

RESEARCH ARTICLE OPEN ACCESS

Postoperative Evolution of Health-Related Quality of Life in Patients With Head and Neck Cancer

Sara Orozco-Núñez¹ | Natsuki Oishi^{1,2}  | Julián Izquierdo¹ | Fernando Martínez-Expósito¹ | Ainhoa García-Lliverós¹ | Enrique Zapater^{1,2}

¹ENT Department, General University Hospital of Valencia, Valencia, Comunitat Valencia, Spain | ²Faculty of Medicine and Odontology, Valencia University, Spain

Correspondence: Natsuki Oishi (Miriam.n.oishi@uv.es)

Received: 2 November 2024 | **Revised:** 5 May 2025 | **Accepted:** 24 May 2025

Keywords: head and neck cancer | health-related quality of life | quality of life questionnaire

ABSTRACT

Background and Objectives: Although there is an abundant international literature evaluating quality of life in patients with head and neck cancer, most of these studies include heterogeneous populations from a therapeutic point of view, without discriminating precisely among therapeutic modalities: whether patients underwent surgery or were treated exclusively with nonsurgical modalities such as radiotherapy (RT) or chemotherapy (CT). Our study focuses on analyzing quality of life in patients undergoing primary surgery.

Methods: Prospective study. T2-T4 primary head and neck cancer patients treated in our department in the period from 2000 to 2023 completed the survey EORTC QLQ-C30 and EORTC QLQ-H&N35 on 4 occasions: 1, 3, 6 and 12 months after surgery. Patients were classified in groups according to age, tumor location, adjuvant radiotherapy, and the laryngectomy group underwent a separate analysis.

Results: Seventy-seven subjects were included in the present study. The mean age was 59 years, 91% (70 patients) were male. Patients older than 66 years showed better perception, and patients with pharyngeal tumors obtained worse scores than patients with laryngeal tumor.

Conclusions: One year after treatment, most patients rate their HRQOL as “good.” Acceptance of the new quality of life after treatment improves with increasing age of the patient. Radiotherapy is associated with a significant worsening of HRQOL in the postoperative period, greater intensity towards the sixth month after surgery.

1 | Introduction

In head and neck cancer (HNC), both the disease and its treatments cause important problems, such as alterations in voice, speech, smell, taste, swallowing, chewing, etc. It is one of the neoplasms that has a greatest psychological impact and causes sequelae that are difficult to cope with.

Although there is an abundant international literature evaluating quality of life in patients with HNC, most of these studies include heterogeneous populations from a therapeutic point of

view, without discriminating precisely among therapeutic modalities: whether patients underwent surgery or were treated exclusively with nonsurgical modalities such as radiotherapy (RT) or chemotherapy (CT) [1–3].

Our study focuses on analyzing quality of life in patients undergoing primary surgery. The study was designed to assess the evolution of health-related quality of life (HRQOL) in surgically treated T2-T4 HNC patients. Secondly, subgroups were evaluated according to age, tumor location, type of laryngeal surgery and adjuvant RT. This methodological decision responds to

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2025 The Author(s). *Journal of Surgical Oncology* published by Wiley Periodicals LLC.

several reasons, first, to describe the specificity of surgical impact. Surgery in the head and neck region carries clinical particularities that can have a profound impact on physical, functional and psychosocial dimensions. Sequelae such as dysarthria, dysphagia, impaired speech, chewing, breathing, body image and communication differentially affect the patient's quality of life. Specific evaluation of this subpopulation allows obtaining more clinically interpretable and relevant results for the otolaryngologist for surgical planning and individualized postoperative support. Second, the results of this study show the differences in the pattern of quality of life according to age, tumor location, adjuvant treatment and total laryngectomy group.

Studies of oncologic subpopulations offer the benefit of obtaining specific data on tumor site-specific sequelae. A national multicenter cohort study of patients undergoing primary transoral robotic surgery (TORS) versus primary RT/CRT for T1-T2 oropharyngeal cancer found that primary TORS was associated with a clinically significant increased risk of dysphagia in the short term, and patients treated with primary RT/CRT had a higher risk of short- and long-term gastrostomy tube dependence and worse 5-year overall survival than those who underwent surgery [4].

Overall, this study does not seek to replace or contradict previous findings, but rather to complement them through a more focused and clinically meaningful approach, contributing to a more detailed and useful understanding of quality of life in surgical patients with HNC.

2 | Materials and Methods

This is a prospective single-center study that evaluated patients diagnosed with primary HNC and surgically treated in our department in the period from 2000 to 2023, whose main objective is to assess changes in HRQOL in an oncology population, using the validated EORTC QLQ-C30 questionnaires and its specific module H&N35. The study protocol was approved by the institutional review board. Patients who had received treatment with radiotherapy as primary treatment or chemoradiotherapy were excluded, as well as those patients with any mental problems who were unable to complete the questionnaires.

We have used the QLQ-C30 and QLQ-H&N35 quality questionnaires during a 1-year period following surgical treatment [5, 6] Tables 1 and 2. The patients completed the questionnaires four times during the first year after diagnosis; the first questionnaire was given to the patients 1 month after surgery, the second 3 months after treatment, then 6 months and 1 year after treatment. The patients completed the questionnaires alone, after the scheduled follow-up visits. Demographic and clinical data were obtained from the medical records.

The QLQ-C30 version 3.0 and QLQ-H&N35 quality of life questionnaires of the European Organization for Research and Treatment of Cancer (EORTC) were used (Tables 1 and 2). The EORTC QLQ-C30 is a tumor-specific, a 1-week time frame, patient-based instrument, designed for self-administration. The

questionnaire comprises 30 questions divided into five functioning scales: physical, role, emotional, cognitive, and social functioning. There are 3 symptom scales and six single items representing cancer symptoms, such as fatigue, nausea and vomiting, pain, dyspnea, insomnia, loss of appetite, constipation, diarrhea. It also evaluates items relating to financial difficulties and a global health status.

The EORTC QLQ-H&N35 is a HNC module. It consists of 35 questions divided into seven scales and six single items and was developed for evaluating HRQOL for HNC patients [6].

The scores of the QLQ-C30 and QLQ-H&N35 items were converted to 0–100 scales using linear transformation according to EORTC guidelines. A high score for a functional scale and for the global health status/QL scale represents a high/healthy level of functioning indicating good QOL, whereas a high score for a symptom scale or single item represents a high level of symptoms corresponds to poorer QOL [6].

For the sample size calculation, the following was considered: A minimum clinically significant difference (MCID) of 10 points on the QLQ-C30/H&N35 scales, based on previous literature. An estimated standard deviation of 20 points, in agreement with similar studies in patients with HNC. A significance level (α) of 0.05 and a statistical power ($1-\beta$) of 0.80. Comparison of within-subject measures (before and after), using tests for paired samples. With these parameters, the required sample size is 32 patients. However, considering a possible loss rate of 20% during the 12-month follow-up, the final sample size was adjusted to: 40 participants. This number will allow detecting clinically relevant differences in quality-of-life scores over time, with an adequate level of statistical confidence.

As a secondary objective, a group analysis was carried out, the following variables were used to classify the patients: age of the patient (younger and older than 65), tumor location (pharynx, larynx, or other tumors (rhinosinusal tumours, metastatic neck nodes of unknown origin, or parotid tumours)), and treatment (total laryngectomy (TL) vs. partial laryngectomy (PL)), and postoperative radiotherapy.

SPSS version 24.0 (IBM Corp., Armonk, NY) was used throughout. Descriptive data from the EORTC QLQ-C30, EORTC QLQ-H&N35 questionnaires are expressed as the mean and standard deviation. Mann-Whitney U test and Fisher's non-parametric permutation test were used to compare the distribution of the questionnaire items and the mean difference of the scales with 95% CI between groups, respectively. All tests were two-sided and conducted on a 0.05 significance level. A mean difference of ≥ 10 scores was considered clinically significant [6].

3 | Results

In total, 77 subjects were included in the present study. The mean age was 59 years and 91% (70 patients) were male. The tumor stage of the patients were: Stage I: 4%, II: 18%, III 27%, IV 51%. The 78% of the patients had tumor stage III or IV (TNM

TABLE 1 | EORTC QLQ-C30. We are interested in some things about you and your health. Please answer all of the questions yourself by circling the number that best applies to you. There are no “right” or “wrong” answers. The information that you provide will remain strictly confidential’s.

	Not at all	A little	Quite a bit	Very much			
1. Do you have any trouble doing strenuous activities, like carrying a heavy shopping bag or a suitcase?	1	2	3	4			
2. Do you have any trouble taking a long walk?	1	2	3	4			
3. Do you have any trouble taking a short walk outside of the house?	1	2	3	4			
4. Do you need to stay in bed or a chair during the day?	1	2	3	4			
5. Do you need help with eating, dressing, washing yourself or using the toilet?	1	2	3	4			
During the past week:							
6. Were you limited in doing either your work or other daily activities?	1	2	3	4			
7. Were you limited in pursuing your hobbies or other leisure time activities?	1	2	3	4			
8. Were you short of breath?	1	2	3	4			
9. Have you had pain?	1	2	3	4			
10. Did you need to rest?	1	2	3	4			
11. Have you had trouble sleeping?	1	2	3	4			
12. Have you felt weak?	1	2	3	4			
13. Have you lacked appetite?	1	2	3	4			
14. Have you felt nauseated?	1	2	3	4			
15. Have you vomited?	1	2	3	4			
16. Have you been constipated?	1	2	3	4			
17. Have you had diarrhea?	1	2	3	4			
18. Were you tired?	1	2	3	4			
19. Did pain interfere with your daily activities?	1	2	3	4			
20. Have you had difficulty in concentrating on things, like reading a newspaper or watching television?	1	2	3	4			
21. Did you feel tense?	1	2	3	4			
22. Did you worry?	1	2	3	4			
23. Did you feel irritable?	1	2	3	4			
24. Did you feel depressed?	1	2	3	4			
25. Have you had difficulty remembering things?	1	2	3	4			
26. Has your physical condition or medical treatment interfered with your family life?	1	2	3	4			
27. Has your physical condition or medical treatment interfered with your social activities?	1	2	3	4			
28. Has your physical condition or medical treatment caused you financial difficulties?	1	2	3	4			
For the following questions please circle the number between 1 and 7 that best applies to you							
29. How would you rate your overall health during the past week?	1	2	3	4	5	6	7
30. How would you rate your overall quality of life during the past week?	1	2	3	4	5	6	7

classification 8th edition). Age groups: < 65 years old group was 68% (52 patients); > 66 years old, 32% (25 patients). The location of tumor was: Laryngeal tumors 42% (32 cases), pharyngeal tumors: 39% (30 cases), other locations: 19% (15 cases). The 73% (56 cases) of patients received adjuvant radiotherapy.

Survey completion rate: Patients who have completed all 4 surveys were 51 cases, 3 times: 5 cases, twice: 9 cases, once: 13 cases.

Of the total, 32 patients required surgical treatment involving total (19 cases) or partial (13 cases) laryngectomy.

TABLE 2 | EORTC QLQ H&N35. Patients sometimes report that they have the following symptoms or problems. Please indicate the extent to which you have experienced these symptoms or problems during the past week. Please answer by circling the number that best applies to you.

	Not at all	A little	Quite a bit	Very much
31. Have you had pain in your mouth?	1	2	3	4
32. Have you had pain in your jaw?	1	2	3	4
33. Have you had soreness in your mouth?	1	2	3	4
34. Have you had a painful throat?	1	2	3	4
35. Have you had problems swallowing liquids?	1	2	3	4
36. Have you had problems swallowing pureed food?	1	2	3	4
37. Have you had problems swallowing solid food?	1	2	3	4
38. Have you choked when swallowing?	1	2	3	4
39. Have you had problems with your teeth?	1	2	3	4
40. Have you had problems opening your mouth wide?	1	2	3	4
41. Have you had a dry mouth?	1	2	3	4
42. Have you had sticky saliva?	1	2	3	4
43. Have you had problems with your sense of smell?	1	2	3	4
44. Have you had problems with your sense of taste?	1	2	3	4
45. Have you coughed?	1	2	3	4
46. Have you been hoarse?	1	2	3	4
47. Have you felt ill?	1	2	3	4
48. Has your appearance bothered you?	1	2	3	4
49. Have you had trouble eating?	1	2	3	4
50. Have you had trouble eating in front of your family?	1	2	3	4
51. Have you had trouble eating in front of other people?	1	2	3	4
52. Have you had trouble enjoying your meals?	1	2	3	4
53. Have you had trouble talking to other people?	1	2	3	4
54. Have you had trouble talking on the telephone?	1	2	3	4
55. Have you had trouble having social contact with your family?	1	2	3	4
56. Have you had trouble having social contact with friends?	1	2	3	4
57. Have you had trouble going out in public?	1	2	3	4
58. Have you had trouble having physical contact with family or friends?	1	2	3	4
59. Have you felt less interest in sex?	1	2	3	4
60. Have you felt less sexual enjoyment?	1	2	3	4
61. Have you used pain-killers?	Yes		No	
62. Have you taken any nutritional supplements (excluding vitamins)?	Yes		No	
63. Have you used a feeding tube?	Yes		No	
64. Have you lost weight?	Yes		No	
65. Have you gained weight?	Yes		No	

The longitudinal results from the EORTC QLQ-C30 and QLQH&N35 are shown in Figure 1. Overall, a progressive improvement in scores was observed from the first to the fourth survey. The improvement was clinically significant ($A \geq 10$) for 10 variables: role functioning, social functioning, cough, speech difficulties, feeling unwell, feeding probe, senses, analgesic use, weight modification.

Worsening HRQOL was observed in the variables. Economic difficulties have been decreasing over time. Some variables that have shown a punctual worsening during the evolution: social difficulties in eating, sexuality, pain, senses, teeth, dry mouth, sticky saliva and use of nutritional supplements. Worsening was clinically significant ($A \geq 10$) for teeth, dry mouth, sticky saliva and dry mouth.

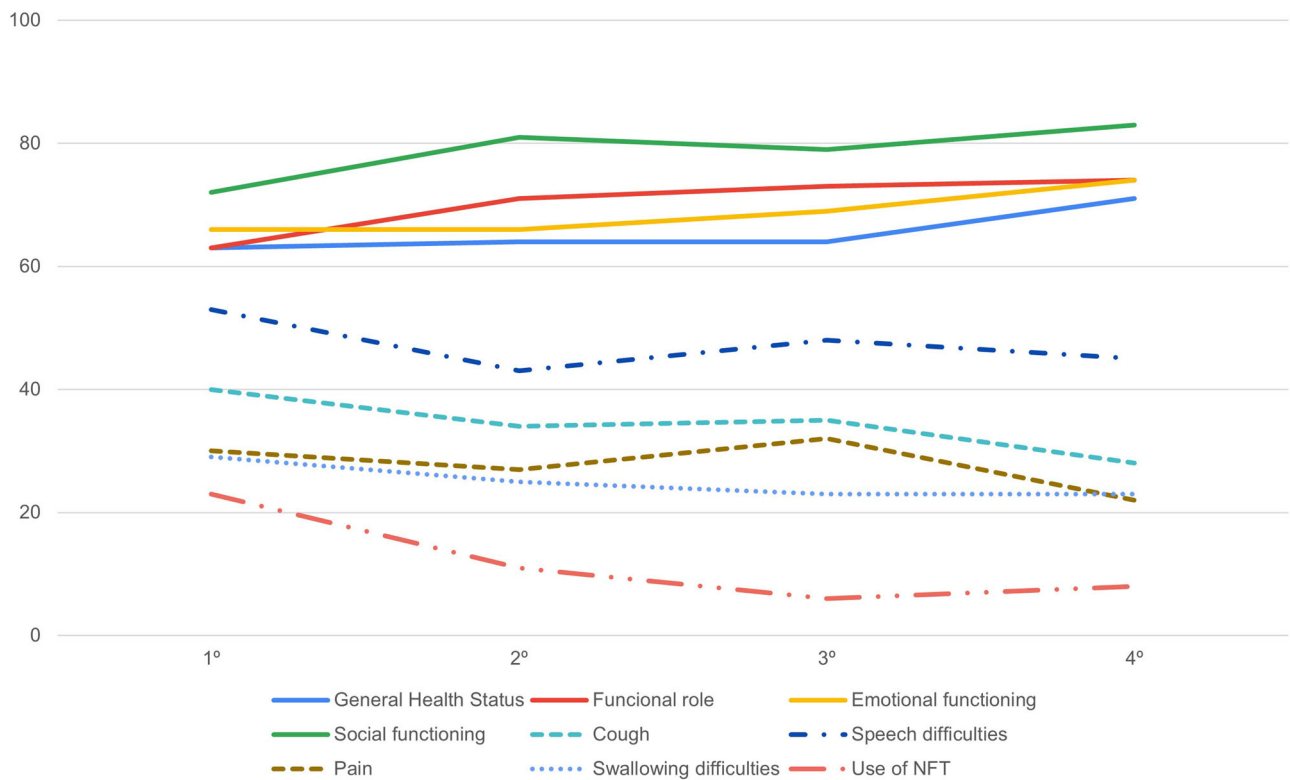


FIGURE 1 | The perception of HRQOL in the postoperative period. At 1 month, 3 months, 6 months, and 12 months. The continuous lines indicate functional parameters: Higher scores for functional scales represent better levels of functioning. Discontinuous lines are symptoms, higher scores for the symptom scale/item represent higher levels of symptoms/problems.

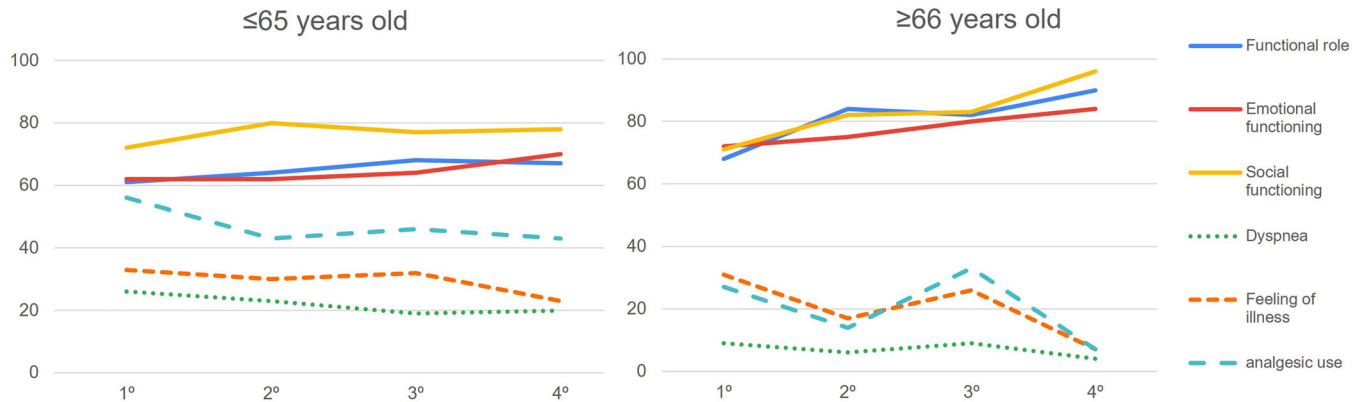


FIGURE 2 | HQOL in the postoperative period by age group. The continuous lines indicate functional parameters, the higher the score the better the HQOL. Discontinuous lines are symptoms, lower score, higher comfort. In general, patients older than 66 years obtained better HRQOL scores.

3.1 | Results in Patients Classified by Age

Patients older than 65 years obtained better HRQOL scores in all variables except sexuality, use of nutritional supplements and weight loss (Figure 2). The differences recorded were clinically significant ($A \geq 10$) for 19 variables: global quality of life, role functioning, emotional functioning, cognitive functioning, social functioning, dyspnea, coughing, financial difficulties, speech, difficulties for social eating, social con-tact, feeling ill, pain of any location, head and neck pain, use of painkillers, insomnia, senses, appetite loss, swallowing difficulties, teeth, open mouth and

dry mouth. In addition, the differences were at the same time statistically significant ($p < 0.05$) for 11 variables.

3.2 | Results in Patients Undergoing Partial and Total Laryngeal Surgery

When we focused on this group of 32 patients undergoing laryngeal surgery, it was observed that HRQOL was superior among patients undergoing total laryngeal surgery for all variables except cough, speech and senses (Figure 3).

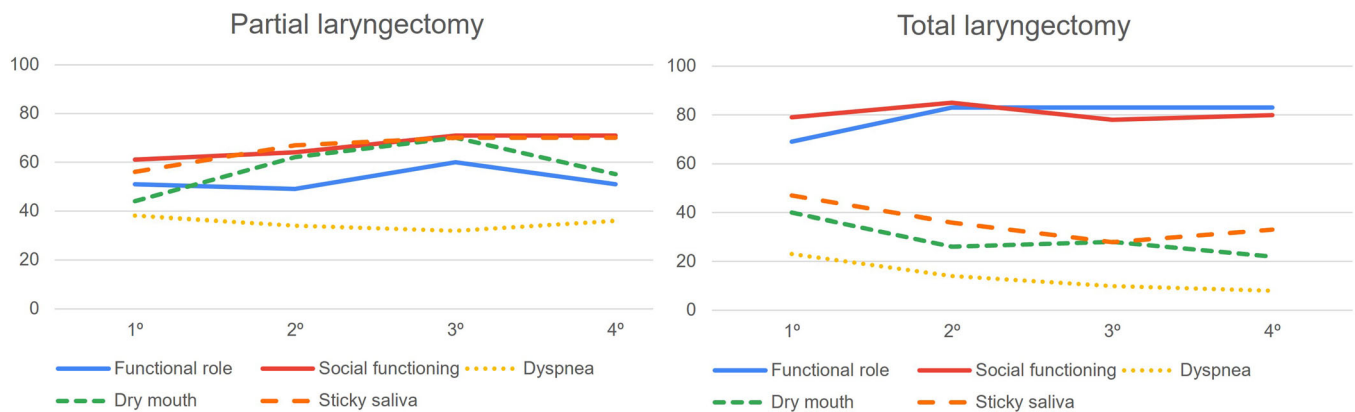


FIGURE 3 | HRQOL in the postoperative period by laryngeal surgery performed. The continuous lines indicate functional parameters, the higher the score the better the HRQOL. Discontinuous lines are symptoms, lower score, higher comfort. In general, total laryngectomy patients obtained better HRQOL scores.

HRQOL was significantly better ($p < 0.05$) in total laryngectomy group for the following variables: role functioning, social functioning, dyspnea, analgesic use, dry mouth and sticky saliva. This group also showed a significant improvement in HRQOL ($A > 10$) for 8 items: role functioning, dyspnea, financial difficulties, feeling of discomfort, use of analgesics, cough, senses, open mouth, dry mouth and weight loss. Such improvement was recorded at the end of the study, with the exception of social functioning, loss of appetite and constipation which have shown early high scores.

The presence of dyspnea was clinically significant ($A \geq 10$), and greater among patients undergoing partial laryngeal surgery versus those undergoing total laryngeal surgery, throughout the study. At the end of the study, the differences were statistically significant ($p < 0.05$). The cough scores were worse in patients performed partial laryngeal surgery in the first questionnaire. Thereafter, the situation was reversed, with greater difficulties in total laryngectomy group ($A \geq 10$ in 2nd, 4th survey).

Speech scores were generally low in both groups of patients. It yielded more negative scores in the total laryngeal surgery patients, at the earlier two surveys. In the first questionnaire, the difference was clinically ($A \geq 10$) and statistically ($p < 0.05$), and clinically significant in the second questionnaire ($A > 10$). Subsequently, erigmophonic voice performance helps to overcome communication barriers.

The variable senses also yielded more negative scores among the patients subjected to total laryngeal surgery. Clinically significant differences ($A \geq 10$) throughout the study was seen. In the case of the 2nd and 3rd questionnaire, the differences were moreover also statistically significant ($p < 0.05$).

The total laryngeal surgery group presented a better HRQOL than those who underwent partial laryngeal surgery. For its part, partial laryngectomy is more common in patients under 65 years of age, coinciding with the age group with the worst HRQOL scores.

The variable economic hardship showed a better clinically significant behavior in partial laryngeal group versus those undergoing total laryngeal surgery. We believe that the observed

difference is attributable to the younger age of patients amenable to functional laryngeal surgery.

3.3 | Results According to Tumor Location

Patients with pharyngeal tumors obtained worse scores than patients with laryngeal tumor, with the exception of cough, speech and senses (Figure 4).

The impairment of quality of life caused by cough was higher among patients with laryngeal lesions in the last three questionnaires, the differences being clinically significant ($A \geq 10$), also statistically significant ($p < 0.05$) for the 2nd and 3rd questionnaires.

In relation to speech, and senses variables, a similar phenomenon was observed, the perception of patients with laryngeal tumor were worse clinically significant ($A \geq 10$) throughout the study, and statistically significant ($p < 0.05$) in some surveys.

As for the rest of the parameters, the group of patients with pharyngeal tumors showed worse perception and the difference of both groups were clinically significant ($A \geq 10$) for 18 of the variables: global quality of life, role functioning, emotional functioning, physical functioning, physical exhaustion, social eating, sensation of discomfort, pain of any location, head and neck pain, use of analgesics, insomnia, loss of appetite, swallowing difficulties, teeth, open mouth, dry mouth, sticky saliva, and use of nutritional supplements. Also, the differences were statistically significant ($p < 0.05$) in 11 variables.

3.4 | Result in Patients According to Radiotherapeutic Treatment

The effects of radiotherapy began to be reflected from the 2nd questionnaire. Patients who did not receive radiotherapy presented better HRQOL scores than those who received such treatment (Figure 5). The differences were clinically significant ($A \geq 10$) for 13 variables mainly in the third and fourth survey: global quality of life, role functioning, social eating, sexuality, feeling of discomfort, generalized pain, head and neck pain, use

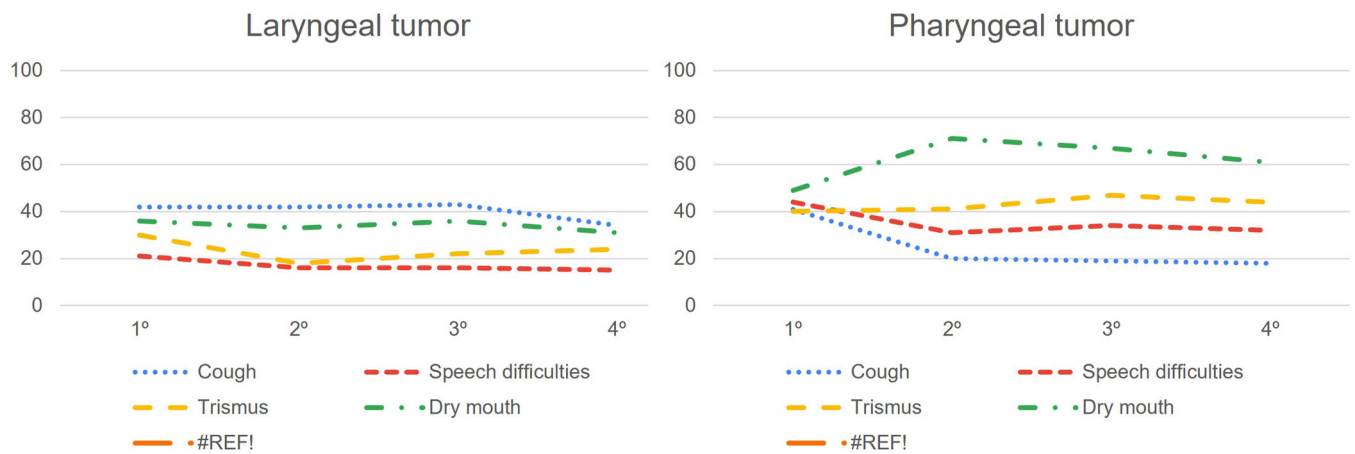


FIGURE 4 | HRQOL in the postoperative period by tumor location. The continuous lines indicate functional parameters, the higher the score the better the HRQOL. Discontinuous lines are symptoms, lower score, higher comfort. In general, laryngeal tumor patients obtained better HRQOL scores.

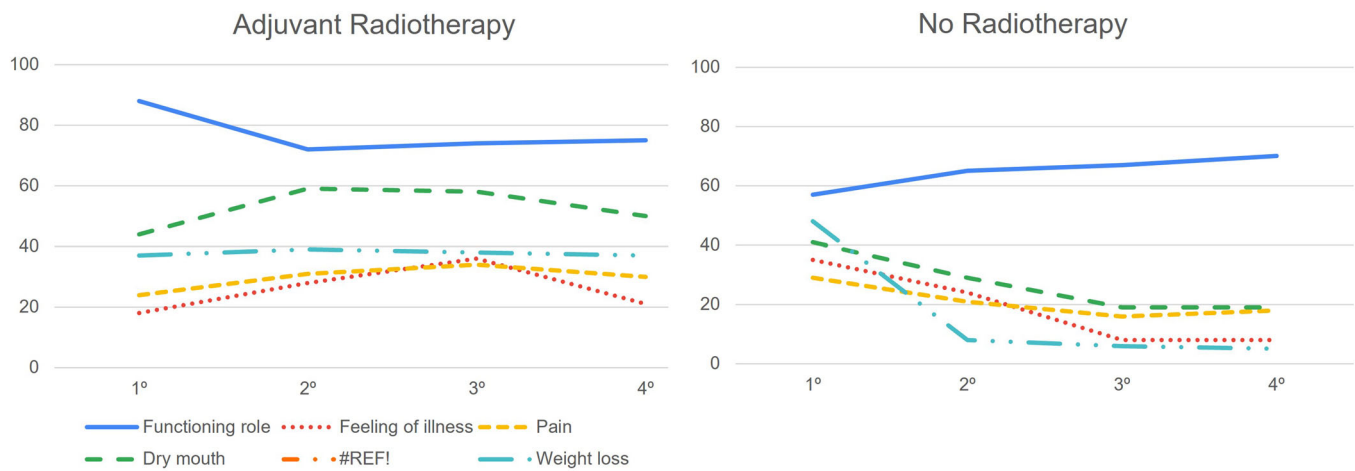


FIGURE 5 | HRQOL in the postoperative period by tumor location. The continuous lines indicate functional parameters, the higher the score the better the HQOL. Discontinuous lines are symptoms, lower score, higher comfort. In general, no radiotherapy group have obtained better HRQOL scores.

of analgesics, loss of appetite, swallowing difficulties, teeth, dry mouth, sticky saliva, constipation, use of nutritional supplements, and weight loss. In turn, differences were statistically significant ($p < 0.05$) for feeling sick, head and neck pain, teeth, dry mouth, sticky saliva and weight loss.

4 | Discussion

The largest HRQOL changes for HNC patients are observed within the first year after diagnosis with a significant deterioration immediately after completing treatment [1–3]. Our study includes patients treated surgically as the only modality with curative intent, in contrast to other studies that studied without distinguishing the therapeutic modality [6]. Our study reflects the evolution of perception in patients to whom ENT specialists offer surgical treatment. Because results may not be generalized to patients outside studies, data focused on surgical patients could give indications on the need for interventions in daily clinical practice, related to both surgical sequelae and postoperative rehabilitation.

The demographic data on sex and age of the population are similar to those reported in the literature. Tumor stages of our patients were somewhat more advanced than those reported in the literature [7–9]. Compliance in our series was 70% after 12 months of study duration, similar to the literature [6]. We have done in person to achieve a better percentage of compliance. In our study, the dropout rate during adjuvant treatment was higher, probably due to the toxicity of adjuvant treatment. The possibility of attrition attributable to death is lower because it does not include palliative patients, unlike other studies [6].

It was observed that most of the study all variables had improved by the end of the survey [6–10], the progressive improvement in the perception of quality of life is a common finding with other studies, including those that studied patients treated with chemoradiotherapy, with worse scores at baseline in this group. Physical and mental recovery continues beyond 1 year after treatment, at 3 years HRQOL slowly returned to pretreatment values with few exceptions [5]. However, a Nordic study of 375 patients reported that no clinically significant

improvements in HRQOL were observed between 1 and 5 years. Dental problems, mouth opening, dry mouth, and sticky saliva persisted or worsened. Recovery of the persisting side effects of treatment cannot be expected for the group as a whole, and the patients must be prepared for this [10].

In our study, the variable economic hardship showed progressive worsening throughout the year, while they report less deterioration in this variable, probably due to the comparatively higher social coverage found in those countries. It is known in the literature that two factors, marital status and low annual household income, had a significant impact on HRQOL. Welfare systems should offer more support to HNC patients with a lower annual household income to increase HRQOL [6].

Those under 65 years of age only had better results in sexual alterations and weight loss. In the rest of the parameters, patients older than 66 years showed better perception. This could be explained by the expected social role, over 65 is an age group that is generally retired, the requested social-economic role in the family and in society is lower, and also age itself provides greater resilience to illness. Other factors could be they more frequently present a less advanced tumor stage, and differences in the location of the primary tumor may also play a role. Bjordal et al. also reported differences between age groups in a large HNC population, they reported that younger patients (< 65 y) reported better HRQL at baseline than older patients except for emotional and social functioning and the use of feeding tube. And later, at 12 months, older patients had better role function and emotional functioning [6]. This difference in HRQOL pattern, confirms the interest of our subpopulation-based study.

In general, patients who underwent total laryngectomy report better HRQOL than patients who underwent partial laryngectomy. In ENT section, it is known that total laryngectomized patients have a good quality of life despite the permanent tracheostoma, the anatomical change caused by this radical surgery. Our study shows better results with the greatest differences in total laryngeal surgery in almost all parameters, only in a few is the opposite the case. The variable economical hardship showed a better clinically significant behavior in partial laryngectomy group, we believe that the observed difference is attributable to the younger age of patients in this group. The duration of this study was 12 months, several patients with partial laryngectomy could still be cannula carriers and undergoing swallowing rehabilitation. There are reports that TL patients experience the greatest impairments in QoL, speech and social reintegration despite rehabilitation and that LP offers the best balance between function and survival [11]. They include T1 cases so partial surgeries included patients with small tumors subsidiary to less invasive treatments. In our study, patients from T2 onwards were included to homogenize the study population.

Patients with pharyngeal tumors show worse results with respect to other locations. The worsening becomes important after the 3rd test. This result was also reported by several authors [6, 12], laryngeal carcinoma patients had a higher HRQOL than patients with pharyngeal carcinoma. Pharyngeal tumors are generally diagnosed later and require adjuvant radiotherapy, a factor that undoubtedly influences quality of life.

In our work, surgical treatment is the first line of treatment, being radiotherapy used with adjuvant intention in 73% of the cases. Patients who received radiotherapy treatment presented greater affectation in difficulties in eating in public, feeling of illness, generalized pain, analgesics use, swallowing difficulties, alterations in dentition, xerostomia, alteration of saliva consistency, and weight loss.

The morbidity associated with postoperative head and neck radiotherapy includes dysphagia, ageusia, dry mouth, osteoradionecrosis, and facial swelling, which justifies the poorer perception of quality of life in this group of patients. The teeth variable showed worsening, especially after the delivery of the third questionnaire in this group. Postoperative and post-radiotherapy fibrosis explain this observation, there is a higher incidence of dental caries after radiotherapy [13]. Post-radiotherapy fibrosis also perpetuates the sensation of lack of improvement once the treatment has ended.

Is known that marital status and low annual family income, had significant impacts on global HRQOL, patients without a spouse had lower utility than those with a spouse, and patients with low annual household income also had lower QOL and overall utility scores [14]. Social welfare systems may need to offer more support to HNC patients with a lower family income to increase the HRQOL.

There is a growing interest in the comprehensive approach to the patient, the application of the questionnaire on several occasions over time allows us to assess the evolution of the patient. Therefore, a European team developed and validated the HNC-FIT scale, a rapid, physician-rated tool for assessing functional outcomes in patients with HNC, with good validity, reliability, and responsiveness. The mean completion time for the HNC-FIT scale was 1 min 17 s [15]. The detailed study of the HRQOL of each patient after treatment for HNC should be part of the therapeutic protocol.

Regarding the loss of questionnaires during follow-up, this level of loss is to be expected in prospective studies of patients with HNC, due to the high morbidity, treatment-related complications and the possibility of clinical deterioration or death during the observation period. Although no formal comparative analysis was performed between participants with complete and incomplete data, this loss did not preclude the intended analyses or compromise the overall interpretation of the results, but should be taken into account when considering the study findings.

A limitation of this study is that we did not have information about comorbidity. Older patients frequently suffer from a number of other medical conditions and possibly polypharmacy. A potential limitation of the analysis is that no formal adjustments for multiple testing were applied, which could increase the risk of significant findings due to chance. However, the comparisons made were clinically justified and guided by a priori hypotheses, so the results should be interpreted with caution, considering both their statistical significance and clinical relevance. In future analyses, we consider applying corrections to strengthen the robustness of the findings.

5 | Conclusions

One year after treatment, most patients rate their HRQOL as “good.” Alterations in HRQOL are determined by alterations in speech and sensory defects (taste and smell). Acceptance of the new quality of life after surgical treatment improves with increasing age of the patient. Radiotherapy is associated with a significant worsening of HRQOL in the postoperative period. The global sequelae of this treatment appear with greater intensity towards the sixth month after surgery.

Data Availability Statement

Data sharing not applicable to this article as no datasets were generated or analysed during the current study. The article describes entirely theoretical research.

References

1. E. Hammerlid, K. Bjordal, M. Ahlner-Elmqvist, et al., “Prospective Longitudinal Quality-of-Life Study of Patients With Head and Neck Cancer: A Feasibility Study Including the EORTC QLQ-C30,” *Otolaryngology-Head and Neck Surgery* 116 (1997): 666–673.
2. E. Hammerlid, K. Bjordal, M. Ahlner-Elmqvist, et al., “A Prospective Study of Quality of Life in Head and Neck Cancer Patients. Part I: At Diagnosis,” *Laryngoscope* 111 (2001): 669–680.
3. K. Bjordal, M. Ahlner-Elmqvist, E. Hammerlid, et al., “A Prospective Study of Quality of Life in Head and Neck Cancer Patients. Part II: Longitudinal Data,” *Laryngoscope* 111 (2001): 1440–1452.
4. D. R. Amin, R. Philips, D. G. Bertoni, et al., “Differences in Functional and Survival Outcomes Between Patients Receiving Primary Surgery Vs Chemoradiation Therapy for Treatment of T1-T2 Oropharyngeal Squamous Cell Carcinoma,” *JAMA Otolaryngology-Head & Neck Surgery* 149, no. 11 (November 2023): 980–986, <https://doi.org/10.1001/jamaoto.2023.1944>.
5. E. Hammerlid, E. Silander, L. Hörnemark, and M. Sullivan, “Health-Related Quality of Life Three Years After Diagnosis of Head and Neck Cancer—A Longitudinal Study,” *Head & Neck* 23 (2001): 113–125.
6. K. Bjordal, A. De Graeff, P. M. Fayers, et al., “A 12 Country Field Study of the EORTC QLQ-C30 (Version 3.0) and the Head and Neck Cancer Specific Module (EORTC QLQ-H&N35) in Head and Neck Patients: EORTC Quality of Life Group,” *European Journal of Cancer (Oxford, England: 1990)* 36 (2000): 1796–1807.
7. C. Finizia, B. Bergman, and J. Lindström, “A Cross-Sectional Validation Study of Self-Evaluation of Communication Experiences After Laryngeal Cancer,” *Acta Oncologica* 38 (1999): 573–580.
8. M. P. Redondo-Martinez, F. Salcedo-Aguilar, M. A. Garcia-Jimenez, M. Monterde-Aznar, F. M. Rodriguez-Almonacid, and A. I. Marcos-Navarro, “Prevalencia Del Insomnio Y Consumo De Psicofarmacos En Ancianos De Una Zona Basica De Salud De Cuenca,” *Atencion Primaria* 25 (2000): 400–404. Mencionado en: Cilveti R. Mujer de 69 insomnio primario (caso clinico). *Somnus Volumen* 111 número 2, 2002. Publicaciones Permanyer.
9. M. Quer, X. León, C. Orús, K. Recher, and J. R. Gras, “[Analysis of 2,500 Squamous Cell Carcinoma of the Head and Neck],” *Acta Otorrinolaringologica Espanola* 52 (2001): 201–205.
10. H. Abendstein, M. Nordgren, M. Boysen, et al., “Quality of Life and Head and Neck Cancer: A 5 Year Prospective Study,” *Laryngoscope* 115, no. 12 (December 2005): 2183–2192, <https://doi.org/10.1097/01.MLG.0000181507.69620.14>.
11. M. O. Murariu, E. R. Boia, A. M. Sitaru, et al., “Long-Term Quality of Life and Functional Outcomes in Patients With Total Laryngectomy,”

Cancers 17, no. 6 (March 2025): 1011, <https://doi.org/10.3390/cancers17061011>.

12. V. Loimu, A. A. Mäkitie, L. J. Bäck, et al., “Health-Related Quality of Life of Head and Neck Cancer Patients With Successful Oncological Treatment,” *European Archives of Oto-Rhino-Laryngology* 272, no. 9 (2015): 2415–2423.
13. C. Moore, C. McLister, C. Cardwell, C. O'Neill, M. Donnelly, and G. McKenna, “Dental Caries Following Radiotherapy for Head and Neck Cancer: A Systematic Review,” *Oral Oncology* 100 (2020): 104484, <https://doi.org/10.1016/j.oraloncology.2019.104484>.
14. L. J. Liao, W. L. Hsu, W. C. Lo, P. W. Cheng, P. W. Shueng, and C. H. Hsieh, “Health-Related Quality of Life and Utility in Head and Neck Cancer Survivors,” *BMC Cancer* 19, no. 1 (2019): 425.
15. D. Dejaco, D. Riedl, S. Gasser, et al., “A Tool for Rapid Assessment of Functional Outcomes in Patients With Head and Neck Cancer,” *Cancers* 13, no. 21 (November 2021): 5529, <https://doi.org/10.3390/cancers13215529>.