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Quality of life, adherence to voice rehabilitation therapy and psychological variables in patients with head and neck cancer

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Abstract: Introduction: Voice problems can affect quality of life (QoL), other psychological aspects, and the adequate adherence to voice rehabilitation therapy. Objective: To determine the association between QoL and treatment adherence (TA) to voice rehabilitation with symptoms of anxiety, depression, and coping strategies. Method: A longitudinal study was conducted with 97 participants with head and neck cancer (H&N) who were attending voice rehabilitation therapy. Instruments: EORTC QLQ-C30 and QLQ-H&N35, Treatment Adherence Checklist, Cancer Coping Questionnaire and HADS. Results: The mean overall QoL was 83.33, and mean TA was 8.80. Lower overall QoL and emotional functioning scores, as well as higher dry mouth scores were associated with higher levels of anxiety. Greater problems with social contact and lower TA were associated to higher depression scores. Conclusion: Consistent with the literature, TA and QoL were associated to depression and QoL was also correlated to anxiety. These results are among the first to explore such aspects in Latino patients and emphasize the importance of multidisciplinary care for H&N cancer patients in voice rehabilitation therapy, given that during their treatment they may encounter psychological barriers that could hinder their progress in voice quality and QoL.

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Keywords: Adherence, anxiety, depression, head and neck cancer, quality of life, voice rehabilitation

ESP Calidad de vida, adherencia al tratamiento de rehabilitación de voz y variables psicológicas en pacientes con cáncer de cabeza y cuello

Resumen: Introducción: Los problemas de la voz pueden afectar la calidad de vida (CV) y otros aspectos psicológicos, así como la adecuada adherencia a la terapia de rehabilitación de voz. Objetivo: Determinar la relación entre la CV y la adherencia al tratamiento (AT) de rehabilitación de voz con síntomas de ansiedad, depresión y estrategias de afrontamiento. Método: Se realizó un estudio longitudinal en 97 participantes con cáncer de cabeza y cuello (CyC) que asistían a terapia de rehabilitación de voz. Instrumentos: EORTC QLQ-C30 y QLQ-H&N35, Lista de Verificación de Adherencia al Tratamiento, la Escala de Afrontamiento al Cáncer y la HADS. Resultados: La CV global promedio fue de 83.33 y el puntaje promedio de AT fue de 8.80. La calidad de vida global, la función emocional y boca seca se asociaron con la ansiedad. La dimensión de la CV contacto social y la AT tuvieron relación con la depresión. Conclusiones: Consistente con la literatura la AT y la CV tuvieron relación con la depresión y solo la CV se relacionó con la ansiedad. Los resultados presentados son de los primeros en explorar estos aspectos en pacientes latinos y enfatizan la importancia de la atención multidisciplinaria a pacientes con cáncer de CyC en terapia de rehabilitación de voz, dado que en el curso de sus tratamientos pueden encontrar barreras psicológicas que obstaculicen la mejora en la calidad de la voz y la CV.
Palabras clave: Calidad de vida, adherencia, rehabilitación voz, cáncer cabeza y cuello, depresión, ansiedad

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1. Introduction

In recent decades, survival for patients with head and neck cancer (H&N) has improved[1], however, some cancer treatment options can have various morbidities as a side effect[2], that affect quality of life (QoL). The most frequently reported are issues with speech, voice, appearance, socialization, swallowing, taste, sticky saliva, dry mouth and chewing. These are long lasting affectations that can persist for up to a year after completing cancer treatment[3,4].

Voice dysfunctions such as dysphonia are one of the main communication alterations[5], affecting up to 50.5% of people undergoing supracricoid laryngectomy[6], up to 37% treated with thyroidectomy[7] and up to 32% of those who received chemoradiotherapy. Voice problems can affect QoL[8] and have been associated with higher levels of depression, anxiety and distress[9-11], so adaptive coping strategies can benefit the emotional well-being of H&N cancer patients. Which is why voice rehabilitation has a very important role in the treatment of these patients since it can improve voice quality[12,13], however, the effectiveness of this intervention requires of treatment adherence (TA)[13,14].

In one study, TA was reported considering the start of voice rehabilitation therapy and the complete and missed appointments, with a percentage of TA of 17% to 80%[15]. However, despite the importance of TA, it continues to be a poorly addressed issue in Latino patients.

In rehabilitation interventions for dysphagia, an adherence of 13% to 54% has been identified[16-18]. Among the main reported barriers to having an adequate TA were the difficulty of the task, the lack of understanding about the importance of exercises, radiation side effects such as pain, fatigue and nausea, symptoms of depression and anxiety, and lower QoL levels[13,16-19]. In addition to this, certain coping strategies are negatively associated to symptoms of anxiety, depression, distress and QoL[20,21] which can affect adherence.

Therefore, the aim of the present investigation was to determine the association among QoL and TA with symptoms of anxiety, depression, and coping strategies in a group of H&N cancer patients receiving voice rehabilitation therapy. As well as longitudinally comparing these variables by sociodemographic and clinical characteristics.

2. Method

Participants and study design

Data collection was performed in the Human Communication Rehabilitation Clinic of Mexico's National Cancer Institute. Eligible patients had 1) any type of head and neck cancer, 2) diagnosis of dysphonia or aphonia, and 3) at least one month in voice rehabilitation therapy according to the clinical record. Exclusion criteria were 1) Karnofsky score of 70 or less according to the clinical record, and 2) presenting physical symptoms that limited participation (nausea, dizziness, fatigue). A longitudinal study was carried out.

Variables

Treatment adherence. The degree to which a person's behavior (taking medication, following a diet, and implementing lifestyle changes) corresponds to the agreed recommendations of a healthcare provider[22].

Perception of one's place in the cultural environment and value system in which one lives, as well as in relation to one's objectives, expectations, criteria and concerns[23].

Symptoms of Anxiety. It is defined as an emotion characterized by feelings of tension, recurrent intrusive thoughts or worry, and physical changes such as increased blood pressure[24].

Symptoms of Depression. Experience of lack of interest and pleasure in daily activities, significant weight loss or gain, insomnia or excessive sleeping, lack of energy, inability to concentrate, feelings of worthlessness or excessive guilt, and recurrent thoughts of death or suicide[25].

Instruments

Quality of life was evaluated with the Spanish version for the Mexican population of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30 version 3)[25,26] and the module for Head and Neck cancer (EORTC QLQ-H&N35). These instruments have shown adequate psychometric properties, with an alpha of 0.88 for the overall QoL score and the rest of the subscales have alpha values between 0.22 and 0.89[27,28].

To assess TA, a Treatment Adherence Checklist (TAC) was used. Toski, Galindo and Contreras previously designed it for this research. It has alpha (α=0.872) and concurrent validity (r=-0.34, p=0.01). It has the components I Identification data, II Clinical information, III list of rehabilitation exercises. Subscales IV, V and VI are sections for recording voice progress, VII relationship with health personnel, VII monitoring of home practice and treatment and IX sociocognitive factors. The frequency with which the participant reported performing the exercises was also considered. Additionally, participants' subjective perception of TA was measured with a visual analogue scale designed for the study.

The Cancer Coping Scale[29] was used, it is an instrument derived from the Mental Adjustment to Cancer (MAC) Scale[30] with 22 items grouped into 5 factors: fighting spirit, anxious worry, helplessness / hopelessness, positive attitude, and cognitive avoidance. These factors showed alphas between 0.45 and 0.80 and a global alpha of 0.81.

The Hospital Anxiety and Depression Scale (HADS), which was validated in Mexico [31] was applied. It showed a global alpha of 0.86, and α = 0.79 for the anxiety subscale and α = 0.80 for the depression subscale.

Procedure

Data collection was performed in the Human Communication Rehabilitation Office of Mexico's National Cancer Institute. This project was approved by the Research Ethics Committee and the Research Committee of Mexico's National Cancer Institute. Every subject agreed to participate in the research and signed the informed consent. Once they agreed to be a part of the study, they were provided with a battery of tests, which was considered as the first evaluation. The second evaluation was carried out on average one month after the first evaluation.

3. Statistical analysis

Data analysis was performed using SPSS® version 22 for Windows. To determine the normality of the data, the Kolmogorov-Smirnov test was used. The variables were correlated by estimating the Pearson Correlation Coefficient and the comparison among independent groups was calculated by Student's t tests and one-way ANOVA. A paired samples t test was used to compare the scores of the first evaluation and the second evaluation. A significance level of $p < 0.05$ was considered.

4. Results

Description of the sample

A total of 97 participants answered the first evaluation and 55 completed the second. They had an average age of 54.69 years, the majority had only finished elementary school (48.5%), had children (82.5%) and a partner (64.9%). Regarding clinical data, the most frequent diagnosis was thyroid cancer (52.6%), and thyroidectomy was the most common cancer treatment (52%). See Table 1.

Table 1. Sample characteristics

Variable	**N**	**%**	**Variable**	**N**	**%**
Sex			**Employment status**		
Male	50	51.5	Employed	48	49.5
Female	47	48.5	Unemployed	49	50.5
Children			**Educational level**		
Yes	80	82.5	None	9	9.3
No	17	17.5	Elementary	47	48.5
Partner			High school	23	23.7
Yes	63	64.9	Professional	18	18.6
No	34	35.1	**Treatment**		
Oncological diagnosis			Supracricoid laryngectomy	6	6.2
Thyroid cancer	51	52.6	Total laryngectomy	17	17.5
Laryngeal carcinoma	38	39.2	Thyroidectomy	52	53.6
			Cordectomy	7	7.2
Other	8	8.2	Other	15	15.5

Clinical stage			**Karnofsky**		
I	31	32	80	3	3.1
II	12	12.4	90	60	61.9
III	10	10.3	100	34	35.1
IV	36	37.1	**Comorbidities**		
Other classification	8	8.2	Yes	32	33
			No	65	67
Months since the diagnosis of the first tumor			**Number of appointments to voice therapy**		
x= 28.94			x= 13.24		
SD = 30			SD = 12.52		
Months in voice therapy					
x= 17.57					
SD = 23.08					

On the other hand, 10.3% of the participants had mild anxiety, 2.1% had moderate anxiety and 1% had severe anxiety; only 13% had mild depression.

Association of QoL, TA and psychological variables

A low and inversely proportional association was found between anxiety and overall QoL (r = -0.426), a moderate and inversely proportional association for anxiety and emotional functioning (r = -0.507) and a low and directly proportional association between anxiety and dry mouth (r = 0.404). In addition, a statistically significant, low, and directly proportional association was found among depression and social contact (r = 0.460). There were also significant, low, and inversely proportional correlations between the total HADS score and the overall QoL score (r = -0.469) and emotional function (r = -0.495) (p <0.05).

There were also significant, low, and inversely proportional correlations between TA, depression (r = -0.463), and the total HADS score (r = -0.478). In addition, significant, low, and directly proportional associations were found among anxious worry with the total HADS score (r = 0.449) and depression (r = 0.473) (p < 0.05).

Quality of life

The mean overall QoL score was 83.33 (SD = 21.77) and the mean score for the rest of the subscales was between 0 and 33.33. Differences were found between men and women in overall QoL scores (87.67 ± 16.94 vs. , t = 2.285; df = 79.99), emotional functioning (88.83 ± 13.32 vs. 79.43 ± 23.43, t = 2.409; df = 71.96), pain (6.67 ± 11.66 vs. 19.86 ± 27.06, t = -3.083; df = 61.70), dyspnea (10 ± 15.43 vs. 19.15 ± 22.78, t = -2.301; df = 80.21), feeling ill (6.67 ± 15.05 vs. 18.44 ± 24.87, t = -2.798; df = 74.81), use of analgesics (12 ± 32.82 vs. 44.68 ± 50.25, t = -3.767; df = 78.45) and in the use of a feeding tube (10 ± 30.30 vs 0 ± 0; t = 2.333, t = 2.333; df = 49) (p < 0.05).

According to the months since the diagnosis, participants were divided in three groups (1 year, 13 to 24 months and more than two years), differences were found in the use of analgesics (x=17.14 ± 38.23; 18.18 ± 39.47; 42.50 ± 50.06 respectively, F = 3,822; df = 2, 94).

When grouped by months in voice rehabilitation (1 year, 13 to 24 months and more than two years), differences were found in speech problems (x= 27.18 ± 23.39; 15.56 ± 20.20; 33.33 ± 21.66 respectively, F = 3.371; df = 2.94) and teeth problems (x= 14.29 ± 22.79; 10 ± 15.67; 36.51 ± 40.69 respectively, F = 6.545; df = 2.94) (p < 0.05).

Differences were found in physical function (F = 3.134; df = 2.94), fatigue (F = 3.371; df = 2.94), pain (F = 4.381; df = 2.94) and in the use of analgesics (F = 3.487; df = 2.94) (p < 0.05) among the different types of cancer.

Treatment adherence

The mean TA score was 8.80 (SD = 1.65), the mean percentage of attendance at appointments was 94.35% (SD = 10.25), completion of exercises and recommendations per day was 84.36% (SD = 22.79) and the performance of exercises per week was 90.28% (SD = 16.56). Differences were identified in the percentage of attendance where participants with a professional degree had better attendance than those without a formal education (81.75 ± 13.45 vs. 95.68 ± 6.23, F = 6.028; df = 3.18), and patients with less than a year attending voice rehabilitation had better adherence (95.80 ± 9.36 vs. 89.05 ± 14.17, F = 3.780; df = 2.94). In addition, patients without comorbidities had a better percentage of completion per day (88.21 ± 20.77 vs. 76.56 ± 24.99, t = 2.276; df = 52.72) ($p < 0.05$).

Comparison of psychological variables

Differences were found among men and women in fighting spirit coping strategies (17.40 ± 3.58 vs 19.04 ± 2.42; t = -2.627, df = 95) and positive attitude (8.48 ± 2.11 vs 9.49 ± 1.79; t = -2.530, df = 95). Also in the coping strategies, a difference was found according to the level of education (none, elementary, high school and professional) for hopelessness (10.67 ± 0.70; 10.23 ± 1.92; 8.39 ± 2.90; 8.72 ± 2.49 respectively; F = 5.089; df = 3) ($p < 0.05$).

Comparison of the first and second evaluation

A statistically significant difference was observed between the first and second evaluation for some QoL subscales and TA (see table 2), meanwhile, anxiety, depression and coping style scores showed no significant differences.

Table 2. Statistically significant differences on QoL and TA between evaluations

	First evaluation		**Second evaluation**		
	Mean	SD	Mean	SD	*t*
Role functioning	87.88	24.10	94.55	12.85	2.234*
Senses problems	16.67	24.84	9.70	19.16	-2.179*
Speech problems	26.26	22.05	19.19	19.65	-2.400*
Visual analog adherence scale	8.75	1.84	9.31	0.97	2.387*

**Differences were estimated by Student's t test, all p values* < 0.05.

5. Discussion

This study's objective was to determine the association between QoL and TA with symptoms of anxiety, depression, and coping strategies. As well as comparing the scores of the study variables between sociodemographic, clinical, and longitudinal variables.

In the first evaluation 97 participants were recruited and in the second 55 were followed up. The experimental losses in the second evaluation were due to different factors, for example that the participants did not agree to answer the evaluation due to having another medical appointment or to having some procedure done. Also, in some cases, there was no evaluator in the clinic the day of the patient's appointment, or the patient's appointment was scheduled on a day outside of the sample collection period. And in some cases, the second evaluation was not carried out because the participant did not attend their speech rehabilitation appointment.

On the other hand, a negative association was found between overall QoL and anxiety, a result similar to other investigations[32,33]. It is possible that high levels of anxiety lead to a greater symptomatic burden that impacts QoL [34]. Despite this, in the present investigation, patients had high levels of QoL, which might be explained by the months since diagnosis and because they already

had received some type of cancer treatment, and it has been described that some aspects of QoL can improve after receiving cancer treatment[4,32].

Regarding depression, it was found to be associated to the social contact dimension of QoL. This association could be explained by the participants age, who were on average 54 years old, and some studies have suggested that the impact on socialization and personal life is greater on people under 60 years of age[7,36]. Additionally, it is likely that socialization problems can also be derived from some sequelae of cancer treatments, such as voice problems, as they can cause greater difficulties in communicating with others [37]. Other sequelae such as dysphagia, thick sputum and dental cavities can affect body image, also causing difficulties when socializing[38].

The overall QoL scores were higher in men, as well as the emotional function, with less affectations in the dimensions of pain, dyspnea, feeling sick and the use of analgesics when compared to women. These differences can be derived from the oncological diagnoses of each group, where most women (83%) had thyroid cancer while most men (70%) were diagnosed with laryngeal carcinoma and QoL could be influenced by the location of the tumors[4].

On the second evaluation, role functioning increased, and senses and speech problems decreased. The improvement of speech could be attributed to the voice rehabilitation therapy that the participants received since these interventions promote an improvement of the voice[12], in the future, we recommend corroborating this finding using specific and objective measures to evaluate voice related QoL, and voice intensity and frequency.

Progress in speech problems could be a factor that helped improve role function, as evidence suggests that voice problems may interfere with the proper development of daily and work activities[7,37,39]. However, it is important to mention that the improvements in these dimensions can also be attributed to temporality, since an average of one month passed between the first and second evaluation and it has been described that dimensions such as role functioning and speech problems con improve after concluding cancer treatment[4,7,40,41].

The association between the Treatment Adherence Checklist results and depression was consistent with the results in previous papers on adherence to other types of rehabilitation in patients with H&N cancer patients[17,39] and other oncological populations[43,44]. This finding is of great relevance, because it underlines the importance of multidisciplinary care, because despite receiving voice rehabilitation, this does not guarantee that the patient will improve since emotional aspects can interfere with therapy. Although it is difficult to give psychosocial care for all cancer patients in Latin America, a psychosocial screening is likely to help identify patients with anxiety and depression symptoms that may interfere with adequate TA.

On the other hand, although it has been reported that there is an association between QoL and TA[17,18,22], we did not find a significant association possibly because we evaluated adherence to a specific therapy for voice rehabilitation but did not use a specific voice related QoL scale, in contrast to other rehabilitation studies for dysphagia[17,18] where such a relationship was found, possibly because they evaluated adherence to dysphagia treatments and used specific scales for dysphagia related QoL.

TA was lower among those who did not receive formal education, those who had more than two years since their cancer diagnosis, and those who had comorbidities. Not having a formal education can lead to greater difficulties in understanding the instructions on the exercises and recommendations, as well as their importance, since it is one of the reported barriers for adequate TA [18,19]. The WHO[22] states that having comorbidities tends to decrease adherence to treatment because it complicates the treatment regimen and, in the case of cancer patients, their different side effects can be accumulated[18] which interferes with motivation and their ability to carry out a rehabilitation plan.

Finally, among the main limitations found in this study was the heterogeneity of the sample since participants with dysphonia and aphonia were included, patients had different oncological diagnoses and were at different points in the disease trajectory. We suggest that future research includes longer follow ups for treatment adherence, and voice assessments to help distinguish whether progress in voice quality is due to rehabilitation therapy.

6. Conclusion

There is an association between QoL with anxiety and depression symptoms, and QoL levels were higher among men. Lower TA to voice rehabilitation was associated with depression, not having a formal education, having more than two years since the oncological diagnosis, and having co-morbidities. These results emphasize the importance of multidisciplinary care for Latino patients with H&N cancer receiving voice rehabilitation therapy, since they may encounter various barriers during their treatment that could hinder the improvement in the quality of their voice and life.

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