Vocal Symptoms in Telemarketers: A Random and Controlled Field Trial

A.G.A. Oliveira^{a,b} M. Behlau^b N. Gouveia^a

^aDepartamento de Medicina Preventiva, Faculdade de Medicina da Universidade de São Paulo, e

^bCentro de Estudos da Voz, São Paulo, Brasil

Key Words

Voice training · Effectiveness · Vocal symptoms · Telemarketers

Abstract

The present study was carried out to evaluate the effectiveness of a specific program regarding the occurrence of vocal attrition symptoms in telemarketers. A total of 71 subjects participated in this study: 28 completed the Vocal Symptoms questionnaire to test its reliability, and 43 were randomly assigned to two groups: an 8-week vocal training group ($n = 14$) and a no-training control group ($n = 29$), to evaluate the effectiveness of the training program with this tool. The voice training group also filled in the posttraining questionnaire 'Benefits Obtained with Voice Training' (BVT). The vocal training program was not considered effective with regard to the occurrence of vocal symptoms. However, due to a probable increase in symptoms in untrained telemarketers, it can work as a protective factor. According to BVT answers, the vocal training contributed to an improvement in vocal use as a communication tool for telemarketers.

Copyright © 2009 S. Karger AG, Basel

Introduction

Due to the high prevalence of vocal attrition in telemarketers, recent studies have emphasized the necessity of vocal training programs for these high-risk profession-

als [1, 2]. Sapir et al. [3] recently defined vocal attrition as disorders and/or alterations in laryngeal tissue as a result of excessive or inappropriate use of the vocal mechanism, likely influenced by behavioral, biological and/or psychosomatic factors. Clinically, vocal fatigue, hoarseness, odynophonia and generalized fullness in the neck, among other symptoms, are often associated with vocal attrition [3–5].

Vocal training programs for professional and occupational voice users typically focus on preventing voice problems associated with prolonged, inappropriate use of the vocal mechanism and inefficient voice production [6]. Although some employers currently implement such programs, data from well-designed investigations regarding the efficacy of these programs are scarce [7–9], particularly for telemarketers [1]. The current study sought to evaluate the effectiveness of a new vocal training program aimed at the prevention of vocal attrition in telemarketers. We hypothesize that vocal training programs will decrease the frequency of vocal attrition in this high-risk population.

Methods

Subjects

Subjects in the current study were telemarketers aged between 18 and 55 years currently performing receptive (those telemarketers sought out by customers), active (those telemarketers seeking out customers) or hybrid telemarketing (a mix of both receptive and active) for at least 6 months [10]. Subjects had to work an av-

erage of 6 h a day, once a week. Potential subjects who received previous vocal training were excluded. In order to facilitate accrual, we targeted a telemarketing service company, located in the state of São Paulo. This company, at the time of the study, employed approximately 700 telemarketers. All research was in accordance with the Resolução Brasileira do Conselho Nacional de Saúde [10].

Data Collection

Reliability Test

Initially, we attempted to determine the reliability of the Vocal Symptoms (VS) self-evaluation questionnaire, an instrument devised by Lehto et al. [1], for telemarketers. This instrument is composed of 11 items related to different vocal symptoms. Fifty telemarketers were invited to voluntarily complete the VS questionnaire twice, 30 days apart, to determine test-retest reliability. No telemarketers received any intervention in this initial stage of investigation.

Field Assay

The second stage of investigation involved a controlled, randomized field assay to determine the effectiveness of a vocal training program with regard to the frequency of vocal attrition symptoms. Of the 700 telemarketers currently employed at the company, 229 were considered eligible. A sample of 120 eligible employees was randomly selected. These professionals were invited to participate in a 30-min vocal hygiene lecture, which was not a component of the training program. The goal of this lecture was to increase the interest in the current study and enhance accrual. During the lecture, the telemarketers were informed of the study and its objectives. They were given the opportunity to consent to participate at the conclusion of the lecture.

A total of 100 telemarketers (83.3%) attended the lecture, of which 92 (76.6%) consented to participate in the current study. Subjects were then randomly assigned to an intervention group ($n = 44$) and a control group ($n = 48$). The intervention group received an 8-week training program, including vocal warming-up and cool-down, as well as tasks to expand the psychodynamic aspects of voice production. In order to be included in the current study, telemarketers had to attend at least 6 (75%) of the 8 training program sessions, which were offered once a week and directed by the voice pathologist responsible for the study. All subjects completed the VS questionnaire both before training and then again at the conclusion of the intervention. In addition, subjects in the intervention group also completed the Benefits Obtained with Vocal Training (BVT) questionnaire, created by the authors of the VS [1]. After the completion of the study, the telemarketers who were part of the control group were provided with the vocal training program, if they were interested.

Sample size was based on estimated improvement associated with the training program. It was estimated that telemarketers receiving training will display a 50% improvement in the number of vocal attrition symptoms. Therefore, 90 telemarketers were required for the study: 45 in the intervention group and 45 controls. These figures were estimated according to the findings of Timmermans [12], and 120 were targeted for the current study to allow for subject attrition.

As shown in appendix 1, the VS questionnaire is composed of 11 items. Responses to these items are a 4-point scale including: (1) not even once a year or never, (2) a few times a year or some-

times, (3) approximately once a month or quite often, and (4) almost every week or very often. A composite score is calculated by adding the individual scores for each item. According to Sapir et al. [3], a symptom was considered present when it occurred approximately once a month (score 3) or almost every week (score 4). Scores of 1 or 2 are indicative of the absence of symptoms. Analysis of the number of symptoms presented was performed according to these criteria. A decrease in the number of symptoms was considered improvement and vice versa.

The BVT questionnaire is an adaptation of a questionnaire also devised by Lehto et al. [1]. Of the 23 items in this instrument, 11 were selected due to their relationship to the particular aspects covered in the training program (items: 1, 3, 5, 6, 12, 14, 18, 19, 21, 22, 23) plus two additional items: 'With the voice training, my voice became clearer than before' and 'With the training, my voice became more resistant to fatigue' (appendix 2). Scoring for the BVT is as follows: (1) disagree, (2) neither agree nor disagree, (3) somewhat agree and (4) agree. In order to simplify the analyses, items scored as a 3 or 4 were considered agreement.

Voice Training

The vocal training program was divided into eight 30-min modules offered weekly. The first 3 modules consisted of vocal warm-up. The fourth module included both warm-up and cool-down. In the last 4 modules, activities included a warm-up as well as group activities regarding the psychodynamics of voice production. In order to promote vocal warm-up, facilitating sounds, body movement techniques with sound production, overarticulation exercises, pitch and loudness range exercises, semi-occluded vocal tract exercises (hand-over-mouth technique) [13] and chant talk exercises [14] were used. The facilitating sounds included humming sounds associated with chewing movements, fricatives [15] and voice sounds [16] associated with ascending musical scales (from C3 to C4) in staccato and legato [13]. For cool-down, voice sounds were also used, with descending musical scales (from G3 to C3), as well as the yawn-sigh technique [17] and laryngeal manipulation [18].

The modules were conducted in an attempt to obtain insight into the participants' perception of their voice and potential problems. After performing the exercises, telemarketers consistently reported alterations in voice production, even without cuing. In the group activities, each analyzed results of different vocal performances to suggest which were more effective. Each clerk received a program brochure, and every week a card was handed out for daily monitoring of compliance with the exercise program. The vocal psychodynamics work included call simulations so that the telemarketers evaluated the impressions conveyed by different vocal behaviors, including changes in quality and vocal modulation as well as in the elements of speech rate and articulatory precision.

Data Analysis

Data were analyzed using SPSS, version 10.0, and SAS, version 8.0 (SAS Institute, Cary, N.C., USA). The reliability of symptoms and VS items was verified via the weight kappa coefficient, and the Altman classification was considered in the interpretation of values obtained [19].

Table 1. Selection of telemarketers for VS test-retest, assessment of effectiveness and benefit obtained from the training program

Results

Reliability of the VS Questionnaire

Of the 50 telemarketers who participated in our preliminary investigation regarding the test-retest reliability of the VS questionnaire, 28 (56%) attended the follow-up evaluation (table 1). The reliability of this questionnaire was rather variable: the comparison of the number of symptoms and items 1, 3 and 5 of the VS was moderately reliable ($\kappa_{\text{symptom}} = 0.5$; $\kappa_1 = 0.5$; $\kappa_3 = 0.5$; $\kappa_5 = 0.4$); item 11 presented good reliability ($\kappa_{11} = 0.7$) and the other items presented values below 0.2, indicating poor reliability. The reliability of the total scores, measured by the intraclass coefficient, was 0.82 (95% confidence interval = 0.66–0.91). From the reliability values obtained,

evaluation of the effectiveness of the training program was approached using the calculation of the number of symptoms, scores and items 1, 3, 5 and 11 of the VS. These are related to: symptoms of vocal fatigue (1), sensation of a lump in the throat (3), sensation of excessive mucus in the throat (5) and absenteeism due to voice problems (11).

Effectiveness of Training

Of the 44 telemarketers in the intervention group, 4 changed positions, 4 were unavailable, 10 had over 25% absence and 12 did not show up. The intervention group was, therefore, comprised of 14 telemarketers. Of the 48 telemarketers in the control group, 39 attended the evaluations and 29 the re-evaluations; this meant a loss of 19

Table 2. Vocal attrition symptoms before and after training between intervention and control groups

Vocal attrition symptoms	Intervention				Control				Total			
	before		after		before		after		before		after	
	n	%	n	%	n	%	n	%	n	%	n	%
Absent	5	35.7	7	50.0	9	31	10	34.5	14	32.6	17	39.5
<2	5	35.7	3	21.4	10	34.5	8	27.6	15	34.8	11	25.6
≥3	4	28.6	4	28.6	10	34.5	11	37.9	14	32.6	15	34.9

Fig. 1. Demonstration chart of the improvement, worsening and absence of alterations in the number of vocal attrition symptoms, as measured by the VS amongst telemarketers in the intervention group (IG) and control group (CG) before and after training.

telemarketers. The sample for field assay was composed of 43 telemarketers, 14 in the intervention group, 9 females (64.3%) and 5 males (35.7%), and 29 in the control group, 24 females (82.8%) and 5 males (17.2%), as shown in table 1.

Frequency of Voice Symptoms

According to the VS findings, as shown in table 2, of the 43 telemarketers, 15 (34.8%) presented few symptoms (score 1 or 2) and 14 (32.6%) multiple symptoms (score 3 or more), that is 29 telemarketers (67.4%) presented 1 or more symptoms. After placing the telemarketers in the intervention and control groups, there was no statistically significant difference in the number of symptoms ($p > 0.05$).

Voice Symptoms – before and after Training

Changes in the number of symptoms before and after training are presented in figure 1. 21.4% of the telemar-

keters in the intervention group improved – the number of symptoms decreased following training. In the control group, a greater number of telemarketers worsened – there was an increase in the number of symptoms (34.5%) as compared to the intervention group (7.1%). This finding approached significance ($p = 0.054$). However, when evaluating the chance of occurrence of worsening in the intervention group, the odds ratio was 0.29 (95% confidence interval = 0.11–0.77). Comparisons before and after training with regard to the number of symptoms are presented in table 2.

A reduction in the number of telemarketers with ‘some symptoms’ in the intervention and control groups was also observed. Although this reduction was greater in the intervention group, there was no statistically significant difference between the groups ($p > 0.05$).

When comparing the average values of the scores obtained before and after training (table 2), there was a slight reduction in the values in the intervention group for both genders; however, when compared to the control group, there was no statistically significant difference. With regard to the VS scores (table 3), comparing the total scores of each clerk before and after training, 57.1% of the intervention group improved. However, when compared to the control group (38%), no statistically significant difference was observed ($p = 0.435$). These results suggest that there were no significant changes in the findings of these variables with the training.

Of the 14 telemarketers in the intervention group, 71.4–100% considered themselves to have benefited from the training program. A total of 85.7% agreed that their voices became more effective in the communication with the voice training. Considering these and VS results, it is possible that the vocal training may be effective with regard to improved vocal and communication performance, but does not induce changes in vocal symptoms.

Table 3. VS scores before and after training between intervention and control groups according to gender

Gender	Before				After			
	intervention group		control group		intervention group		control group	
	n	mean	n	mean	n	mean	n	mean
Male	5	17.8	5	16.6	5	16	5	17.8
Female	9	20.2	24	19.2	9	18.7	24	19.1

Table 4. Improvement, worsening or absence of alterations in VS scores between intervention and control groups according to gender

	Intervention group						Control group					
	male		female		total		male		female		total	
	n	%	n	%	n	%	n	%	n	%	n	%
Improvement	3	60.0	5	55.6	8	57.2	2	40.0	9	37.5	11	38.0
Worsening	2	40.0	3	33.3	5	35.7	3	60.0	10	41.7	13	44.8
No alteration	–	–	1	11.1	1	7.1	–	–	5	20.8	5	17.2
Total	5	100.0	9	100.0	14	100.0	5	100.0	24	100.0	29	100.0

Discussion

Vocal attrition symptoms are frequent among telemarketers [2]. The current study sought to provide evidence that vocal training programs aid in the prevention of voice disorders for these individuals. In the current study, 142 telemarketers (92 for the field assay and 50 for the VS test-retest) participated. Of this initial sample, only 50% of the telemarketers ($n = 71$, 43 for the assay and 28 for the test-retest) remained in the study. The losses in the field assay occurred, in general, due to time unavailability, dismissal by the company and because training was not carried out during their working hours. In the test-retest, losses occurred primarily due to dismissal by the company. These findings concur with a previous investigation by Jones et al. [2], who also found a high prevalence of vocal attrition symptoms in telemarketers, of whom 68% presented 1 or more symptoms, and Liechavičius [20], with a sample of 62 telemarketers, observed that 58% of them presented with 1–3 vocal symptoms. Despite these issues with retention, no differences were observed between the intervention and control groups with regard to the number of vocal symptoms.

However, engaging in a vocal training program may not significantly reduce the number of symptoms, but it

may prevent the occurrence or exacerbation of vocal symptoms. Telemarketers are clearly a high-risk group for vocal disorders [2] and the odds ratio supports this hypothesis; the statistical power of the assay was likely influenced by a relatively small sample size [21]. With regard to scores before and after training, no statistically significant difference in the values obtained as per gender was observed (tables 3, 4). Similar findings were described by Lehto et al. [1]. Since there is probably no gender difference in vocal load used by telemarketers, the findings of similar scores were in accordance with the results expected. When comparing the pre- and posttraining Voice Handicap Index scores of theater and radio announcing students, Timmermans [12] found significant differences; those subjects receiving 9 months of training presented with reduced scores. Although the methodology and the population differ in the current study, it is possible that changes in the VS scores in telemarketers can only occur after a long period of training. It is known that in the different areas of telemarketing operations, it is necessary that telemarketers have efficient voices. However, participation in training may often be jeopardized by the high employee turnover, a high rate of dismissals and the logistic policies of some companies. For greater enrolment, it would be ideal that the vocal and communication

Table 5. Agreement with BVT questionnaire items among intervention group telemarketers

BVT items	Agree		Somewhat agree		Indifferent	
	n	%	n	%	n	%
1 I can now recognize my own voice features	11	78.6	2	14.3	1	7.1
2 My voice production has become easier after the training	12	85.7	1	7.1	1	7.1
3 Voice exercises are easy to do	13	92.9	1	7.1	–	–
4 Knowledge of the factors affecting my voice helps to take better care of my voice	13	92.9	1	7.1	–	–
5 With the voice training my voice became clearer than before	13	92.9	1	7.1	–	–
6 I learned things that I didn't know about my voice	13	92.9	1	7.1	–	–
7 While speaking, I succeed to control my breathing better than before	14	100	–	–	–	–
8 I think that although I got lots of new knowledge, I still can't control my voice	–	–	3	21.4	–	–
9 I got useful and important knowledge concerning my work	13	92.9	1	7.1	–	–
10 I can also convey the impression I want when discussing over the phone	10	71.4	3	21.4	1	7.1
11 I can now use my voice as a tool of communication more effectively than before	12	85.7	–	–	2	14.3
12 I can now react to the client's speaking pattern better than before	12	85.7	–	–	2	14.3
13 With the training my voice became more resistant to fatigue	14	100	–	–	–	–

training programs were carried out within the telemarketers' working hours and that they were of shorter duration, considering the time necessary for changes to be observed [22].

Results of the BVT questionnaire (table 5) suggest that there was improvement regarding the different aspects of vocal behavior. With regard to the differences obtained in this evaluation and the VS, one hypothesis is that the training provides the telemarketers with increased vocal awareness, although it does not produce significant changes in vocal symptoms. Since vocal function is multidimensional [23], it is possible that with training changes in other dimensions occur. That is in the voice perceptual and acoustic dimensions may be more relevant and sensitive to changes associated with training in this population. Previous data confirm this phenomenon [12]. However, in order to confirm such a hypothesis, it is necessary to carry out additional studies that include the evaluation of these dimensions in telemarketers. A complement to the present study is being carried out to assess the effectiveness of the training program proposed with perceptual and acoustic measures.

A vocal hygiene lecture was performed before the voice training, because there is no evidence in the literature about significant vocal changes after relatively brief training [7]. Although the influence of an isolated intervention for telemarketers has been evaluated in the present study, the process in which the manifestation of vocal attrition symptoms occurs is doubtlessly much more complex; the increase in symptoms in untrained telemarketers could also be influenced by other factors. These results make clear the need for an ergonomic analysis of the work process in telemarketing companies so that the influence of

environmental aspects – many times underrated by companies and health professionals – be evaluated [24]. Some aspects that can affect the vocal production and performance are harmful working postures, inadequate air humidity, noise level and temperature [25, 26].

According to the results obtained, the training program did not produce significant changes in the VS scores, but there may be an increase in the number of symptoms in untrained telemarketers. This increase would indicate the proposed program as a factor of protection for telemarketers with regard to the appearance or increase in the number of symptoms. As the training may be a protection factor, but not one of remission of the symptoms mentioned, a vocal therapy program for those telemarketers with 'a few symptoms' or 'multiple symptoms' could be performed. In order to investigate this hypothesis, studies with larger samples should be carried out. And, to evaluate the effectiveness of an intervention with regard to vocal symptoms, the ideal would be the development of a study that assessed the effectiveness of a vocal therapy program for telemarketers.

Based on the results of the current study, one may conclude that the vocal training program was not considered effective with regard to the occurrence of vocal symptoms. However, these trainings may be protective against the accumulation or exacerbation of vocal symptoms in untrained telemarketers. Furthermore, the majority of the professionals who attended the training felt as though they gained significant insight into their voice and its care. Perhaps the long-term effects of this training are not captured during the current study. Instead, insight gleaned by these data may be imminently useful over the course of voice professionals' career.

Appendix 1

Items of the VS Questionnaire (by Lehto et al., 2003)

- 1 My voice gets tired very easily
- 2 My voice is hoarse even when I don't have the flu
- 3 I have a feeling of a lump in my throat
- 4 I feel like having a choker around my neck
- 5 I have frequently a feeling of mucus in my throat
- 6 My throat is dry and/or itchy
- 7 In noisy circumstances my voice might not be heard
- 8 My voice gets worse during the day
- 9 My voice breaks when I speak
- 10 I have lost my voice totally even when I haven't had the flu
- 11 I have been absent from work because of my voice

Appendix 2

Items of the BVT Questionnaire (adapted from Lehto et al., 2003)

- 1 I can now recognize my own voice features (item 1)
- 2 My voice production has become easier after the training (item 3)

- 3 Voice exercises are easy to do (item 5)
- 4 Knowledge of the factors affecting my voice helps to take better care of my voice (item 6)
- 5 With the voice training my voice became clearer than before (new item)
- 6 I learned things that I didn't know about my voice (item 12)
- 7 While speaking, I succeed in controlling my breathing better than before (item 14)
- 8 I think that although I got lots of new knowledge, I still cannot control my voice (item 18)
- 9 I got useful and important knowledge concerning my work (item 19)
- 10 I can also convey the impression I want when discussing over the phone (item 21)
- 11 I can now use my voice as a tool of communication more effectively than before (item 22)
- 12 I can now react to the client's speaking pattern better than before (item 23)
- 13 With the voice training my voice became more resistant to fatigue (new item)

References

- 1 Lehto L, Rantala R, Vilkmán E, Backström T: Experiences of a short vocal training course for call-centre customer service advisors. *Folia Phoniatr Logop* 2003;55:163–176.
- 2 Jones K, Sigmon J, Hock MS, Eric Nelson BS, Sullivan MA, Ogren F: Prevalence and risk factors for voice problems among telemarketers. *Arch Otolaryngol Head Neck Surg* 2002;128:571–577.
- 3 Sapir S, Attias J, Shahar A: Symptoms of vocal attrition in women army instructors and new recruits: results from a survey. *Laryngoscope* 1990;100:991–994.
- 4 Sapir S, Attias J, Shahar A: Vocal attrition related to idiosyncratic dysphonia: re-analysis of survey data. *Eur J Disord Commun* 1992; 27:129–135.
- 5 Sapir S: Vocal attrition in voice students: survey findings. *J Voice* 1993;7:69–74.
- 6 Behlau M, Pontes P: Avaliação e tratamento das disfonias. São Paulo, Lovise, 1995.
- 7 Roy N, Gray SD, Simon M, Dove H, Corbin-Lewis K, Stemple JC: An evaluation of the effects of two treatment approaches for teachers with voice disorders: a prospective randomized clinical trial. *J Speech Lang Hear Res* 2001;44:286–296.
- 8 Roy N, Weinrich B, Gray SD, Tanner K, Toledo SW, Dove H, Corbin-Lewis K, Stemple JC: Voice amplification versus vocal hygiene for teachers with voice disorders: a treatment outcomes study. *J Speech Lang Hear Res* 2002;45:625–638.
- 9 Roy N, Weinrich B, Gray SD, Tanner K, Stemple JC, Sapienza CM: Three treatments for teachers with voice disorders: a randomized clinical trial. *J Speech Lang Hear Res* 2003;46:670–688.
- 10 Camargo MS: Telemarketing: um novo instrumento de marketing à disposição das empresas. *Estudos EPM* 1984;132:205–220.
- 11 Ministry of Health, National Health Council: Resolution No 196/96 on research involving human subjects. 1996. http://conselho.saude.gov.br/docs/Resolucoes/reso_196_english.doc.
- 12 Timmermans B: The effectiveness of voice training in future professional voice users; thesis, Universiteit Antwerpen, 2003.
- 13 Behlau M, Madazio G, Feijó D, Azevedo R, Gielow I, Rehder MI: Aperfeiçoamento vocal e tratamento fonoaudiológico das disfonias; in Behlau M (ed): *Voz – o livro do especialista*. Rio de Janeiro, Revinter, 2005, pp 409–564.
- 14 Colton R, Casper J: *Understanding Voice Problems: A Physiological Perspective for Diagnosis and Treatment*. Baltimore, Williams & Wilkins, 1990.
- 15 Bloch P: *Você quer falar melhor?* Rio de Janeiro, Bloch, 1977.
- 16 Morrison M, Rammage LA: Muscle misuse voice disorders: description and classification. *Acta Otolaryngol (Stockh)* 1993;113: 428–434.
- 17 Boone DR: *Is your Voice Telling on You?* San Diego, Singular Publishing Group, 1991.
- 18 Aronson AE: *Clinical Voice Disorders: An Interdisciplinary Approach*. New York, Decker, 1985.
- 19 Szklo M, Nieto FJ: *Epidemiology – Beyond the Basics*. Gaithersburg, Aspen Publishers, 2000, pp 378–384.
- 20 Liechavicius C: Sintomas Vocais, análise perceptivo-auditiva e análise acústica de teleoperadores de centrais de atendimento. São Paulo, Centro de Studys da Voz, 2000.
- 21 Pocock JS: *Clinical Trials: A Practical Approach*. Chichester, Wiley, 1995.
- 22 Schneider CM, Saxon K, Dennehy CA: Exercise physiology: perspective for vocal training; in Sataloff RT (ed): *Professional Voice – The Science and Art of Clinical Care*. San Diego, Singular Publishing Group, 1997, pp 775–779.
- 23 Hirano M: *Clinical Examination of Voice*. New York, Springer, 1981, pp 81–84.
- 24 Assunção AA, Lima FPA: A contribuição da ergonomia para a identificação, redução e eliminação da nocividade do trabalho; in Mendes R (ed): *Patologia do trabalho*, ed 2. Rio de Janeiro, Atheneu, 2003, pp 1767–1789.
- 25 Vilkmán E: Occupational safety and health aspects of voice and speech professions. *Folia Phoniatr Logop* 2004;56:220–253.
- 26 Vilkmán E: Voice problems at work: a challenge for occupational safety and health arrangement. *Folia Phoniatr Logop* 2000;52: 120–125.