$), that is, actors who reported the presence of smoke are more likely of presenting this injury compared to those who didn't report the presence of smoke in the workplace. The satisfactory cleaning of the place showed to be a protective factor (OR=0.19, $p=0.023$) in this same model. It also can be noticed that the presence of smoke (OR=3.62; $p=0.026$) is associated with the presence of 'voice ranging from rough to thin' for model 2. In addition to this, the "scenarios, props and costumes undermine your performance?" variable presented an association to the endpoint, recording a chance of OR=4.16 ($p=0.019$) of actors to present voice ranging from rough to thin among those who reported that the scenario, props and/or costumes undermine their performance in comparison to those who didn't (Table 5).

Having an environment with echo was an independent factor for the presence of 'feeling of lump in the throat' endpoint (Table 5) (OR=0.28; $p=0.027$).



Table 5. Analysis of chi-square association between work organization characteristics and the presence of vocal symptoms.

Questions	Presence of Signs and Symptoms																						
	H	LOV	VF	RV	TV	VRRT	VW	SST	FST	FLT	DC	SC	PSP	PSW	DS	BST	ST	DT	FS	EF	SB		
	N	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	
Do you have a good relationship with your colleagues who work on the play? (actors, production and technical staff?)	No	0	0.0	0	0.0	1	1.1	1	1.1	1	1.1	1	1.1	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0
	Yes	34	(35.1)	4	(4.1)	24	(24.7)	17	(17.5)	13	(13.4)	20	(20.6)	67	(69.1)	39	(40.2)	33	(34.0)	8	(8.2)	9	(9.3)
p		1.000*	1.000*	0.432*	1.000*	0.432*	1.000*	1.000*	0.432*	1.000*	0.432*	1.000*	0.432*	1.000*	0.432*	1.000*	0.432*	1.000*	0.432*	1.000*	0.432*	1.000*	
Do you have a good relationship with the management?	No	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0
	Yes	33	(34.4)	3	(3.1)	23	(24.0)	43	(44.8)	16	(16.7)	17	(17.5)	66	(68.0)	38	(39.6)	33	(34.4)	7	(7.3)	9	(9.4)
p		1.000*	0.153*	1.000*	0.054*	1.000*	0.054*	1.000*	0.153*	1.000*	0.054*	1.000*	0.153*	1.000*	0.054*	1.000*	0.153*	1.000*	0.054*	1.000*	0.153*	1.000*	
Are you free to create and provide suggestions throughout the process?	No	2	(66.7)	3	(100.0)	0	(0.0)	1	(33.3)	1	(33.3)	3	(100.0)	3	(100.0)	22	(66.7)	0	(0.0)	0	(0.0)	0	(0.0)
	Yes	32	(33.0)	4	(4.1)	22	(22.7)	42	(43.3)	17	(17.5)	11	(11.3)	24	(24.7)	13	(13.4)	20	(20.6)	65	(67.0)	36	(37.1)
p		0.266*	1.000*	0.142*	1.000*	0.088*	1.000*	0.088*	1.000*	0.142*	1.000*	0.088*	1.000*	0.142*	1.000*	0.088*	1.000*	0.142*	1.000*	0.088*	1.000*	0.142*	
Is there a regular monitoring from direction?	No	0	(0.0)	0	(0.0)	1	(50.0)	0	(0.0)	1	(50.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
	Yes	34	(37.7)	4	(4.1)	23	(23.5)	44	(44.9)	17	(17.3)	18	(18.4)	67	(68.4)	38	(38.8)	33	(33.7)	8	(8.2)	9	(9.2)
p		0.547*	1.000*	0.424*	1.000*	0.227*	1.000*	0.424*	1.000*	0.227*	1.000*	0.424*	1.000*	0.227*	1.000*	0.424*	1.000*	0.227*	1.000*	0.424*	1.000*	0.227*	
Have you ever felt any kind of harassment from the management?	No	25	(30.9)	3	(3.7)	16	(19.8)	35	(43.2)	10	(12.3)	15	(18.5)	56	(69.1)	29	(35.8)	24	(29.6)	6	(7.4)	7	(8.6)
	Yes	9	(47.4)	1	(5.3)	8	(42.1)	10	(52.6)	7	(36.8)	6	(31.6)	12	(63.2)	10	(52.6)	9	(47.4)	2	(10.5)	3	(15.8)
p		0.172	0.576*	0.069*	0.458	0.018*	0.103*	0.048*	0.069*	0.018*	0.103*	0.048*	0.069*	0.018*	0.103*	0.048*	0.069*	0.018*	0.103*	0.048*	0.069*	0.103*	
Is the work rate stressful?	No	12	(32.4)	1	(2.7)	7	(18.9)	21	(56.8)	4	(10.8)	5	(13.5)	7	(18.9)	24	(64.9)	19	(51.4)	10	(27.0)	3	(8.1)
	Yes	22	(34.9)	3	(4.8)	17	(27.0)	24	(38.1)	13	(20.6)	11	(17.5)	16	(25.4)	44	(69.8)	20	(31.7)	23	(36.5)	5	(7.9)
p		0.800	1.000*	0.362	0.070	0.371	0.030*	0.175	0.030*	0.175	0.030*	0.175	0.030*	0.175	0.030*	0.175	0.030*	0.175	0.030*	0.175	0.030*	0.175	
Is there enough budget to produce the plays?	No	19	(30.6)	1	(1.6)	14	(22.6)	26	(41.9)	9	(14.5)	11	(17.7)	42	(67.7)	25	(40.3)	22	(35.5)	5	(8.1)	7	(11.3)
	Yes	15	(39.5)	3	(7.9)	10	(26.3)	19	(50.0)	8	(21.1)	5	(13.2)	26	(68.4)	14	(36.8)	11	(28.9)	3	(7.9)	2	(5.3)
p		0.366	0.152*	0.671	0.431	0.398	0.534	0.762*	0.431	0.398	0.534	0.762*	0.431	0.398	0.534	0.762*	0.431	0.398	0.534	0.762*	0.431	0.398	
In your opinion, is your work monotonous?	No	30	(33.7)	4	(4.5)	22	(24.7)	40	(44.9)	15	(16.9)	23	(25.8)	62	(69.7)	34	(38.2)	30	(33.7)	7	(7.9)	9	(10.1)
	Yes	4	(36.4)	0	(0.0)	2	(18.2)	5	(45.5)	2	(18.2)	3	(27.3)	6	(54.5)	5	(45.5)	3	(27.3)	1	(9.1)	0	(0.0)
p		1.000*	1.000*	0.028*	1.000*	0.289*	1.000*	0.028*	1.000*	0.289*	1.000*	0.028*	1.000*	0.289*	1.000*	0.028*	1.000*	0.289*	1.000*	0.028*	1.000*	0.289*	
Do you perform intense physical effort?	No	7	(31.6)	1	(4.5)	7	(31.6)	12	(54.5)	0	(0.0)	4	(18.2)	15	(22.5)	20	(22.5)	34	(38.2)	6	(27.3)	7	(30.6)
	Yes	27	(34.6)	3	(3.8)	17	(21.8)	33	(42.3)	17	(21.8)	15	(19.2)	8	(10.3)	20	(25.6)	52	(66.7)	27	(34.6)	25	(32.1)
p		0.807	1.000*	0.331	0.308	0.020*	0.756*	0.456*	0.020*	0.756*	0.456*	0.020*	0.756*	0.456*	0.020*	0.756*	0.456*	0.020*	0.756*	0.456*	0.020*	0.756*	
Do you carry weight often?	No	14	(36.8)	2	(5.3)	7	(18.4)	17	(44.7)	4	(10.5)	3	(7.9)	24	(63.2)	15	(39.5)	10	(26.3)	2	(5.3)	3	(7.9)
	Yes	20	(32.2)	2	(3.2)	17	(27.4)	28	(45.2)	13	(21.0)	9	(14.5)	16	(25.8)	9	(14.5)	12	(19.4)	44	(71.0)	24	(38.7)
p		0.639	0.633*	0.306	0.967	0.177	0.652	0.527*	0.177	0.652	0.527*	0.177	0.652	0.527*	0.177	0.652	0.527*	0.177	0.652	0.527*	0.177	0.652	
Is the group committed to the maintenance and organization of the workplace?	No	3	(33.3)	1	(11.1)	3	(33.3)	2	(22.2)	1	(11.1)	3	(33.3)	3	(33.3)	3	(33.3)	1	(11.1)	1	(11.1)	5	(55.6)
	Yes	31	(34.1)	3	(3.3)	21	(23.1)	41	(45.1)	16	(17.6)	15	(16.5)	10	(11.0)	23	(25.3)	32	(35.2)	7	(7.7)	9	(9.9)
p		1.000*	0.318*	0.443*	1.000*	0.203*	0.294*	0.683*	0.601*	0.680*	1.000*	0.265*	0.543*	1.000*	0.588*	1.000*	0.438*	1.000*	0.588*	1.000*	0.438*	1.000*	
Are you satisfied with your role?	No	0	(0.0)	0	(0.0)	1	(50.0)	2	(100.0)	1	(50.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
	Yes	34	(34.7)	4	(4.1)	24	(24.5)	44	(44.9)	15	(15.3)	21	(21.4)	68	(69.4)	38	(38.8)	33	(33.7)	8	(8.2)	9	(9.2)
p		0.547*	1.000*	0.027*	1.000*	0.027*	1.000*	0.027*	1.000*	0.027*	1.000*	0.027*	1.000*	0.027*	1.000*	0.027*	1.000*	0.027*	1.000*	0.027*	1.000*	0.027*	
Do you feel stressed because of your work?	No	19	(37.3)	3	(5.9)	14	(27.5)	27	(52.9)	6	(11.8)	6	(11.8)	12	(23.5)	36	(70.6)	27	(52.9)	18	(35.5)	5	(9.8)
	Yes	15	(30.6)	1	(2.0)	10	(20.4)	18	(36.7)	11	(22.4)	12	(24.5)	32	(65.3)	22	(44.5)	15	(30.6)	3	(6.1)	6	(12.2)
p		0.483	0.618*	0.410	0.103	0.155	0.098	0.941	0.410	0.155	0.098	0.941	0.410	0.155	0.098	0.941	0.410	0.155	0.098	0.941	0.410	0.155	

Questions		H	LOV	VF	RV	TV	VRRT	WV	SST	FST	FLT	CT	DC	SC	PSP	PSW	DS	BST	ST	DT	FS	EF	SB
		N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Do work factors impact your health?		24 (48.0)	4 (8.0)	15 (30.0)	26 (52.0)	9 (18.0)	8 (16.0)	6 (12.0)	11 (22.0)	8 (16.0)	11 (22.0)	39 (78.0)	26 (52.0)	20 (40.0)	4 (8.0)	4 (8.0)	4 (8.0)	13 (26.0)	10 (20.0)	33 (66.0)	12 (24.0)	9 (18.0)	8 (16.0)
Yes		10 (20.0)	0 (0.0)	9 (18.0)	19 (38.0)	8 (16.0)	10 (20.0)	6 (12.0)	13 (26.0)	5 (10.0)	10 (20.0)	29 (58.0)	13 (26.0)	13 (26.0)	4 (8.0)	5 (10.0)	5 (10.0)	8 (16.0)	17 (34.0)	21 (42.0)	11 (22.0)	13 (26.0)	10 (20.0)
p		0.003	0.117*	0.160	0.159	0.790	0.603	1.000	0.640	0.372	0.806	0.032	0.008	0.137	1.000*	1.000*	1.000*	0.220	0.115	0.016	0.812	0.334	0.603
Besides acting, do you perform other activities that require the use of voice?		12 (33.3)	0 (0.0)	9 (25.0)	23 (63.9)	3 (8.3)	3 (8.3)	2 (5.6)	7 (19.4)	6 (16.7)	10 (27.8)	23 (63.9)	14 (38.9)	13 (36.1)	4 (11.1)	3 (8.3)	2 (5.6)	10 (27.8)	7 (19.4)	20 (55.6)	9 (25.0)	8 (22.2)	4 (11.1)
Yes		22 (34.4)	4 (6.3)	15 (23.4)	22 (34.4)	14 (21.9)	15 (23.4)	10 (15.6)	17 (26.6)	7 (10.9)	11 (17.2)	45 (70.3)	25 (39.1)	20 (31.3)	4 (6.3)	6 (9.4)	7 (10.9)	11 (17.2)	20 (31.3)	34 (53.1)	14 (21.9)	14 (21.9)	14 (21.9)
p		0.916	0.294*	0.861	0.004	0.084	0.059	0.203*	0.424	0.537*	0.212	0.509	0.986	0.620	0.454*	1.000*	0.482*	0.212	0.202	0.815	0.722	0.968	0.179
Do you usually warm up your voice before acting?		2 (66.7)	0 (0.0)	2 (66.7)	1 (33.3)	1 (33.3)	0 (0.0)	0 (0.0)	2 (66.7)	2 (66.7)	2 (66.7)	3 (100.0)	0 (0.0)	2 (66.7)	0 (0.0)	1 (33.3)	1 (33.3)	2 (66.7)	1 (33.3)	2 (66.7)	2 (66.7)	2 (66.7)	1 (33.3)
Yes		32 (33.0)	4 (4.1)	22 (22.7)	44 (45.4)	16 (16.5)	18 (18.6)	12 (12.4)	22 (22.7)	11 (11.3)	19 (19.6)	65 (67.0)	39 (40.2)	31 (32.0)	8 (8.2)	8 (8.2)	8 (8.2)	19 (19.6)	26 (26.8)	52 (53.6)	21 (21.6)	20 (20.6)	17 (17.5)
p		0.266*	1.000*	0.142*	1.000*	0.432*	1.000*	1.000*	0.142*	0.044*	0.111*	0.549*	0.279	0.253*	1.000*	0.249*	0.249*	0.111*	1.000*	1.000*	0.068	0.121*	0.452*
Do you usually cool down your voice after acting?		23 (33.8)	2 (2.9)	15 (22.1)	34 (50.0)	12 (17.6)	13 (19.1)	6 (8.8)	18 (26.5)	10 (14.7)	14 (20.6)	45 (66.2)	28 (41.2)	23 (33.8)	6 (8.8)	5 (7.4)	6 (8.8)	15 (22.1)	17 (25.0)	37 (54.4)	15 (22.1)	18 (26.5)	16 (23.5)
Yes		11 (34.4)	2 (6.3)	9 (28.1)	11 (34.4)	5 (15.6)	5 (15.6)	6 (18.8)	6 (18.8)	3 (9.4)	7 (21.9)	23 (71.9)	11 (34.4)	10 (31.3)	2 (6.3)	4 (12.5)	3 (9.4)	6 (18.8)	10 (31.3)	17 (53.1)	8 (25.0)	4 (12.5)	2 (6.3)
p		0.957	0.591*	0.508	0.143	0.802	0.672	0.191*	0.399	0.541*	0.883	0.569	0.515	0.798	1.000*	0.462*	1.000*	0.705	0.511	0.904	0.744	0.116	0.036
Total		34 (34.0)	4 (4.0)	24 (24.0)	45 (45.0)	17 (17.0)	18 (18.0)	12 (12.0)	24 (24.0)	13 (13.0)	21 (21.0)	68 (68.0)	39 (39.0)	33 (33.0)	8 (8.0)	9 (9.0)	9 (9.0)	21 (21.0)	27 (27.0)	54 (54.0)	23 (23.0)	22 (22.0)	18 (18.0)

Legend: H=Hoarseness; LOV=Loss of voice; VF=Voice failure; RV=Voice failure; TV=Thin voice; VRRT=Voice ranging from rough to thin; WV=Weak voice; SST=Stinging sensation in throat; FST=Feeling of sand in throat; FLT=Feeling of lump in throat; CT=Clearing throat; DC=Dry cough; PSW=Pain when speaking; PSP=Pain when swallowing; DS=Difficulty swallowing; BST=Burning sensation in the throat; ST=Secretion in the throat; DT=Dry throat; FS=Fatigue when speaking; ES=Effort when speaking; SB=Shortness of breath. * =p-value extracted from the Fisher's exact test.

In Table 6, the independent factor for clearing throat was the noisy place variable, OR=2.91 (p=0.029). As for the 'secretion cough' endpoint, the only variable that showed an independent protective factor was 'work factors impact in health' (OR=0.40; p=0.044).

As for the 'burning sensation in the throat' (Table 6), the independent factor was the presence of smoke at the place (OR=3.46; p=0.020), that is, it is almost four times more likely that actors who work in a place with smoke will present a burning sensation in the throat when compared to actors who don't.

The presence of the 'secretion in the throat' symptom presented an independent factor for the 'stressful work rate' variable. Actors who reported a stressful work rate present an OR=3.06 (p = 0.049) to secretion in the throat when compared to actors who didn't indicate a stressful work rate (Table 6).

The 'working factors impact in health' variable presented as an independent protective factor (OR=0.42, p=0.042) for dry throat (Table 6).

The habit of cooling down the voice after acting has proved to be an independent protective factor for shortness of breath (OR=0.19; p=0.034), that is, it is less likely that actors who cool down their voices after acting will present shortness of breath when compared to actors who don't perform such activity (Table 6).

Table 6. Multiple binary logistic regression analysis for vocal symptoms.

CT		DC			BST			ST			DT			SB		
OR _{ai}	P	CI _{95%}	OR _{ai}	P	CI _{95%}	OR _{ai}	P	CI _{95%}	OR _{ai}	P	CI _{95%}	OR _{ai}	P	CI _{95%}		
Is your rehearsal and presentation space noisy?																
1.0			Do work factors impact your health?													
2.91	0.029	1.1 – 7.5	1.0		Is there smoke on the place?											
			0.40	0.044	0.2 – 0.9	1.0		Is the work rate stressful?								
			3.46	0.020	1.2 – 9.9	1.0		Do work factors impact your health?			Do you usually cool down your voice after acting?					
						3.06	0.049	1.0 – 9.3	1.0		0.42	0.042	0.2 – 0.9	1.0		
														0.19	0.034	0.0 – 0.8

CT=clearing throat, model adjusted by 'are your rehearsals and presentations usually in the same environment', 'are bathrooms properly sanitized', and 'do you usually cool down your voice after acting' variables; DC=dry cough, model adjusted by 'is the work rate stressful', and 'do cleaning products cause irritation' variables; BST=Burning sensation in the throat, model adjusted by 'do you usually cool down your voice after acting' variable; ST=Secretion in the throat, model adjusted by 'do you perform intense physical effort', and 'are your rehearsals and presentations usually in the same environment' variables; DT=Dry throat, model adjusted by 'do you perform intense physical effort', and 'are your rehearsals and presentations usually in the same environment' variables; SB=Shortness of breath, model adjusted by 'is the work rate stressful' variable. The 'no' category was used as a reference for all independent variables. All models presented a >0.70 value for the Hosmer-Lemeshow test.

Discussion

The sample of 100 actors in this study with more than half of men (56%) was also observed in another study in 2013⁷, which had 173 actors, with 90 men (52%). This observation is important because in some voice professional categories, such as teachers, there is a trend of having more women as participants, since they are majority in the profession⁹. Such data may influence the development of studies focused on professional voice, since the findings in research involving actors may report data more related to the work, and not to a gender, since women are more likely to develop vocal disorders by the characteristics of their vocal apparatus¹¹.

Focusing on the results of the statistical analysis, it is possible to notice that there were some spurious associations, that is, false associations that can occur by chance, bias or lack of biological basis. The bias occurs when the study is influenced by a group with common characteristics, but that does not reflect what happens with the majority of the population, causing a smaller or greater chance of a certain event. The alternative is when the association occurs without biological foundation, and it might not be in line with basic principles of literature¹².

Data collection indicated that 64% of the actors, in addition to their work as actors, perform another activity that requires the use of voice. Results that probably would be different if this variable was in inclusion criteria and, as so, only individuals exclusively dedicated to acting were included. However, it probably would not result on data from what happens with most actors.

It is important to notice that 49% of respondents are not able to support themselves financially exclusively by being actors, which is possibly due to the instability in the work rate, low wages and the lack of appreciation of the profession. This fact is also observed among the singers¹³, and it may affect the greater heterogeneity of the analyzed group.

Among the 64% of actors engaged in another activity, 37.5% reported to be singers and 42.2% reported to be teachers, that is, two professions with specific vocal demand. Performing arts professional and singers are categorized as vocal elite, since they need vocal quality and have high demand¹⁴.

The main self-reported symptoms by actors were: clearing throat (68.0%), dry throat (54.0%)

and rough voice (45.0%). In a study⁷ that applied the Voice Disorder Screening Index (a reduced version of the symptoms list of the CPV-P) in 173 actors, some of the main symptoms indicated are the same found in this study: clearing throat, 51.45% (89 actors), dry throat, 45.09% (78), and dry cough, 39.88% (69). On the other hand, in another study¹⁰, 14 (29.2%) reported coordination difficulties between speech and breathing while they were acting.

Dust was the environmental factor that may impact the voice most reported by actors (75%), followed by noise (71%), which is probably due to the fact that curtains, carpets and wooden floor are not always kept and cleaned and are part of the various presentation spaces^{15,16}. A study with 317 teachers made it possible to notice the statistically significant association between the presence of dust in the classroom and the self-reported voice disorder, which constitutes a vocal risk for teachers¹⁷. Symptoms as vocal fatigue, dry throat, pain when speaking, dry cough and weak voice were also associated with dust and noise in the literature¹⁸. Dust is also common in places where singers perform and it is present in their complaints, generating rhinitis, allergies and damaging the vocal quality^{19,20}. Therefore, it can be noticed that the adverse effect of dust on the respiratory system has been found in other studies related to the different voice professionals.

Noise (both external and internal) was the second environmental factor most mentioned by actors (71%), and 47% reported that the noise was strong. Thus, it is certainly one of the most disrupting factors for teachers and it is constantly mentioned, self-reported and studied in research as it is an environmental factor that harms the voice²¹. A study with 40 teachers recorded a direct relationship between noise and hoarseness, effort when speaking and burning in the throat²². As singers are often exposed to noise at their rehearsal spaces, they also suffer from such impact²⁰.

Due to the constant noise at work, professionals must compete with it, demanding greater vocal intensity, which is responsible for tensions, fatigue and tiredness²³. The presence of noise among actors who participated in this research is related to the reports of thin voice ($p=0.032$), clearing throat ($OR=2.91$, $p=0.029$) and also pain when speaking ($p=0.024$), while the "feeling of lump in the throat" symptom was statistically reported in

environments with the presence of echo (OR=0.28; $p=0.027$), possibly due to the difficulty with sound competition. Voice projection is a basic issue for actors; therefore, issues related to the environment and the presence of noise or echo can impact with the perception of actors on their own voice and, in an attempt to improve their performance, they might generate different vocal symptoms. The 'feeling of lump in the throat' endpoint was also reported as spurious association in the absence of echo in the environment ($p=0.013$). As for the rehearsal space, 60% reported that they rehearse and perform in the same environment. There was an association between 'pain when swallowing' and the 'rehearse and presentation in the same environment' independent variable ($p=0.010$). It can be hypothesized that these locations have dust and it can cause irritation and inflammation, which leads to difficulty swallowing.

Most of the participants reported a pleasant temperature at the rehearsal place (88%), however, when the temperature is inadequate, symptoms such 'weak voice' ($p=0.036$) and 'thin voice' ($p=0.005$) occur. The proper temperature proved to be a protective factor against thin voice.

Subjects with exposure intolerance to high or oscillating temperatures (natural or controlled by electronic equipment) may present an allergic disorder, resulting in changes in structures that determine the pneumophonatory incoordination and the inappropriate use of resonances²⁴.

In the same way, it is possible to relate the data related to the cleaning that was reported by the majority as adequate (90%), with sanitized bathrooms (96%) and the use of products that do not cause irritation (86%). On the other hand, subjects who reported an inadequate cleaning had thin voice ($p=0.012$), and voice ranging from rough to thin ($p=0.016$).

There are reports in the literature that inadequate cleaning (mold, mildew, dirt, among others), and products that cause allergy, dust and smoke (cigarettes and dry ice) can generate allergic conditions and therefore impact with vocal quality²⁴, since the presence of these conditions affect nose, ears and throat that are basic structures for voice production and control²⁵.

The burden of allergy to artistic voice is greater due to the demand for high quality performances and presentations²⁶. The absence of irritative substances in cleaning products avoided the 'dry throat'

symptom ($p=0.040$). There was a spurious association of 'feeling of sand in throat' with a higher probability of occurrence when there was no dust at the place (28.0% versus 8.0%, $p=0.017$) and in the presence of humidity on the place ($p=0.049$).

Most of the actors reported the absence of smoke at the workplace (77%), but when this factor was present, it was associated with symptoms such as, 'voice ranging from rough to thin' and 'burning sensation in the throat'. Actors exposed to smoke are more than three times more likely to develop these symptoms ('voice ranging from rough to thin' - OR=3.21; $p=0.028$ and 'burning sensation in the throat' - OR=3.46; $p=0.020$). In particular, the 'burning sensation in the throat' symptom was also related to the budget available for the production of plays ($p=0.042$), suggesting that the higher the budget, the more harmful effects for the actor are introduced in the play, such as, dry ice smoke.

The presence of costumes and props that undermine the performance of actors was associated with the 'weak voice' and 'voice ranging from rough to thin' symptoms. Some authors mention this by explaining that the weight, size, pressure and manipulation of these objects may compromise the movements and undermine and change respiratory patterns, generate tension in glottic or neck regions, thus hindering vocal production¹⁹.

As for the aspects related to the work organization, the study found that half of the participants reported that work factors impact their health. Hoarseness ($p=0.003$), dry cough ($p=.008$), dry throat ($p=0.016$) and throat clearing ($p=0.032$) were recorded in actors who didn't report such impact. Actors who reported an impact presented such element as protective factor against secretion cough (OR=0.40; $p=0.044$), dry throat (OR=0.42; $p=0.042$) and hoarseness (OR=0.30; $p=0.011$). Such data is in line with the literature¹⁵, since they report that is essential for performing arts professionals to be aware of environmental factors and harmful habits, since individuals who are more aware are able to better protect themselves from adverse factors and to watch over their health. Thus, actors who are more conscious and perceive this impact are least vulnerable.

Actors usually perform various functions besides acting in their presentations. Producing (64%) and setting/dismantling the material (72%) are routine activities for the actors interviewed. A study with singers¹⁹ presented similar dynamics

since, according to the authors, half of the singers usually help to load and assemble the materials to be used in presentations, such as instruments, costumes (clothes, accessories, shoes) to the concerts, in addition to organizing dressing rooms.

Data presented here show the association of 'secretion' ($p=0.032$) and 'thin voice' ($p=0.020$) symptoms with intense physical effort. This context of physical efforts is reported in the literature, which also indicates that this situation cannot occur while the subject is speaking or singing, since it can generate laryngeal tension thus causing vocal changes¹⁶.

Despite the good relationship recorded at various levels, the 'thin voice' symptom was reported in actors who suffered bullying and also those who are not satisfied with their roles. In addition, psychic changes conditions can directly affect the voice of individuals, and these may be submitted to laryngeal tests and present a little adduction of the vocal folds in extended position, thus resulting in a high-pitch with breathlessness²⁷.

Stressful work rate and harassment presented a statistically significant association with weak voice. A study with teachers²⁸ pointed out that stress, high demand, difficulties in performing tasks and psychic suffering are directly related to vocal complaints. The stressful work rate has also been associated with secretion in the throat ($p=0.020$). In line with this result, a study with 30 singers¹³ raised, as main factors of suffering and stress, the lack of recognition and being discriminated due to the profession, irregularities in the work flow, financial condition and having to participate in works against the values of the professional. When it comes to artists, studies often end up focusing only on harmful habits and vocal health, and avoid psychological issues that may exist, which create opportunities to new research with these professionals.

There was a spurious association between hoarseness and commitment with the workplace maintenance and organization ($p=0.028$), as well as for the presence of dry cough and absence of stress ($p=0.008$).

Most actors (97.0%) usually warm up their voices, which is a positive outcome, since this practice increases the flexibility of tissues, blood flow, and ability of relaxation and contraction of the structures providing a benefit in their performance and greater protection against injuries¹⁴. However, cooling down practices are performed by only

32.0% of the actors, and this procedure is required to relax and reestablish the muscular patterns, thus preventing fatigue and eventual injuries¹⁴. In this sense, another study²⁹ with 50 actors, found that even when the warming up practices are not always effectively performed, it is more widespread among actors than the cooling down practices (84% of actors warm up their voices versus 40% who cool down their voices, and 38% reported that they don't even know cool down practices).²⁹ This study also found a greater probability among actors who don't cool down their voice of having shortness of breath, and this practice proved to be an independent protective factor for the occurrence of this symptom. The 'feeling of sand in the throat' is associated with actors who usually don't warm their voices before acting ($p=0.044$).

In general, actors were vulnerable to the environmental and organizational conditions of their work. However, it is possible to notice a concern in the area to avoid these burdens. Even though they do not always have a fixed work base as teachers, actors who showed greater sensitivity to perceive environmental factors that affect their health are more able to take care of themselves and most respondents seem to consider some measure to improve performance and avoid vocal problems.

As well as other voice professionals, actors can have their voices damaged due to work organization and environmental factors, although some of them are knowledgeable and prepared, and take steps to avoid these harms.

Many theater schools rely on speech-language pathologists who educate future professionals on the need of voice care, unlike vocational training of teachers in different professions³⁰. Since vocational training, it is important that actors are aware of environmental issues and possible working conditions, thereby improving their performance and enabling them to watch better their overall health, and in particular health related to voice production.

Speech-language pathologists, in addition to focusing on vocal care, including warming up and cooling down practices, expressiveness and voice poetic for the character composition, need to be aware of the environmental issues and work organization issues under which these actors are submitted to in planned interventions with them, both in care and in the training process of these professionals.

Future research can be conducted in order to explore this wide universe, developing new and specific tools for the voice of actors based on the context of their work.

Conclusion

There were associations between environmental and organizational work aspects and vocal symptoms of actors. According to the group of actors participating, dust and noise were the main environmental factors cited, intense physical effort and stressful rhythm among those related to work organization. The most commonly reported symptoms were throat clearing, dry throat, rough voice and dry cough, with clearing was directly associated with noise.

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Appendix 1

Vocal Production Condition instrument for Actors - CPV-A (Adjusted CPV-P)

I – IDENTIFICATION

1. Name: _____
- 2 Date of birth: ___/___/___ 3. Gender: () female () male
4. Marital status: () single () married/any form of relationship
() separated/divorced () widowed
5. Education level: () Undergraduate degree () Undergraduate degree in progress () Undergraduate degree incomplete
() High school () High school incomplete () Primary school
() Primary school incomplete () other: _____

II – FUNCTIONAL SITUATION:

6. How long have you been a professional actor? ____ years ____ months
7. How was your training to become an actor?
() stage training () undergraduate or professional technical course () workshops
() stage training and undergraduate/professional technical course
() stage training and workshops () undergraduate/professional technical course and workshops
() stage training, undergraduate/professional technical course and workshops
8. How many plays, projects, and other professional activities are you currently involved in? _____
- 8.1. How many hours per week do you take to presentations and rehearsals? _____ hours/week.
9. Besides acting, do you perform other activities that require the use of voice?
If yes, where do you work? _____; What is your role? _____
- 9.1. Are you able to support yourself financially with your acting profession?
never / rarely / sometimes / usually / always
10. Do you act in:
Street theater: never / rarely / sometimes / usually / always
Arena theater: never / rarely / sometimes / usually / always
Italian stage: never / rarely / sometimes / usually / always
Dubbing studio: never / rarely / sometimes / usually / always
TV station: never / rarely / sometimes / usually / always
Storytelling: never / rarely / sometimes / usually / always
Art intervention/performances: never / rarely / sometimes / usually / always
Theater school: never / rarely / sometimes / usually / always
Recreational activities at events/parties: never / rarely / sometimes / usually / always
Theater classes: never / rarely / sometimes / usually / always
Other (please specify) _____
11. What role(s) do you currently perform in the theater
Acts: never / rarely / sometimes / usually / always
Directs: never / rarely / sometimes / usually / always
Teaches: never / rarely / sometimes / usually / always
Produces: never / rarely / sometimes / usually / always
Operates sound: never / rarely / sometimes / usually / always
Actor preparation: never / rarely / sometimes / usually / always
Creates costumes: never / rarely / sometimes / usually / always
Make-up artist: never / rarely / sometimes / usually / always
Operates stage lighting: never / rarely / sometimes / usually / always
Set/dismount the stage (lighting/sound/scenario): never / rarely / sometimes / usually / always
Work as stage manager: never / rarely / sometimes / usually / always
Other (please specify) _____: never / rarely / sometimes / usually / always



III- WORK ENVIRONMENT (Think about the places where you usually rehearse and perform. The questions below must be answered with respect to your main work environment...)

12. Are your rehearsals and presentations usually in the same environment?
never / rarely / sometimes / usually / always
13. Is your rehearsal and presentation space noisy?
never / rarely / sometimes / usually / always
14. Is the noise strong? never / rarely / sometimes / usually / always
15. Is acoustics satisfactory? never / rarely / sometimes / usually / always
16. Does the environment have an echo? never / rarely / sometimes / usually / always
17. Is there dust on the place? never / rarely / sometimes / usually / always
18. Is there smoke on the place? never / rarely / sometimes / usually / always
19. Is the temperature of the place pleasant? never / rarely / sometimes / usually / always
20. Is there humidity on the place? never / rarely / sometimes / usually / always
21. Is cleaning satisfactory? never / rarely / sometimes / usually / always
22. Are bathrooms properly sanitized? never / rarely / sometimes / usually / always
23. Do cleaning products cause irritation? never / rarely / sometimes / usually / always
24. Are scenarios, props and costumes suitable to your physical constitution? (height and weight)
never / rarely / sometimes / usually / always
25. Do scenarios, props and costumes undermine your performance?
never / rarely / sometimes / usually / always

IV - WORK ORGANIZATION

26. Do you have a good relationship with:
Your colleagues who work on the play? (actors, production and technical staff):
never / rarely / sometimes / usually / always
The management: never / rarely / sometimes / usually / always
27. Are you free to create and provide suggestions throughout the process?
never / rarely / sometimes / usually / always
28. Is there a regular monitoring from direction? never / rarely / sometimes / usually / always
29. Have you ever felt any kind of harassment from the management? never / rarely / sometimes / usually / always
30. Is the work rate stressful? never / rarely / sometimes / usually / always
31. Is there enough budget to produce the plays? never / rarely / sometimes / usually / always
32. In your opinion, is your work monotonous? never / rarely / sometimes / usually / always
33. Do you perform intense physical effort? never / rarely / sometimes / usually / always
34. Do you carry weight often? never / rarely / sometimes / usually / always
35. Is the group committed to the maintenance and organization of the workplace?
never / rarely / sometimes / usually / always
36. Are you satisfied with your role? never / rarely / sometimes / usually / always
37. Do you feel stressed because of your work? never / rarely / sometimes / usually / always
38. Do work factors impact your health? never / rarely / sometimes / usually / always



39. Which of the following violence situations have ever occurred in your work environment:
 Theft of personal belongings: never / rarely / sometimes / usually / always
 Theft of material from the theater group/company: never / rarely / sometimes / usually / always
 Bullying activities (prejudices, jokes in bad taste, hostile climate, verbal or physical assaults (against the professionals): never / rarely / sometimes / usually / always
 (Constant) Conflicts in the group: never / rarely / sometimes / usually / always
 Acts of vandalism against the place: never / rarely / sometimes / usually / always
 Violence near the rehearsal/presentation place: never / rarely / sometimes / usually / always

V- VOCAL ASPECTS, HABITS AND LIFESTYLE

40. When you are at stage, do you usually:
 Force your throat to speak loudly and shout: never / rarely / sometimes / usually / always
 When you have to talk too much, do you feel throat and voice fatigue:
 never / rarely / sometimes / usually / always
 Do you usually feel vocal fatigue in presentations in an open place:
 never / rarely / sometimes / usually / always
 Talking when performing intense physical activity: never / rarely / sometimes / usually / always
 Talking when carrying weight: never / rarely / sometimes / usually / always
41. Do you employ any voice technique when you are performing and/or rehearsing?
 never / rarely / sometimes / usually / always
42. Have you ever received guidance on voice care?
 never / rarely / sometimes / usually / always
 If yes (except 'never'), from what professional(s)?
 Speech-language pathologist / actor/director / singing teacher / speech-language pathologist and actor/director /
 speech-language pathologist and singing teacher / speech-language pathologist, actor/director, and singing teacher
43. Are you satisfied with your voice? never / rarely / sometimes / usually / always
44. Have you ever missed work due to voice changes? never / rarely / sometimes / usually / always
45. If yes, how many days in the last year? Absences _____ days
46. Do you spend time on leisure activities? never / rarely / sometimes / usually / always
47. Do you smoke? No / Yes. If yes, how many cigarettes a day? _____cigarettes/day
48. Do you drink alcohol? never / rarely / sometimes / usually / always
 48.1. Do you usually take energy drink before or during intense vocal use?
 never / rarely / sometimes / usually / always
 48.2. Do you drink water while using the voice? never / rarely / sometimes / usually / always
49. Do you eat at regular times? never / rarely / sometimes / usually / always
50. Do you avoid any food? never / rarely / sometimes / usually / always
 If yes, what and why? _____
51. How long before bed do you eat? Up to 30 minutes / 31-60 minutes / >60 minutes
52. Opening your mouth or chewing, do you notice:
 Crackling sound: never / rarely / sometimes / usually / always
 Feeling of sand: never / rarely / sometimes / usually / always
 Chin deviation: never / rarely / sometimes / usually / always
 Difficulty opening mouth: never / rarely / sometimes / usually / always
 Difficulty chewing food: never / rarely / sometimes / usually / always
53. With respect to your sleeping habits:
 Do you wake up at night? never / rarely / sometimes / usually / always
 Do you wake up tired? never / rarely / sometimes / usually / always
 How many hours do you sleep on average? _____ hours
54. Check the option that best describes how often you have the following symptoms:
 Hoarseness: never / rarely / sometimes / usually / always
 Loss of voice: never / rarely / sometimes / usually / always
 Voice failure: never / rarely / sometimes / usually / always
 Rough voice: never / rarely / sometimes / usually / always



- Thin voice: never / rarely / sometimes / usually / always
Thin/rough voice: never / rarely / sometimes / usually / always
Weak voice: never / rarely / sometimes / usually / always
Stinging sensation in throat: never / rarely / sometimes / usually / always
Feeling of sand in throat: never / rarely / sometimes / usually / always
Feeling of lump in throat: never / rarely / sometimes / usually / always
Clearing throat : never / rarely / sometimes / usually / always
Dry cough: never / rarely / sometimes / usually / always
Secretion cough: never / rarely / sometimes / usually / always
Pain when speaking: never / rarely / sometimes / usually / always
Pain when swallowing: never / rarely / sometimes / usually / always
Difficulty swallowing: never / rarely / sometimes / usually / always
Burning sensation in the throat: never / rarely / sometimes / usually / always
Secretion in the throat: never / rarely / sometimes / usually / always
Dry throat : never / rarely / sometimes / usually / always
Fatigue when speaking: never / rarely / sometimes / usually / always
Effort when speaking: never / rarely / sometimes / usually / always
Shortness of breath: never / rarely / sometimes / usually / always
55. Do you usually warm up your voice before acting? never / rarely / sometimes / usually / always
56. Do you usually cool down your voice after acting? never / rarely / sometimes / usually / always