

Measurement of Voice Quality, Anxiety and Depression Symptoms After Speech Therapy

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Summary: Objective. To verify changes in vocal behavior of dysphonia patients and components of anxiety and depression symptoms before and after voice therapy.

Study Design. It is an uncontrolled clinical trial on individuals with dysphonia who attended voice therapy at the outpatient clinic of a hospital in southern Brazil.

Methods. Statistical analysis was carried out using descriptive statistics, Mann-Whitney and Wilcoxon tests, assuming maximum significance level of 5% ($P \leq 0.05$), SPSS 16.0. All patients underwent otorhinolaryngologic assessment for laryngeal disorder diagnosis. Perceptual-auditory voice assessment (GRBAS scale) and the Hospital Anxiety and Depression Scale were applied before and after voice therapy.

Results. Sixty-eight patients, 23 of whom were men (33.82%), mean age of 49 years (standard deviation ± 19.14). The number of voice therapy sessions varied according to each case, with a mean of 10.31 (standard deviation ± 5.32). The comparisons between psychological or psychiatric referral and participants' age revealed statistical significance, suggesting that younger people were referred to the specialties because they were suspected potential clinical cases. Comparisons between voice parameters, anxiety and depression scores before and after voice therapy showed statistically significant findings.

Conclusions. This study identified the presence of emotional symptoms in dysphonia patients and indicated that voice therapy is effective to improve voice quality and to early detect and help reduce anxiety and depression symptoms. It also highlights the influence of psychological and psychiatric referral on emotional symptoms. The need for controlled trials and the importance of interdisciplinary interventions in this area for the complete care of individuals with dysphonia is pointed out.

Key Words: Voice–Anxiety–Depression–Speech therapy–Voice disorder.

INTRODUCTION

Voice production is an adapted and learned laryngeal function that requires highly integrated and precise neurophysiological control. The voice has an important role in the transmission of verbal and emotional messages.¹ In this context, the voice can influence the formation of interpersonal relationships and voice disorders may impact the daily activities of the individuals with dysphonia, jeopardizing their personal and professional relationships, and the perception of well-being and quality of life.²

The diagnosis of dysphonia can be directly related to the emotional state of stress, anxiety, and depression among others.^{3–6} Many voice disorders arise from emotional problems. These disorders may be more related to the emotional and psychological states than the flawed use of the mechanisms involved in phonation.^{1,7} In contrast, voice disorders also affect the welfare and health of dysphonia patients.^{8,9} By understanding the relation between voice and emotional state and the influence of its aspects, it is known that emotional states can be either primary or secondary to the voice problem.^{3,4,10} Regarding the occurrence of these mental disorders in the population, a study¹¹ performed in the United

States evidenced that 24.9% of the population showed anxiety and 19.3% had mood disorders (including depression).¹²

The influence that emotions and personality have on voice as well as the role of voice as a personality trait and as a means of expressing emotions have led to an increasing amount of studies and research on this area.³ It is known that many cases of dysphonia have a strong emotional component.^{5,6} The evaluation of anxiety and depression symptoms will provide the specialist with information about the patient's mental state, about the individual needs for interdisciplinary interventions, and adaptations of the customization treatment.^{1,5} In this context, this study aimed to verify changes in the vocal behavior of dysphonia patients and components of anxiety and depression symptoms before and after voice therapy.

METHODS

Participants

This was an uncontrolled trial with convenience sample. Sixty-eight adult volunteers, 23 of whom were male (33.3%) with otorhinolaryngologic diagnosis of laryngeal disorder participated in the study. After being assessed, the patients were referred to a voice therapy program in an outpatient clinic of a hospital in the south of Brazil. All participants signed a term of informed consent approved by the Ethics Committee of the institution of origin, filed under protocol 986/12.

Procedures

After the otorhinolaryngologic diagnosis, voice quality was assessed, and anxiety and depression symptoms were measured before and after voice therapy. The perceptual-auditory vocal

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quality analysis was performed in a silent environment, and the patient's voice was recorded and evaluated aurally by two independent judges, with a third judge being consulted in case of disagreements. The GRBAS scale was used, including the instability parameter in the voice analysis.^{13,14}

Anxiety and depression symptoms were measured using the Hospital Anxiety and Depression Scale (HADS)¹⁵—a validated tool for Brazil¹⁶—individually and with no intervention from the evaluator. This assessment tool has 14 items, seven for measuring anxiety (HADS-A) and seven for depression (HADS-D). Each item scores from zero to three, with a maximum score of 21 points for each subscale. Following the cut-offs recommended by Zigmond and Snaith,¹⁵ a score of nine points for each subscale (anxiety or depression) determines the presence of symptoms. Patients were referred to psychology and psychiatry services when they had high scores on anxiety and depression items in HADS and also through patients' self-report and the examiners' perception. The patients were referred to improve their mental state and quality of life and to aid in the voice therapy prognosis.

Voice therapy comprised three interconnected models of interventions: guidance, psychodynamic, and voice training, which use different vocal techniques and exercises aimed at favoring the correct and satisfactory voice use and competent communication. All procedures were adapted and customized to each patient profile according to their bodily and vocal aspects and personalities. The weekly 30-minute interventions were individual and the number of sessions in a case by case basis.

Data analysis

Data were analyzed using descriptive statistics and by means of Mann-Whitney and Wilcoxon tests to check for statistical significance. Normality was tested by the Kolmogorov-Smirnov test. For these tests, the significance level was set at a maximum of 5% ($P \leq 0.05$), and the software used for statistical analysis was SPSS version 16.0 (SPSS, Inc., Chicago, IL, USA).

RESULTS

Sample data

The number of voice therapy sessions varied according to the case and had a mean value of 10.31 sessions with a standard deviation of 5.32. The subjects' occupations (frequency and percentage) were retired ($n = 20$, 29.4%), teacher ($n = 9$, 13.2%), student ($n = 7$, 10.3%), maid ($n = 4$, 5.9%), housekeeper ($n = 3$, 4.4%), businessperson ($n = 3$, 4.4%), seamstress ($n = 2$, 2.9%), clergyman ($n = 2$, 2.9%), private secretary ($n = 2$, 2.9%), sales person ($n = 2$, 2.9%), and other occupations ($n = 14$, 20.8%).

Table 1 shows the distribution of the patients' laryngeal disorders ranked by the amount of accumulated percentage and frequency. The other disorders are listed in the table's caption and had a frequency of one per laryngeal disorder.

Comparisons by subject gender and specialist referral

The findings regarding age and anxiety and depression scores were compared with the participants' gender. Table 2 presents

TABLE 1.
Frequency and Cumulative Percentage of Laryngeal Disorders

Laryngeal Disorders	Frequency	%	Cumulative %
Vocal fold nodules	14	20.6	20.6
Incomplete glottal closure	7	10.3	30.9
Vocal fold paralysis	7	10.3	41.2
Presbylarynx	6	8.8	50.0
Vocal fold cyst	6	8.8	58.8
Ventricular phonation	5	7.4	66.2
Vocal fold polyps	5	7.4	73.5
Sulcus vocalis	4	5.9	79.4
Glottal redness by laryngopharyngeal reflux	3	4.4	83.8
Other disorders*	11	16.2	100.0

* Functional aphonia, Reinke's edema, subglottal stenosis, surgical trauma, leukoplakia, Parkinson's disease dysphonia, laryngeal cancer, phonotrauma, and contact ulcer.

these values as medians and quartiles and the P value for each comparison. This table also describes findings regarding participant age and psychological or psychiatric referral. It is noteworthy that 17 individuals, 25% of the sample, needed to be referred to these services because they were identified as potential clinical cases as defined by the methods of the study. It must be pointed out that there was no control over patient adhesion or compliance with the psychological or psychiatric treatments.

Comparisons between the voice analysis and anxiety and depression symptoms before and after speech therapy

Table 3 presents the degree of voice parameter disorder, expressed as median and quartiles, before and after voice

TABLE 2.
Data Compared With Gender and to Psychological and Psychiatric Referral

	Male $n = 23$	Female $n = 45$	P Value
	Median (Quartile)	Median (Quartile)	
Age	56 (21.0–65.0)	51 (36.0–60.5)	0.922
Anxiety score	8 (6.0–10.0)	10 (6.0–12.0)	0.072
Depression score	6 (4.0–10.0)	5 (2.0–9.0)	0.133
	Referred $n = 17$	Not Referred $n = 51$	
	Median (Quartile)	Median (Quartile)	P Value
Age	35 (19.5–54.0)	57 (39.0–65.0)	0.020*

* Statistical difference by Mann-Whitney test ($P \leq 0.05$).

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