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### Keywords

Voice  
 Voice Disorders  
 Occupational Health  
 Working Conditions  
 Telecommunications

### Descritores

Voz  
 Distúrbios da Voz  
 Saúde do Trabalhador  
 Condições de Trabalho  
 Telecomunicações

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Received: May 01, 2015

Accepted: July 02, 2015

# Relationship between working and voice conditions self-reported by telemarketers of an emergency call center

## *Relação entre as condições de trabalho e de voz autorreferidas por teleoperadores de uma central de emergência*

### ABSTRACT

**Purpose:** To investigate whether there is association between vocal symptoms, voice complaint, and working and voice conditions self-reported by telemarketers. **Methods:** Study participants were 72 telemarketing operators, both genders, who work in an emergency call center. They responded to a questionnaire on personal data, voice complaints, vocal symptoms, and working conditions. Data analysis was performed using the Chi-square, Mann-Whitney, and Fisher's Exact tests. **Results:** Correlation was found between the telemarketers in the study group and voice disorder complaint for aspects of working condition, such as noisy working environment, and aspects of voice condition, such as change in the voice and workplace absence. Differences were observed between the mean of auditory vocal symptoms of participants for echo in the work room, change in voice, and workplace absence, as well as between the mean of their sensory vocal symptoms in relation to the variables stressful work rate, noisy working environment, noise from other rooms, echo in the work room, radio use, change in voice, and workplace absence. **Conclusion:** Correlation was found between the presence of vocal complaints, number of auditory and sensory vocal symptoms, and working conditions self-reported by the telemarketers surveyed.

### RESUMO

**Objetivo:** investigar se existe associação entre os sintomas vocais, a queixa vocal e as condições de trabalho e da voz autorreferidas por teleoperadores. **Método:** participaram 72 teleoperadores, de ambos os gêneros, atuantes em uma central de atendimento em emergência. Eles responderam ao questionário que levantou dados pessoais, queixa vocal, sintomas vocais e condições de trabalho. A análise dos dados foi realizada por meio do Teste Qui quadrado, Teste exato de Fisher e do Teste Mann-Whitney. **Resultados:** houve associação entre o grupo de teleoperadores com queixa de distúrbio da voz para os aspectos de condição de trabalho como empresa ruidosa, e para os aspectos de condição de voz: mudança na voz e faltas ao trabalho. Observaram-se diferenças entre a média de sintomas vocais auditivos para: eco na sala, mudança na voz e faltas ao trabalho, assim como se observou entre a média de sintomas vocais sensoriais dos participantes em relação às variáveis: ritmo de trabalho estressante, empresa ruidosa, barulho vindo de outras salas, eco na sala, uso do rádio, mudança na voz e faltas ao trabalho. **Conclusão:** existe associação entre a presença de queixa vocal, o número de sintomas vocais auditivos e sensoriais e as condições de trabalho autorreferidas pelos teleoperadores pesquisados.

Study carried out at Departamento de Fonoaudiologia, Universidade Federal da Paraíba – UFPB - João Pessoa (PB), Brazil.

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**Financial support:** nothing to declare.

**Conflict of interests:** nothing to declare.

## INTRODUCTION

Certain professional performance conditions may cause limitations, illnesses, or even irreversible damages to the quality of life and overall health of workers<sup>(1)</sup>.

Work-related voice disorder (WRVD) is a multifactorial, occupational disease resulting from environmental and/or organizational factors of work, inadequate vocal conditions, and predisposing factors of the individual. WRVD affects mainly individuals who use the spoken voice as their main working tool - the so-called voice professionals<sup>(2-4)</sup>.

Telemarketing operators, or telemarketers - a labor category that has experienced a sharp increase - should be especially addressed, considering that telemarketing companies are among the largest employers in the country<sup>(5,6)</sup>. These professionals are often exposed to environmental risk factors such as inadequate ergonomics, sudden temperature changes, rooms without acoustic treatment, dust, etc., as well as to organizational risk factors, e.g., stressful work rate, need for more breaks, difficulties in relating with management<sup>(7-9)</sup>. In addition, they usually do not receive the necessary guidance to make better use of their voice, performing various adjustments and cultivating inadequate vocal habits<sup>(10)</sup>. Consequently, scientific research in the field of voice seeking to study this population has increased considerably<sup>(11-15)</sup>.

The conditions of the working environment in which these professionals are inserted may favor the development of WRVD symptoms, and may even generate further tissue lesions in the larynx<sup>(10)</sup>, which may affect the professional and social life of these workers. Possible consequences of these changes include ineffective use of the voice, decrease in professional performance, and future labor clearance<sup>(6,12,16)</sup>. It is worth mentioning that such aspects could negatively impact on the operation and growth of enterprises.

A pioneering study in the area<sup>(17)</sup> reported that, although the telemarketers were satisfied with their voices, they often presented vocal symptoms of dry throat, vocal fatigue, and hoarseness. Furthermore, the study found that environmental and organizational factors were also associated with voice complaints.

In this context, the speech-language pathologist plays a key role on the development of educational activities for the promotion and prevention of the vocal health of these professionals within companies, as well as on their vocal enhancement and in the construction of a good image for the company, considering that the company's voice is the telemarketer's voice<sup>(18)</sup>.

Therefore, considering the growing number of telemarketers and call center companies in Brazil, as well as the need for studies that precisely address the relationship between working conditions and WRVD development, the purpose of the present study is to investigate whether there is association between vocal symptoms, voice complaint, and working and voice conditions self-reported by the telemarketers of an emergency call center.

## METHODS

This is an observational, descriptive, cross-sectional, quantitative study approved by the Research Ethics Committee on Human Beings of the home Institution under no. 0532/14. All the telemarketers involved in the research agreed to participate by signing an Informed Consent Form, therefore allowing the conduction and disclosure of this study and its results according to the normative Resolution MS/CNS/CNEP no. 466/12.

This survey was conducted in an emergency call center of a public agency. Participants of the study were firefighters, military and civil police officers who worked as telemarketers in this agency. After the public agency's acceptance, authorized by the person in charge, all operators (87) were invited to participate in the research. After the presentation of the study, 15 operators were excluded due to the following conditions: not willing to participate in all stages of the research (9), under speech-language therapy in the voice area (4), and on maternity leave (2). In the end, the study sample was composed of 72 telemarketers who had worked in this profession in the company for at least six months.

The workload of these telemarketers differed considerably from that of workers of other call centers because of the work dynamics of the company surveyed. They worked in 12-hour daily shifts, interspersed with two days of continuous rest, from Monday to Sunday, totaling 36 hours per week; but they worked overtime sometimes.

Data were collected using the Telemarketing Operator Vocal Profile (PVOT) Questionnaire (Appendix 1), which was adopted by the researchers based on the instrument Condition of Vocal Production - Teacher (CPV-P)<sup>(7)</sup>. This questionnaire was designed to collect data on the voice conditions of teachers, gathering information about the workers, their professional performance, general health, habits, and vocal health. In addition, the CPV-P has been used in several studies, surveying a variety of populations, from teachers and health workers to the general population<sup>(16)</sup>. This questionnaire has not been fully validated in its complete version. One of its parts underwent validation in a recent study, in which the Voice Handicap Index (VHI) was investigated<sup>(19)</sup>.

The PVOT questionnaire used in the present study contains 29 questions which address personal data (1 to 3), employment status (4 to 8), organizational (9, 10), environmental (11 to 18) and vocal (19 to 29) aspects.

Prior to data collection, participants were informed about the procedures pertaining this research. The PVOT questionnaire was applied by the researcher in the company's premises according to the availability of each telemarketer. Data collection occurred from Monday to Friday in the morning, afternoon and night shifts, between September and December 2014.

The data obtained through the application of the PVOT questionnaire were classified using the Microsoft Office Excel 2010 software. For registration in the database, questions whose answers were "never," "seldom" and "do not know" were grouped as "absence" and questions whose answers were "sometimes" and "always" were grouped as "presence".

Statistical analysis was performed with the support of the Statistical Package for Social Sciences (SPSS) software, version 20.0. Personal data (age, gender, and education) and employment status (operating time, daily working hours, and number of operators in the room) were investigated using descriptive analysis.

Issues related to working conditions, changes in the voice after beginning in the profession, workplace absence, and vocal symptoms were raised with respect to their occurrence. After that, the groups of telemarketers with and without vocal complaints were compared with the application of the Chi-square test. The Fisher's Exact test was used when fewer than five cases were observed per classification group. The means of sensations and symptoms were correlated to the aforementioned variables by means of the Mann-Whitney Test. A level of significance of 5% ( $p < 0.05$ ) was used for all the statistical analyses performed.

## RESULTS

Most of the 72 telemarketing operators surveyed were men (63,9%) with mean age of 39.9 years ( $SD = 7.7$  years), and mean working time in the occupation of 6.7 years. In addition, most of them had completed High School (43.1%). An average of 8.6 telemarketers worked in each telemarketing room.

Regarding the distribution by type of service, the majority of respondents worked in the receptive function (47.3%), answering calls from community members, whereas 34.8% acted in both telemarketing functions (active and receptive). The latter received the calls from the citizens and forward them to the official service vehicles or corresponding diligences. Only 18% of the operators worked in the active function, calling the vehicles or corresponding diligences.

The following working conditions were the most frequently reported by the operators: poor acoustics, use of telephone, noisy

working environment, stressful work rate, echo in the room, and noise from other rooms (Table 1). When asked about the perceived changes in the voice after beginning in the profession, higher occurrence was observed for speaking loudly (26.6%) and hoarse voice (60%).

With respect to vocal aspects, as shown in Table 2, most telemarketers informed having or having had some voice disorder, with horse, deep and faint voice as the most frequent auditory vocal symptoms and throat clearing, dry cough, and dry throat as the most frequent sensory vocal symptoms (laryngopharyngeal sensations).

A total mean of vocal symptoms of 4.7 was found for all participants, with specific means of 1.5 and 3.2 for auditory symptoms and sensory symptoms, respectively.

Differences in working and voice conditions were observed among telemarketers with and without vocal complaint regarding the following variables: noisy working environment, change in the voice after beginning in the profession, and workplace absence, that is, the results demonstrate that such variables show correlation with the presence or absence of vocal complaint among the operators investigated (Table 3).

Differences were also found between the mean of auditory vocal symptoms of telemarketers with regard to the following working conditions: echo in the work room, change in the voice after beginning in the profession, and workplace absence because of the voice (Table 4), as well as between their mean of sensory vocal symptoms (laryngopharyngeal sensations) in relation to the following working and voice conditions: stressful work rate, noisy working environment, noise from other rooms, echo in the work room, telecommunication equipment - radio, change in the voice after beginning the profession, and workplace absence because of the voice (Table 5).

**Table 1.** Numeric (N) and percentage (%) distribution of the working conditions most frequently self-reported by telemarketers

VARIABLES	CATEGORIES	N	%		
Working conditions	Stressful work rate	No	55	76.4	
		Yes	17	23.6	
	Noisy working environment	No	53	73.6	
		Yes	19	26.4	
	Origin of noise	Work room	No	17	23.6
			Yes	55	76.4
		Air conditioning	No	52	72.2
			Yes	20	27.8
	Other rooms	No	60	83.3	
		Yes	12	16.7	
	Satisfactory acoustics	No	47	65.3	
		Yes	25	34.7	
	Echo in the room	No	56	77.8	
		Yes	16	22.2	
Telecommunication equipment used	Headset	12	16.7		
	Microphone	16	22.2		
	Telephone	43	59.7		
	Radio	27	27.5		

**Table 2.** Numeric (N) and percentage (%) distribution of telemarketers according to the following vocal aspects: voice disorder complaint, change in the voice, workplace absence, auditory and sensory vocal symptoms most frequently self-reported

VARIABLES	CATEGORIES	N	%	
voice disorder complaint	No	41	56.9	
	Yes	31	43.1	
<b>Total</b>		72	100.0	
Change in the voice after beginning in the profession	No	57	79.2	
	Yes	15	20.8	
<b>Total</b>		72	100.0	
Workplace absence because of the voice	No	49	68.1	
	Yes	23	31.9	
<b>Total</b>		72	100.0	
Auditory vocal symptoms	Hoarse voice	No	44	61.1
		Yes	28	38.9
	Deep voice	No	52	72.2
		Yes	20	27.8
	Faint voice	No	58	80.6
		Yes	14	19.4
Throat clearing (hawking)	No	38	52.8	
	Yes	34	47.2	
Sensory vocal symptoms	Dry cough	No	44	61.1
		Yes	28	38.9
	Dry throat	No	44	61.1
		Yes	28	38.9

**Table 3.** Correlation between the groups of participants with and without voice disorder complaint and the working and voice conditions self-reported by telemarketers

VARIABLES	Without voice disorder complaint		With voice disorder complaint		p-value
	N	%	N	%	
<b>Stressful work rate</b>					
No	35	63.6	20	36.4	0.074
Yes	6	35.3	11	64.7	
<b>Noisy working environment</b>					
No	35	66.0	18	34.0	0.017*
Yes	6	31.6	13	68.4	
<b>Noise in the work room</b>					
No	13	76.5	4	23.5	0.055
Yes	28	50.9	27	49.1	
<b>Noise from other rooms</b>					
No	37	61.7	23	38.3	0.069
Yes	4	33.3	8	66.7	
<b>Echo in the work room</b>					
No	36	64.3	20	35.7	0.062
Yes	5	31.2	11	68.8	
<b>Telecommunication equipment - radio</b>					
No	30	66.7	15	33.3	0.096
Yes	11	40.7	16	59.3	
<b>Change in the voice after beginning in the profession</b>					
No	40	70.2	17	29.8	<0.001*
Yes	1	6.7	14	93.3	
<b>Workplace absence because of the voice</b>					
No	35	71.4	14	28.6	0.002*
Yes	3	20.0	12	80.0	

**Caption:** Chi-square test (p<0.05)

\*Statistically significant values

**Table 4.** Difference between the mean of auditory vocal symptoms and the working and voice conditions self-reported by telemarketers

VARIABLES	N	%	Mean of auditory vocal symptoms	p-value
<b>Noisy working environment</b>				
No	53	73.6	1.25	0.079
Yes	19	26.4	2.05	
<b>Noise from other rooms</b>				
No	60	83.3	1.25	0.083
Yes	12	16.7	2.5	
<b>Echo in the work room</b>				
No	56	77.8	1.27	0.025*
Yes	16	22.2	2.13	
<b>Telecommunication equipment - radio</b>				
No	45	62.5	1.24	0.057
Yes	27	37.5	1.81	
<b>Change in the voice after beginning in the profession</b>				
No	57	79.2	1.12	0.006*
Yes	15	20.8	2.73	
<b>Workplace absence because of the voice</b>				
No	49	68.1	1.08	0.001*
Yes	23	31.9	2.67	

Caption: Mann-Whitney test (p&lt;0.05)

\*Statistically significant values

**Table 5.** Difference between the mean of sensory vocal symptoms and the working and voice conditions self-reported by telemarketers

VARIABLES	N	%	Mean of sensory vocal symptoms	p-value
<b>Stressful work rate</b>				
No	55	76.4	2.69	0.034*
Yes	17	23.6	4.76	
<b>Noisy working environment</b>				
No	53	73.6	2.66	0.023*
Yes	19	26.4	4.63	
<b>Noise from other rooms</b>				
No	60	83.3	2.78	0.032*
Yes	12	16.7	5.17	
<b>Satisfactory acoustics</b>				
No	47	65.3	3.74	0.057
Yes	25	34.7	2.12	
<b>Echo in the work room</b>				
No	56	77.8	2.68	0.01*
Yes	16	22.2	4.94	
<b>Telecommunication equipment - radio</b>				
No	45	62.5	2.62	0.032*
Yes	27	37.5	4.11	
<b>Change in the voice after beginning in the profession</b>				
No	57	79.2	2.35	<0.001*
Yes	15	20.8	6.33	
<b>Workplace absence because of the voice</b>				
No	49	68.1	2.33	0.002*
Yes	23	31.9	5.27	

Caption: Mann-Whitney test (p&lt;0.05)

\*Statistically significant values



## DISCUSSION

The present study consisted in the application of a questionnaire of vocal self-perception - Telemarketing Operator Vocal Profile (PVOT) Questionnaire - to telemarketers who worked in an emergency call center. Based on the findings provided by the use of this tool, it was possible to observed association between vocal symptoms, voice disorder complaint, and working and voice conditions self-reported by these professionals.

The profile of the telemarketing operators surveyed in this study differs from those described in other studies<sup>(10,11,12)</sup>, which are mostly composed of female young adults with less than two years of experience in the area. Participants of the present research are predominantly men with mean age close to the end of vocal efficiency period and working time in the occupation greater than that found in the literature<sup>(11,14,18)</sup>. This fact is justified because all participants of this study were civil servants: firefighters, military or civil police officers - professions with higher prevalence of men<sup>(20)</sup>.

As previously mentioned, all study participants worked in 12-hour daily shifts, interspersed with two days of continuous rest. This is a worrisome finding because a long and excessive workload may harm the vocal function of the participants, contributing to the development of possible work-related vocal disorders (WRVD).

The telemarketers mentioned 4.7 symptoms on average. This value was close to the Screening Index for Voice Disorders (SIVD) established in another study<sup>(19)</sup>, which considered individuals with a score equal to or greater than five symptoms likely to present risks for voice disorders. Thus, based on the research highlighted, these data suggest that this occupation places its professionals at risk for the development of WRVDs.

Confronting these data with the findings of an epidemiological study<sup>(21)</sup> conducted with teachers and non-teachers, it was possible to observe that the average symptoms of the general population, 1.7, is considerably below the data in this study, as well as that of another study with teachers<sup>(22)</sup>.

Hoarse voice was the auditory vocal symptom most frequently reported by the telemarketing operators, followed by deep voice, and faint voice. Hoarse voice is among the symptoms most frequently cited in other studies with this population<sup>(1,13,15,18)</sup>. In general, hoarse voice, deep voice, and faint voice are associated mainly with the intensive use of the voice, which results in the overload of the phonatory system, affecting the vocal tract configuration and the operation of the vocal folds<sup>(12,13,15,16,23)</sup>.

The sensory vocal symptoms throat clearing, dry cough, and dry throat cited by the participants were found in other studies with telemarketing operators<sup>(1,12,24)</sup> and can be justified by the fact that these professionals use their voices in inadequate environmental and organizational working conditions, e.g., constant exposure to air conditioning, which cause dryness of the laryngeal mucous membrane<sup>(12,18)</sup>.

These symptoms may also occur because telemarketing operators know very little about the professional use of the voice, such as using the voice correctly and the need for vocal

rest and greater hydration, especially in an occupation where the voice is one of the main work tools<sup>(6,7,12,17)</sup>. In case of persistence of these symptoms, and in combination with inadequate habits and health problems, voice production can be compromised, and so the professional activity of the individual.

As for working conditions, the telemarketers reported the presence of stressful work rate - an aspect found in the specific literature<sup>(1)</sup>. In most cases, this finding may be associated with the work routine of the telemarketers surveyed, who take emergency calls for serious situations that affect the community, which require attention, promptness, objectivity, and clarity; this labor category is one of the most vulnerable for the development of stress reactions<sup>(25,26)</sup>.

This study also found that individuals submitted to stressful work rate present a higher mean of sensory vocal symptoms compared with those who are not subjected to such condition, corroborating previously mentioned studies<sup>(1,18,27,28)</sup>. In this context, the literature highlights that stress may be, in some cases, the initial cause of vocal imbalance<sup>(3,26)</sup>.

Another relevant finding of this study was the presence of very loud noise in the workplace; this is one of the occupational risk factors commonly found in call centers. This situation favors the use of inadequate voice adjustments by telemarketers, who speak at a higher intensity than they usually would, leading to incorrect vocal use and, consequently, contributing to the onset of voice disorders<sup>(3,15,29)</sup>.

Moreover, such inadequate vocal adjustments may cause overload in the phonatory system of these professionals, negatively influencing the vocal tract configuration, i.e., by using the voice at higher intensity, workers favor a decrease in the supraglottic cavities and glottal mechanisms, generating greater adduction and elevation of the fundamental frequency<sup>(16)</sup>.

Regarding correlation between the presence of noise and individuals with and without voice disorder complaint, the results show that 68.4% of the operators who worked in a noisy environment presented this complaint, whereas 31.6% did not. Such finding was also described in the literature<sup>(18)</sup>. Correlation was also observed between the presence of noise and higher mean of sensory vocal symptoms (laryngopharyngeal sensations) in these professionals. Such data may consider the fact that these workers have the need to compete with the noise present in the workplace, leading to vocal abuse and, consequently, possible voice disorders<sup>(4,11,15,18,24)</sup>.

As for the telecommunication equipment used in the telemarketers' function, participants reported the use of the phone more frequently, followed by radio use. There were few reports on the use of headset, which is the most suitable device for this function. According to an international study<sup>(4)</sup>, the headset is the ideal equipment for the telemarketer, because it frees the hands for typing during the work and contributes to maintenance of proper body posture. In the field of voice, there are studies demonstrating that most of bodily pain is associated with vocal problems, thus causing dysphonia by means of muscle tension<sup>(15)</sup>. In addition, radio use contributes to increased noise intensity, as previously mentioned by the telemarketers surveyed.

Radio use can be justified by the profile of the company's calls, considering that many of them are directed to police cars. Also, participants who made use of the radio presented higher mean of sensory vocal symptoms compared with those who did not use this device.

Another interesting finding related to the working environment of these operators was the presence of echo in the telemarketing rooms. Telemarketers who worked in rooms with echo presented means of auditory and sensory vocal symptoms higher than those of operators who worked in rooms without echo. Studies with telemarketers showing correlation between the presence of echo in the work room and the onset of voice disorders were not found in the literature consulted. However, some authors<sup>(24)</sup> have reported that the environment and its furnishings are determining factors for reverberation reduction and sound absorption in the site, cushioning background noise and the echo.

Based on what has been previously exposed, it is possible to assume that the poor working conditions, with constant exposure to noise at high levels, verified in the work rooms may lead to increased voice intensity of the telemarketers analyzed and, consequently, generate an overload of the phonatory system, predisposing the participants of this study to the development of auditory and sensory vocal symptoms, and even signaling future voice disorders<sup>(16)</sup>.

In view of this, the importance and the need for acoustically appropriate working environments in order to avoid the onset of possible voice disorders are once again emphasized<sup>(24)</sup>.

From the discussions presented on the environment and working conditions of the participants, which are many times unfavorable, it is possible to verify that part of the operators perceived changes in the voice after beginning in the profession, with hoarse voice and speaking loudly as the ones most frequently mentioned. Such data were similar to those reported in another research conducted in the area<sup>(12)</sup>. These changes may lead to increased prevalence of vocal problems - given that this professional class has a high demand for voice use - as well as of risk factors<sup>(24)</sup>.

With respect to the participants' reference to change in the voice and voice disorder complaint, 93.3% of the telemarketing operators who mentioned change in the voice after beginning in the profession presented vocal complaints, whereas 29.8% of them did not.

It was also observed that the telemarketers who reported change in the voice presented means of auditory and sensory vocal symptoms higher than those of the operators that did not report this alteration. Such findings reinforce the view that the complaints reported by the telemarketers investigated may indicate an incipient framework of voice disorder, considering that, even in the presence of a light general degree of phonatory deviation, these professionals continue to develop their activities, which may increase the risk of developing laryngeal changes, entailing risks to the vocal function<sup>(12)</sup>. It is fundamental that these professionals recognize the voice as a primary work tool and, therefore, care for it<sup>(1)</sup>.

Brazilian studies on possible vocal changes in telemarketers are still incipient and are mainly aimed at comparing voice alterations in pre- and post-workday moments<sup>(12,24)</sup>. This fact demonstrates the need for further investigation on this professional category, considering that information on the possible changes in the voice, by comparing the vocal quality of individuals before and after beginning in the profession, is still not fully elucidated in the literature. The main existing vocal changes must be identified within this category, so that these aspects can be understood, enabling approximation to the reality and vocal needs of these professionals.

Regarding workplace absence, the number of telemarketers who mentioned this aspect was smaller than that found in other research - 15.3% of absence<sup>(15)</sup>. According to the correlation between workplace absence and vocal complaints, 80% of the operators who missed work because of problems with the voice presented voice disorder complaints, whereas 20% presented no such complaints. Also, these individuals who missed work owing to vocal problems presented means of auditory and sensory vocal symptoms greater than those of individuals who did not.

These findings were relevant considering that 20.8% of the individuals who reported never having missed work because of vocal problems mentioned having worked under inadequate vocal conditions, even when aphonic. This information deserves attention because it suggests that telemarketers work even in the presence of voice disorders, which can probably cause a delayed search for help from a health professional (speech-language pathologist or otolaryngologist), when such a problem may have already worsened<sup>(15)</sup>.

It is worth noting that the higher rates of absenteeism among telemarketers reinforce the premise that, for this category, a voice disorder makes the work impracticable, compared to that of teachers, who have the possibility to use other pedagogical resources that enable continuity of the work<sup>(11)</sup>.

Based on the aforementioned discussion, it is possible to conclude that the occupational risk factors in the company investigated may be interfering in the vocal conditions of the telemarketers. The responses of these professionals to the questionnaire on voice disorders brought valuable insight into the daily work routine in this company, assisting in a better understanding of the working conditions and environment of telemarketers<sup>(1)</sup>.

As already mentioned the WRVD is of multifactorial genesis and involves factors intrinsic to the individual, as well as extrinsic factors such as organizational and environmental aspects of the work<sup>(11)</sup>. Therefore, it is necessary to raise awareness among telemarketers and call center managers about the onset of WRVD in order to minimize the risk factors that affect vocal production. Speech therapy intervention in telemarketers presents beneficial results<sup>(24)</sup> and should include planning and development strategies of promotion and prevention of vocal health on the importance of voice production in the occupational context, issues related to healthy habits of vocal use, and health conditions of telemarketers. These themes can be elucidated through training, workshops and campaigns, and relevant

partnerships with other professionals<sup>(18)</sup>, such as engineers, occupational physicians, physiotherapists, psychologists, etc.

To this end, companies and public agencies which have a responsible policy of health promotion programs should invest in the prevention of diseases and provide assistance to these operators with the aid of an interdisciplinary team of professionals; this is an important tool for promoting quality of life and improving professional performance<sup>(1,10,14,24)</sup>. It is essential to prepare these workers to become the main agents in the proposal of changes to the vocal, environmental and organizational conditions of work<sup>(18,30)</sup>.

## CONCLUSION

The results of the present study show association between the number of auditory and sensory vocal symptoms, the presence of voice complaint, and the working conditions self-reported by the telemarketers surveyed. The telemarketing operators, who reported echo in the room, change in the voice, and workplace absence showed a larger number of auditory vocal symptoms. A greater number of sensory vocal symptoms (laryngopharyngeal sensations) were also observed among telemarketers who reported stressful work rate, noisy working environment, noise from other rooms, echo in the room, radio use, change in the voice, and workplace absence. These results demonstrate correlations between occupational risk factors and the vocal condition of the telemarketers investigated. Thus we conclude that poor working conditions can compromise the vocal performance of such workers.

Based on these results, we suggest that further studies be conducted to investigate the prevalence of voice disorders among telemarketers by means of perceptual analysis, because data from this evaluation are important to identify future candidates likely to develop voice disorders along their professional careers. We also suggest that longitudinal studies be developed to analyze the voice of telemarketers regularly in order to assess voice quality and possibly prevent work-related vocal disorders.

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### Author contributions

*All authors participated in the development of this research, namely: CTS and MFBSL contributed to the study design and collection, classification, and interpretation of data; POCS was responsible for the statistical analysis; CS contributed to data collection; LWL was responsible for the revision of the manuscript; MFBSL was the study adviser.*

**Appendix 1. Telemarketing Operator Vocal Profile (PVOT) Questionnaire**

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

**I - GENERAL INFORMATION****1. Gender:** 1. Female ( ) 2. Male ( )**2. Age:** \_\_\_\_\_**3. Schooling:**

- ( ) Incomplete Elementary School
- ( ) Complete Elementary School
- ( ) Incomplete High School
- ( ) Complete High School
- ( ) Incomplete College
- ( ) Complete College

**II - EMPLOYMENT STATUS****4. How long have you been a telemarketing operator?** \_\_\_\_\_**5. What is your telemarketing function?**

- 0. Active (makes calls) ( )
- 1. Receptive (answers calls) ( )

**6. How long have worked for this company?** \_\_\_\_\_**7. What are your daily working hours?** \_\_\_\_\_**8. Do you have another job besides this?**

- 0. No ( ) 1. Yes ( )

If yes, where and what function? \_\_\_\_\_

**9. Is your working environment calm?**

- 0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**10. Is there permanent supervision?**

- 0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**III - WORKING ENVIRONMENT****11. Is your working environment noisy?**

- 0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**12. If so, where does the noise come from: (more than one option can be marked)**

- 1. ( ) work room
- 2. ( ) other rooms
- 3. ( ) air conditioning
- 4. ( ) refurbishing in the premises
- 5. ( ) the street
- 6. ( ) other people's voices
- 7. ( ) TV/stereo
- 8. ( ) others

**13. Is the room acoustics satisfactory?**

- 0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**14. Is there dust in the environment?**

- 0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**15. Is there smoke in the environment?**

- 0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**16. Are there adequate furnishings?**

- 0. ( ) no 1. ( ) yes

**17. Is the hygiene condition of the company satisfactory?**

- 0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**18. Is there appropriate material for the work execution?**

- 0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

## Appendix 1. Continued...

**IV – VOCAL ASPECTS****19. Do you smoke? ( ) Did you use to smoke? ( )**

0. ( ) no 1. ( ) yes .

If yes: 1. How long have you smoked / did you smoke? \_\_\_\_\_

2. Do you smoke / Did you use to smoke at work (during the breaks)?

0. ( ) No 1 ( ) yes

**20. Are used to drinking water during your working hours?**

0. ( ) no 1. ( ) yes

**21. Do you keep appropriate bodily posture during the execution of your work?**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**22. Do you have / Have you had change in the voice?**

( ) no 1. ( ) yes, I have 2. ( ) yes, do

**If yes, have long have you had it?**

1. ( ) 0 to 5 months 2. ( ) 6 to 11 months 3. ( ) 1 to 2 years 4. ( ) 3 to 4 years 5. ( ) over 4 years

**23. Have you noticed any changes in the voice after beginning in this occupation?**

0. ( ) No 1. ( ) Yes. If yes, which one(s)? \_\_\_\_\_

**24. Do you perceive change in the voice throughout your work hours?**

0. ( ) no 2. ( ) sometimes 3. ( ) yes. Which one(s)? \_\_\_\_\_

**25. Which of the following auditory vocal symptoms do perceive at present?****hoarse voice**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**loss of voice**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**crack in voice**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**breathlessness**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**treble voice**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**deep voice**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**voice ranging from deep to treble**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**faint voice**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**26. Which of the following sensory vocal symptoms do perceive in the throat at present?****pick in the throat**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**sand in the throat**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**lump in the throat**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**throat clearing (hawking)**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**dry cough**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**phlegm cough**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**pain when speaking**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**pain when swallowing**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**difficulty swallowing**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**Appendix 1. Continued...****sore throat**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**secretion/phlegm in the throat**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**dry throat**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**vocal fatigue**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**difficulty speaking**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**other**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) do not know

**27. Have you missed work because of the voice?**

0. ( ) no

1. ( ) no, but I worked with an altered voice

2. ( ) yes; how many times? \_\_\_\_\_

**28. Are you satisfied with your voice?**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) no

**29. Have you received orientation or attended vocal training?**

0. ( ) never 1. ( ) seldom 2. ( ) sometimes 3. ( ) always 4. ( ) no

**Would you like to add any information?**


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**We are grateful for your participation!**