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Impact of call center work in subjective voice symptoms and complaints – an analytic study

Impacto da atividade laboral de teleatendimento em sintomas e queixas vocais – estudo analítico

ABSTRACT

Purpose: To estimate the prevalence of vocal symptoms, occupational risk factors, associated symptoms and their impact on the professional activity of the telemarketers. **Methods:** Cross-section analytical study with 124 telemarketers and 109 administrative workers (control group) selected from a random sample stratified by gender. The subjects answered an anonymous self-administered questionnaire involving issues related to the presence of vocal symptoms, potential risk factors for dysphonia, and vocal impact of symptoms in professional activity. The presence of one or more voice symptoms that occurred daily or weekly was considered positive for the presence of vocal symptoms. **Results:** The prevalence of vocal symptoms was found in 33% of telemarketers and in 21% of the control group, indicating an association between vocal symptoms and the activity of the telemarketer. When adjusted for confounders, this association remained in the sense of risk. In telemarketers, the sensation of dry air, ambient noise, and lack of vocal rest were the most frequently reported complaints reported by those presenting vocal symptoms. Almost 70% of telemarketers with vocal symptoms reported that these symptoms interfere with their professional activity. The rate of absenteeism by vocal symptoms in this group was 29%. **Conclusion:** Vocal symptoms are common in most telemarketers when compared to their peer controls, and significantly affect their job performance.

RESUMO

Objetivo: Estimar a prevalência de sintomas vocais, os fatores de risco ocupacionais associados e o impacto desses sintomas na atividade profissional do teleoperador. **Métodos:** Estudo transversal analítico com 124 teleoperadores e 109 funcionários da área administrativa (grupo controle) selecionados a partir de amostra aleatória estratificada por gêneros. Os participantes responderam a um questionário autoaplicável, anônimo, envolvendo questões referentes à presença de sintomas vocais, potenciais fatores de risco para disfonia e impacto dos sintomas vocais na atividade profissional. A presença de um ou mais sintomas vocais referidos com frequência diária ou semanal foram considerados como positivos para a presença de sintomas vocais. **Resultados:** A prevalência de sintomas vocais encontrada foi de 33% em teleoperadores e 21% no grupo controle, indicando uma associação entre sintomas vocais e a atividade de teleoperador. Quando ajustado para fatores de confundimento, essa associação permaneceu no sentido do risco. Em teleoperadores com sintoma vocal, a sensação de ar seco, o ruído ambiental e a ausência de repouso vocal se mostraram mais frequentes. Quase 70% dos teleoperadores com sintomas vocais referiram que estes interferem na sua atividade profissional. A taxa de absenteísmo pelos sintomas vocais no grupo foi de 29%. **Conclusão:** Os sintomas vocais são mais frequentes em teleoperadores se comparados com seus pares controles e afetam de modo significativo seu desempenho profissional.

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INTRODUCTION

The need of using the voice as a work tool has been increasing in the past few decades. Recent estimates indicate that 20% to 30% of the worldwide workforce performs activities that require a significant vocal demand^(1,2). Singers, actors, dubbers, teachers, telephone operators and telemarketers are part of those estimates; those are named voice professionals⁽³⁻⁵⁾.

In several companies, telemarketing has becoming the main sales and customer service tool. The operator is responsible for the communication between the company and the customer⁽⁶⁻⁸⁾. Such professional uses primarily their voice in their activity, for a continuous period of time of six hours a day, with a 15-minute break, on average. Clinical impressions suggest that overusing the voice, as required by such a professional activity, when added to environmental and individual factors, may cause a midterm dysphonia condition^(2,4,9,10).

Dysphonia is a symptom that may be described as any difficulties in vocal emission that prevents the natural voice production. It is expressed by the effort to speak, difficulty to sustain the phonation, vocal fatigue, lack of vocal volume and projection, hoarseness or other changes to vocal quality⁽¹¹⁾. Dysphonia may damage the intelligibility of the subject's speech, resulting in emotional, social, professional and economical effects^(5,10,12).

The question gains more relevance when, under the patient point of view, the impact of a dysphonia on the communication, due to an excessive demand by their professional activity, is not lower than the impact of diseases already listed in the labor laws as occupational diseases^(4,13,14).

From the 90's on, there has been a growing interest on studies that look for understanding voice changes related to occupational use^(2,4,10,13). Those studies have been trying to estimate the prevalence data of dysphonia and its risk factors in a population with an increased vocal exposure in speech situations, such teachers^(5,15-21) and, more recently, telemarketers^(3,7-9,22-26).

When it comes to telemarketers, the number of publications aiming at investigating the occurrence of dysphonia in that population is growing^(7-9,22-26). A prevalence study carried out in United States assessed the presence of vocal symptoms in telemarketers and in a compared sample by means of a self-administered questionnaire. The prevalence of vocal symptoms found in those groups was 68% and 48%, respectively⁽⁹⁾.

Another study assessed the frequency and magnitude of vocal symptoms in 45 telemarketers working at a call center company in Finland. The symptoms were evaluated over different times during the work hours and the magnitude of the vocal symptoms was measured by a visual analogue scale. The most frequently reported symptoms were hoarseness and perceived phonatory effort. The results indicated a linear increase in the magnitude of the symptoms during the work day⁽³⁾.

In Brazil, a survey carried out with 120 telemarketers from a call center company in the city of Sao Paulo identified self-reported vocal symptoms in at least 45% of the sample, including dry throat, tiredness when speaking, hoarseness and loss of voice⁽⁷⁾. Another study, carried out with 95 tele-

marketers in the city of Porto Alegre, identified the dry throat and tiredness when speaking as the most frequently reported symptoms⁽²⁶⁾. A recent study using a retrospective analysis of 404 occupational medical registers of telemarketers aimed at relating demographic data and time in the telemarketer job to vocal symptoms⁽²⁵⁾.

It is worth noting that, in Brazil, there is a growing effort from the scientific community to try and understand better that population of telemarketers and the reflection of their working activity on their health. However, no Brazilian studies assessing the vocal symptoms in the telemarketer population using a compared sample (control group) have been found so far, and only with that it would be possible to evaluate the magnitude of the findings against the risk found in the profession. Researches in that field in Brazil are required so that, in a near future, more appropriate intervention policies are developed to decrease the social, economical, professional and personal impact of dysphonia.

METHODS

Study design

This is a cross-sectional study whose studied factor was the continuous use of voice and the outcome was the presence of vocal symptoms.

Selection of subjects

This study was developed with employees of companies that own call center centrals in their facilities. To do so, all companies headquartered in a capital in the South of Brazil with more than 100 employees working in the call center centrals and enrolled with the Sindicato dos Telefônicos do Estado (SINTTEL, State Telephone Operators Union) were invited to participate. Out of the five existing companies, three of them were willing to participate and two refused to participate, justifying the lack of logistic conditions to perform a study by the time of collection.

The sample was comprised of two groups – telemarketers and the control group. The control group was comprised of employees working in the administration departments of the companies (accounting, human resources and warehouse), with similar salary range and who did not used their voice continuously during the work hours (given the characteristics of their functions.) For both groups, a weighed average was calculated in order to ensure a proportional participation from each of the three companies.

The human resources department of each participant company provided the database of their employees (name and work hours) and, from that on, a random sample (draw) was established and stratified by gender. The stratification was necessary, since the number of women working as telemarketers is higher than men^(6,7). Additionally, the prevalence of vocal changes is higher among women^(5,9).

Each subject drawn was contacted by one of the researchers and asked on their availability to participate in the study. All the

employees drawn that accepted to participate in the research were enrolled. There were no exclusion criteria and, in case of refusal, a new draw was carried out in order to reach the number of subjects required by the study.

To calculate the sample size, the prevalence data of vocal symptoms found in the Jones et al.⁽⁹⁾ study was used – 68% for the telemarketers group and 48% for the control group. The calculated sample was 104 subjects for each group. To that calculation, 20% was added to each group in order to replace potential losses.

Research instrument and study variables

In order for the companies to authorize the execution of the study, we were required to adapt the data collection so as not to disturb the work routine of the participants. Thus, the measurement of outcome by means of a otorhinolaryngologic assessment or recording of voices for perceptual auditory analysis could not be performed. The outcome was measured by the presence of one or more vocal symptoms reported with daily or weekly frequency⁽²¹⁾.

The research instrument was comprised of a self-administered, anonymous questionnaire, based on the instrument created by Jones et al.⁽⁹⁾. The questions included referred to demographic data, use of voice in their professional activity, potential occupational and individual risk factors for vocal symptoms, presence of vocal symptoms and impact of the symptoms on their professional and social activities. The original protocol was translated from English into Portuguese and adapted by means of a pilot study, which consisted of: a) application of the questionnaire in the form of an interview with 20 telemarketers and 20 control subjects, in order to assess the appropriateness of terms and understanding of the instrument; b) review of the questions poorly understood by the respondents; c) application of the questionnaire reformulated in the self-administered format with ten telemarketers and ten control subjects.

Studied variables

The following variables were assessed:

- 1) demographic data (gender, age, color of the skin, education);
- 2) occupational variables (daily working hours, time of professional actuation in the area, other professional activity with the use of voice, assistance method*, feeling of excessive noise in the work environment, access to water while working, feeling of dry air in the work environment, vocal training, vocal rest during the working hours);
- 3) individual variables (airway diseases, smoking, diagnosed hypoacusia and gastroesophageal reflux disease, leisure habits harmful to the voice);
- 4) vocal symptom (vocal fatigue, phonatory effort, feeling of hoarseness, worsening of the vocal quality by the end of the day, feeling of voice failures);
- 5) interference in the vocal symptoms during the professional activity and absenteeism due to vocal problems.

This study was approved by the Ethics Committee of Hospital de Clinicas de Porto Alegre, under protocol no. 01-196. All participants read and signed the Informed Consent Form. The companies were guaranteed anonymity regarding their participation in the study.

Statistical analysis

The sample characteristics were described in the tables. In order to compare categorical variables, the Chi-Squared test was used, and for continuous variables with normal distribution, the Student t test was used. Values of $p < 0.05$ were considered significant. Odds ratio was used to assess the independent associations.

The logistic regression was used to relate the studied factor to the outcome. Among the variables representing potential confounder variables, the respective odds ratios were calculated: time working in that profession, other professional activity that uses the voice, feeling of excessive noise in the work environment, feeling of dry air in the work environment, participation in vocal training, vocal rest during the work hours, access to water while working, airway diseases, hypoacusia, smoking, reflux, daily ingestion of water, leisure, age, race and education. The variables that changed the raw OR in 15% were part of the logistic regression model.

RESULTS

There were 233 subjects enrolled to the study: 124 telemarketers and 109 control subjects. Two telemarketers drawn did not accept to participate in the study were replaced from a new drawing. Analyzing the questionnaires excluded from the control group, no outcome or demographic characteristics that may be different from the analyzed sample were observed.

Gender distribution in both groups was 29% of male subjects and 71% of female subjects. Regarding demographic variables, there are differences between the groups regarding age, skin color and education. However, those differences did not change the association when included to the regression model.

The occupational variables indicated that the time of professional expertise was longer in the control group. Approximately 86% of the telemarketers have been working in that area for less than two years, while in the control group 64% had been working in the area for less than two years (Table 1).

Specific occupational data from the telemarketers sample indicated that 94.4% of them work six hours a day, with a 15-minute break for a snack. Regarding the method of customer assistance, the receptive approach was the most frequently used (71.8%), but only 2.4% of the telemarketers used exclusively the active method. The remaining 25.8% used both methods.

The feeling of ambient noise at work, the participation in a vocal training and the involvement in other professional activities using the voice were not different between the groups. However, the feeling of dry air in the environment was most frequently reported among the telemarketers.

* For telemarketers only: active (actively contacts the customer), receptive (receives the customer call), both (contacts the customer and receives their call)

Table 1. Demographic and occupational characteristics of the sample – telemarketers and control group

Variables	Telemarketers (n= 124)	Control group (n=109)	p-value
	Mean (SD)		
Age (years)++	26.48 (± 6.08)	28.62 (± 6.84)	0.001*
Time in the profession++	1.41 (± 0.73)	1.95 (± 0.88)	0.001*
	n (%)		
Skin color+			
White	81 (65.3)	93 (85.3)	0.001*
Non-white	44 (34.7)	16 (14.7)	
Education+			
High school	64 (51.6)	31 (28.4)	0.001*
University	60 (48.4)	78 (71.6)	
Other activity with the use of voice+			
No	111 (89.5)	102 (93.6)	0.35
Yes	13 (10.5)	7 (6.4)	
Vocal training+			
No	84 (68)	78 (71.5)	0.57
Yes	40 (32)	31 (21.5)	
Sensation of ambient noise+			
No	90 (72.6)	78 (71.5)	0.25
Yes	34 (27.4)	31 (28.5)	
Sensation of dry air+			
No	64 (51.6)	76 (69.7)	0.005*
Yes	60 (48.4)	33 (30.3)	

* Significant values (p≤0.05)

+ Chi-Square test

++ t-Student test

Note: SD = standard deviation

The individual variables (health and leisure habits) in both groups (telemarketers and control subjects) indicated that the samples do not differ from the frequency of airway diseases, smoking, reflux, hypoacusia, use of voice in leisure and estimation of daily consumption of water (Table 2).

The telemarketers present a higher prevalence of vocal symptoms (33%) when compared against the control group (21%). When adjusted for potential confounders, this association remains in the sense of risk (OR=2.24). However, the feeling of dry air in the environment was proven an independent variable that influences such association. Since that variable was not previously controlled, a stratified analysis for the “dry air” variable was performed. Both the group “exposed” to dry air and the group “not exposed” to dry air changed the direction of association between vocal symptom and the fact that the subject is telemarketer (Table 3).

The most frequently reported vocal symptoms in the telemarketers group were voice worsening by the end of the day, followed by tiredness when speaking and phonatory effort (Table 4).

Regarding the impact of vocal symptoms in the professional activity of telemarketers, the most common complaints related to the difficulty of being understood by the customer and the feeling that they are “saving” the voice, speaking the strict necessary only (Table 5).

Approximately 70% of the telemarketers said that the vocal symptoms compromise their professional activity. In

the telemarketers group, the absenteeism rate due to vocal problems was 29%.

Over 30% of the telemarketers sample signaled vocal symptoms with daily or weekly frequency, while in the control group that rate topped 21%. The most frequently reported vocal symptoms in the telemarketers group were feeling of voice worsening by the end of the day (53.7%), followed by tiredness when speaking (46.3%) and phonatory effort (43.9%).

DISCUSSION

The results of this study indicate an increased prevalence of vocal symptoms in telemarketers than in the control group, indicating an association between the telemarketer professional and vocal symptoms. Among the telemarketers with vocal symptoms, the vast majority of them describe work impairments due to the voice problem. Those values call attention to such a poorly studied population that has been growing in the labor market.

So far, a small number of studies related to that theme were published^(3,7,9,22-26). However, clinical impressions and vocal symptoms prevalence studies in other populations suggest an increased prevalence of dysphonia in individuals exposed than those not exposed to the prolonged use of voice^(9,15,16,19,22,23). In the multivariate analysis performed in this study, when adjusted for potential confounder factors, this association remains in the sense of risk (OR=2.24). However, the feeling of exposure

Tabela 2. Características e hábitos de saúde e lazer da amostra - teleoperadores e grupo controle

Variables	Telemarketers (n= 124)	Control group (n=109)	p-value
	Mean (SD)		
Daily consumption of water (Glasses)++	4.07 (±2.16)	4.02 (±1.94)	0.73
	n (%)		
Respiratory tract diseases+			
Yes	72 (58.1)	61 (56)	0.79
No	52 (41.9)	48 (44)	
Smoking+			
Smoker	39 (68.5)	34 (68.8)	1
Non-smoker	85 (31.5)	75 (31.2)	
Diagnosed hypoacusia+			
Yes	3 (2.4)	4 (3.7)	0.71
No	121(97.6)	105 (96.3)	
Gastroesophageal reflux+			
Yes	20 (16.1)	22 (20.2)	0.49
No	104 (83.9)	87 (79.8)	
Leisure with intense use of voice+			
Yes	47 (62.1)	39 (35.8)	0.78
No	77 (37.9)	70 (64.2)	

+ Chi-Square test

++ t-Student test

Note: SD = standard deviation**Table 3.** Distribution of the prevalence of vocal symptoms in the telemarketers sample and the control group, and stratified analysis using the variable "dry air"

		With vocal symptom n (%)	Without vocal symptom n (%)	OR	95% CI
Telemarketers		41 (33)	83 (67)	1.84	(1.02-3.34)
Control Group		23 (21)	86 (79)	2.24*	(1.11-4.53)
Sensation of dry air					
Yes	Telemarketers	29 (48.3)	31 (51.7)	1.52	(0.6-3.41)
	Control	13 (39.4)	20 (60.6)		
No	Telemarketers	12 (18.8)	52 (81.3)	1.43	(0.61-3.8)
	Control	10 (13.2)	66 (86.6)		

* Significant values with Odds Ratio adjusted for the variables: dry air, noise and education

Table 4. Occupational variables of telemarketers regarding outcome

Characteristics	With vocal symptom n=41 n (%)	Without vocal symptom n=83 n (%)	p-value
Excessive ambient noise			
Yes	19 (46.3)	15 (18.1)	0.001*
Dry environment air			
Yes	29 (71)	31 (37.3)	0.001*
Insufficient vocal rest			
Yes	30 (73.2)	34 (41)	0.001*
Difficult access to water			
Yes	5 (12.2)	7 (8.4)	0.52

* Significant values (p≤0.05) – Chi-Square test

Table 5. Description of the most frequent complaints of the impact of vocal symptoms on the professional activity of telemarketers

Voice-related complaints	Frequency* (%)
"I need to repeat several times until the customer understands what I am saying"	46.4
"My voice does not transmit as much enthusiasm as it should"	28.6
"I do not offer all the products I could offer"	17.9
"I sound like I have got the flu — and the customer notices it"	32.1
"I speak nothing but the necessary", "I 'save' my voice"	57.1

* Percentage of answers in a universe of 28 telemarketers who considered that their vocal symptoms affect their professional activity, by answering Yes to one or more previously mentioned statements

to dry air is an independent variable and may explain part of that association.

The relationship between low relative humidity and the risk of dysphonia is described in literature⁽²⁷⁻²⁹⁾. Experimental studies with exposure to low relative humidity indicated that the dryness caused on the vocal folds increases the phonatory threshold pressure, i.e., increased subglottic pressure and increased effort to initiate phonation⁽²⁹⁾. Even though that factor may be associated to uneven levels of water consumption between the groups, no differences were found in the sample in relation to that fact. The feeling of exposure to dry air is probably effect of the exposure to air conditioning in the work environment. If that could have been expected, ideally the control group should be exposed to air conditioning just like the telemarketers. However, that variable was not controlled in the study planning. In the sample, the telemarketers group is more exposed to air conditioning than the participants in the control group.

In order to assess the magnitude of that independent variable, a subanalysis was performed to stratify the association between the studied factor and the outcome for the exposure to the “dry air” variable (understood as dry air feeling in the environment). Both in the exposed group and in the group not exposed to dry air, the association between vocal symptoms and the telemarketer profession remains in the risk direction (OR= 1.43 and 1.52, respectively).

Another study on the prevalence of vocal symptoms in telemarketers found a 68% rate of vocal symptoms in telemarketers and 48% in control group subjects⁽⁹⁾, values higher than those obtained from this research (33% in telemarketers and 21% in the control group). However, the relevant study included the feeling of dry throat as part of the outcome characterization variables, which is most frequent among the telemarketers. That symptom may be effect of the combination of increased exposure to air conditioning and frequent opening of the oral cavity during speech due to the continuous use of voice. It is suggested that, in future studies with the telemarketers population, the exposure to low relative humidity is a controlled variable.

Work environment-related risk factors for dysphonia have been described in literature⁽⁴⁾. In the call center environment, several of those factors are clearly observed, such as low relative humidity, prolonged time using the voice without an appropriate vocal rest, excessive ambient noise, in addition to the absence of prevention programs that allow early identification of vocal symptoms. In this study, a subanalysis of those work-related risk factors was performed. Even though the sample were calculated to test this association, data suggest that, in addition to the feeling of dry air, the excessive ambient noise and the absence of vocal rest during the work hours were more frequently found in telemarketers presenting vocal symptoms.

In this study, it is not possible to establish whether the occupational variables contribute as cause of the vocal symptoms or if, due to the symptoms, the vocal performance gets worse in those environmental conditions. However, taking into account the high prevalence of vocal symptoms in this population, control measures of the deleterious environmental conditions seem feasible and necessary.

The symptoms reported by the telemarketers seem to be associated to vocal overload. The feeling of worsening of the vocal quality by the end of the day was the most frequently reported vocal symptom (53%), followed by fatigue (46%) and effort to speak (43%). A study that assessed the impact of vocal training on telemarketers of a call center in Finland established that, even though the magnitude of vocal symptoms have decreased after the training, they tend to be more intense by the end of a work day⁽²³⁾. Data seems to reinforce the idea that there might be a vocal overload inherent to the telemarketer activity. The systematic worsening of the symptoms by the end of a workday may indicate the initial phase of a functional or organofunctional dysphonia⁽¹¹⁾.

The vocal symptoms seem to generate consequences beyond the telemarketers themselves. In this study, the difficulty in being understood by the customer and the need of “saving” the voice appear as the main complaints by the telemarketers related to the impact of vocal symptoms at work. As a consequence, the time of each call may be longer due to the need of repeating information. That may decrease the number of calls made by the telemarketer or make the customer wait longer on the telephone when dialing to the call center. It is worth mentioning that “saving” the voice trying to speak less may cause the telemarketer not to benefit from the contact with the customer to offer products in addition to what was asked. Similar results are presented in other studies^(8,9). Among the main findings are the need of repeating the information, the feeling of effort to be understood and the feeling of being less “excited” to sell.

In the sample telemarketers, the rate of absenteeism resulting from the vocal symptoms is around 29%. In teachers, the absenteeism rates due to dysphonia range between 18%⁽¹⁹⁾ and 20%⁽¹⁶⁾. The higher absenteeism rates in telemarketers seem to reinforce the perception that, upon a dysphonia, the work is unfeasible. For teachers, the presence of dysphonia does not seem so critical to the point of generating major absenteeism rates due to the possibility of using other pedagogical resources that make the continuity of work feasible.

In the studied sample, less than 33% of the telemarketers participated in speeches or vocal training in which they could obtain information on the care required to preserve vocal health. It is worth mentioning that the ratio of participation in vocal training found in the control group is similar to the telemarketers'. It is also worth mentioning that, despite being important to the professional activity, the existence of systematic programs of preservation of vocal health for the telemarketers was not observed in none of the companies participating in the study.

Risk factors for dysphonia that have been widely described in literature, such as airway diseases, smoking, diagnosed hypoacusia e gastroesophageal reflux disease, did no change the odds ratio (OR) value in more than 15% and, thus, they were not included in the regression model as potential confounders. Thus, even though the data was collected by means of a self-administered questionnaire (not complemented by medical and phonoaudiological assessment), the variables seem to be equally distributed between the groups, which does not change the strength of association between dysphonia and the telemarketer profession.

The dysphonia in voice professionals is of multifactorial genesis, involving intrinsic factors to the subject and extrinsic factors, such as work and the environment. It is still difficult to clearly establish the limits to those factors and maybe it is the greatest challenge to create the occupational health prevention policies in the area^(2,25). A cohort study seems to be the most appropriate way to estimate the risk to exposure to the professional use of voice. The work conditions of telemarketers are very specific and, thus, new studies in that field aim at controlling the environmental variables, such as noise and air humidity.

It is known that a cross-sectional design with the use of self-administered questionnaires presents methodological limitations, such as the recall bias and the unfeasibility to check the truthfulness of the data. However, the data presented in such study seems to reinforce the results of other researches of that same kind^(9,30). Since they involve a poorly studied population, prevalence studies on dysphonia among telemarketers in different locations are still required. The validation of a protocol to estimate the prevalence of vocal symptoms in telemarketers seems critical in order to make the different studies comparable. In a future not so far, results from the studies are expected to generate concrete actions to prevent dysphonia in voice professionals.

CONCLUSION

The results of this study indicate an association between vocal symptoms and the continuous use of voice in the telemarketer activity.

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