

# Assessment of quality of life in patients with locally advanced head and neck cancer who received concurrent chemoradiotherapy

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## Abstract

**Introduction.** Head and neck cancer is defined as any malignancy arising in the skin, nasal cavity, paranasal sinuses, oral cavity, salivary glands, pharynx, and larynx. Quality of life (QoL) is known as the patient's perception of his/her general well-being. It is a multidimensional concept that includes psychological, social occupational, functional, and physical well-being. The term health-related QoL (HR-QoL) is preferred over QoL as it only focuses on the health status and disease-related issues, such as symptoms and functions.

**Material and methods.** This was a prospective study aiming to assess and measure the healthrelated quality of life (HR-QoL) in patients with locally advanced head and neck cancer (HNC) using a specific questionnaire for this group of cancer patients. EORTC QLQ-H & N35 module was developed specifically for HNC patients and contains 35 questions divided into 7 subscales about pain, swallowing, senses, speech, social eating, social contact, and sexuality. There are 10 single items relating to problems with teeth, dry mouth, cough, opening the mouth, sticky saliva, weight loss, weight gain, use of nutritional supplementation, feeding tubes, and painkillers.

Higher scores in this module represent a higher level of problems.

**Results.** Study results show an overall decrease in HR-QoL at the completion of concurrent chemoradiotherapy with significant improvement at 3-month follow-up regarding pain, use of painkillers, difficulty in swallowing, teeth problems, cough, sexual interest, and social eating, but there was still a worsening regarding dry mouth, social contact, speech difficulties, and taste problems. There was no change in use of nutritional supplementation, and hence no significant weight changes.

**Conclusions.** Locally advanced head and neck cancer patients who were receiving concurrent chemoradiotherapy have shown degrees of impairment in HR-QoL as measured by the extensively used worldwide questionnaire of EORTC QLQ-H & N35 module.

**Keywords:** quality of life, head and neck cancer, chemoradiotherapy

## Introduction

Locally advanced head and neck cancers are defined generally as stage IVB tumors, according to the American Joint Committee on Cancer (AJCC) TNM Classi-

fication of Malignant Tumors (TNM) staging system. "Unresectable" tumors are typically those that cannot be removed without causing unacceptable morbidity, such as tumors with dense involvement of the cervical vertebrae, brachial plexus, deep muscles of the neck, or the base of the skull [1].

In patients with locally advanced head and neck cancer (LAHNC), both disease and treatment have a great impact on quality of life (QoL). Standard

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treatment for these patients is concomitant chemoradiotherapy, which induces severe acute and late toxicities. Common acute toxicities of chemoradiotherapy include mucositis, dermatitis, dysphagia, ototoxicity, and neuropathy [1]. Late toxicity may consist of dysphagia sometimes with aspiration, odynophagia, xerostomia, fibrosis, and occasionally osteoradionecrosis. These toxicities negatively influence the QoL [1].

## Material and methods

This was a prospective study assessing the quality of life in LAHNC patients who received concurrent chemoradiotherapy and give an idea about the need to improve treatment modalities with higher quality and efficacy with lesser toxicity especially for long-term survivorship.

The study was started over LAHNC 60 patients who were invited to conduct questionnaire after consenting to answer questions and documenting their answers. Questions were clear in suitable verbal understood Arabic language. The study started immediately after they finished treatment and after 3 months. The study was conducted from February 2021 to August 2021. We obtained verbal patient consent. Quality of life of patients was evaluated using the EORTC Questionnaire for head and neck cancer 35 (it includes mainly oral symptoms, psychosocial troubles, sense of pain, and nutritional status).

### Inclusion criteria

1. Age is more than 18 and less than 70.
2. Head and neck squamous cell carcinoma diagnosed by histopathology with baseline clinical and radiological assessment.
3. Patients after 3 and 6 months of neoadjuvant concurrent chemoradiotherapy only, 3D conformal radiotherapy conventional fractionation before surgical intervention (whether it was planned or not).
4. Eastern Cooperative Oncology Group (ECOG) performance status 0–2.
5. No evidence of metastasis at the time of diagnosis.
6. Adequate blood cell counts, liver, and renal function tests at presentation and during treatment.

### Statistical analysis

Documented data of questionnaire results in excel sheet were analyzed using SPSS, version 20.0 (Inc., Chicago, Illinois, US). Quantitative data were expressed as mean  $\pm$  standard deviation (SD). Qualitative data were expressed as frequency and percentage.

## Results

After analysis of patient characteristics, the age range was 20–70 years with mean age  $\pm$  SD = 54.21  $\pm$  9.48,

**Table 1.** Data on patient and disease characteristics

Age [years]	n = 60	[%]
20–30	1	1.7
30–40	3	5.0
40–50	12	20.0
50–60	27	45.0
60–70	17	28.3
Sex	n = 60	[%]
Female	15	25.0
Male	45	75.0
Site	n = 60	[%]
Laryngeal cancer	42	70.0
Nasopharyngeal cancer	9	15.0
Tongue cancer	3	5.0
Buccal	3	5.0
Hypopharyngeal	1	1.7
Oropharyngeal	2	3.3

with most patients aged from 50 to 60 years, representing 45% of the studied population. Male sex was predominant (75%), and the most common head and neck primary site was laryngeal carcinoma (70%) (Tab. 1).

The assessment of pain degree showed a statistically highly significant value difference between pain degrees 1 and 4 in the period immediately after treatment and after 3 months ( $p < 0.001$ ) with a statistically significant p-value (0.002) regarding pain degree 3. Moreover, there was a highly significant difference ( $p < 0.001$ ) between the period immediately after treatment and 3 months later regarding the use of painkillers (Tab. 2).

Regarding dental symptoms and difficulty in opening the mouth, there were statistically significant differences between the period immediately after treatment and after 3 months. They were statistically significant for all degrees of dental problems except the 4<sup>th</sup>, but they were significant only for 3<sup>rd</sup> degree difficulty in opening the mouth. There was no significant difference in any degree for both dry mouth symptoms and smell changes between the period immediately after treatment and after 3 months (Tab. 3).

There was a highly significant difference between swallowing difficulties in the period immediately after treatment and after 3 months for both the 2<sup>nd</sup> and 3<sup>rd</sup> degrees and a significant value for the 1<sup>st</sup> and 4<sup>th</sup> degrees. Regarding cough, there was no significant difference, except for the 1<sup>st</sup> degree, between the period immediately after treatment and after 3 months. There was no significant difference in both taste sensation changes and speech difficulties immediately after treatment and 3 months later (Tab. 4).

**Table 2.** Comparison between the period immediately after treatment and after 3 months according to pain degree and painkiller use

Pain degrees	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	10	16.7	33	55.0	17.506	< 0.001**
2	14	23.3	22	36.7	1.967	0.161
3	20	33.3	5	8.3	9.915	0.002*
4	16	26.7	0	0.0	16.252	< 0.001**
Use of painkillers	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	14	23.3	42	70.0	24.446	< 0.001**
2	46	76.7	18	30.0		

\*p-value > 0.05; \*\*p-value < 0.001

**Table 3.** Comparison between the period immediately after treatment and after 3 months with regard to teeth problems, difficulty in opening the mouth, oral dryness, and smell sensation

Teeth problem	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	22	36.7	12	20.0	4.338	0.046*
2	19	31.7	10	16.7	3.970	0.048*
3	9	15.0	23	38.3	7.182	0.007*
4	10	16.7	15	25.0	0.800	0.371
Opening mouth with difficulty	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	24	40.0	18	30.0	0.916	0.339
2	14	23.3	16	26.7	0.048	0.827
3	8	13.3	17	28.3	4.238	0.042*
4	14	23.3	9	15.0	0.853	0.356
Dry mouth	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	7	11.7	4	6.7	0.399	0.528
2	13	21.7	17	28.3	0.389	0.533
3	29	48.3	22	36.7	1.211	0.271
4	11	18.3	17	28.3	1.166	0.280
Smell changes	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	37	61.7	34	56.7	0.138	0.711
2	11	18.3	18	30.0	1.649	0.199
3	2	3.3	8	13.3	2.737	0.098
4	10	16.7	0	0.0	8.860	0.003**

\*p-value > 0.05; \*\*p-value < 0.001

As shown in Table 5, there was a statistically significant difference for the 2<sup>nd</sup> and 4<sup>th</sup> degree social eating abilities (in front of family members and other people) between the period immediately after treatment and after 3 months, with no difference in social contact. Regarding sexual interest, there was a sta-

tistically significant difference for both the 1<sup>st</sup> and 4<sup>th</sup> degrees (p-value = 0.007 and 0.028, respectively). All studied patients felt ill, with a highly statistically significant difference in p-values between the period immediately after treatment and 3 months later for most degrees.

**Table 4.** Comparison between the period immediately after treatment and after 3 months with regard to swallowing difficulties, changes in taste, speech difficulties, and cough

Swallowing with difficulty	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	2	3.3	15	25.0	9.911	0.002*
2	8	13.3	29	48.3	15.639	< 0.001**
3	28	46.7	10	16.7	11.123	< 0.001**
4	22	36.7	6	10.0	10.504	0.002*
Changes in taste	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	6	10.0	3	5.0	0.480	0.488
2	9	15.0	12	20.0	0.231	0.631
3	20	33.3	30	50.0	2.790	0.095
4	25	41.7	15	25.0	3.050	0.081
Speech difficulty	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	6	10.0	3	5.0	0.480	0.488
2	13	21.7	8	13.3	0.942	0.332
3	21	35.0	27	45.0	0.868	0.352
4	20	33.3	22	36.7	0.040	0.842
Cough	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	24	40.0	38	63.3	5.622	0.018*
2	19	31.7	13	21.7	1.064	0.302
3	13	21.7	7	11.7	1.498	0.221
4	4	6.7	2	3.3	0.190	0.663

\*p-value > 0.05; \*\*p-value < 0.001

**Table 5.** Comparison between the period immediately after treatment and after 3 months regarding social contact, social eating, sexual interest, and feeling ill

Social contact	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	9	15.0	7	11.7	0.069	0.793
2	19	31.7	23	38.3	0.321	0.571
3	18	30.0	18	30.0	0.040	0.842
4	14	23.3	12	20.0	0.047	0.828
Social eating	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	6	10.0	3	5.0	0.480	0.488
2	10	16.7	22	36.7	5.152	0.023*
3	21	35.0	24	40.0	0.142	0.706
4	23	38.3	11	18.3	4.969	0.026*
Sexual interest	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	6	10.0	19	31.7	7.296	0.007*
2	12	20.0	15	25.0	0.191	0.662
3	23	38.3	18	30.0	0.587	0.444
4	19	31.7	8	13.3	4.817	0.028*
Feeling ill	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	2	3.3	29	48.3	29.421	< 0.001**
2	4	6.7	18	30.0	9.371	0.002*
3	32	53.3	11	18.3	14.503	< 0.001**
4	22	36.7	2	3.3	18.881	< 0.001**

\*p-value > 0.05; \*\*p-value < 0.001

**Table 6.** Comparison between the period immediately after treatment and after 3 months regarding weight changes

Weight changes	Immediately after treatment (n = 60)		3 months after treatment (n = 60)		Chi-square test	
	No.	[%]	No.	[%]	×2	p-value
1	43	71.7	46	76.7	0.174	0.677
2	17	28.3	14	23.3		
Loss	14/17	82.4	9/14	64.3	0.539	0.463
Gain	3/17	17.6	5/14	35.7		

As for nutritional supplementation, 15 patients needed supplementation. There was no significant difference between the period immediately after treatment and after 3 months for all studied patients.

Regarding tube feeding, only 5 patients used it, and there was no significant difference between the period immediately after treatment and after 3 months for all patients regardless of whether they used the feeding tube or not.

Table 6 shows no statistically significant difference between the period immediately after treatment and after 3 months regarding weight changes. Most (82.4%) patients experienced weight loss immediately after treatment and 64.3% three months later. Only 17.6% of patients experienced weight gain immediately after treatment and 35.7% three months later.

### Discussion

Head and neck cancer, an umbrella term for malignancies of the larynx and hypopharynx, nasal cavity, paranasal sinuses, nasopharynx, oropharynx, oral cavity, and salivary gland, affects about half a million people annually and ranks as the sixth most common cancer globally [2]. In developing countries, like Egypt, head and neck squamous cell carcinoma (HNSCC) is more frequent in males than in females. This is attributed to the local custom of excessive use of cigarettes and tobacco [2].

Due to advancements in diagnostic and treatment modalities, the survivorship of HNC patients has increased significantly during the last decade. However, these remarkable but aggressive treatment methods also bring along numerous side effects that significantly affect patient QoL. Chemoradiation is the organ-conserving standard of care for locally advanced HNSCC; concurrent treatment using a platinum-based agent is reported to be the dominant treatment approach. Chemotherapy toxicity also could significantly contribute to patients' HRQoL [2].

Our prospective study used a questionnaire specific to LAHNC patients. The EORTC QLQ-H & N35 module was developed for patients with HNC and contains 35 questions divided into 7 subscales. The results of our study show an overall decrease in HR-QoL

at the completion of concurrent chemoradiotherapy, with significant improvement in pain, use of painkillers, swallowing, teeth problems, cough, sexual interest, and social eating at 3 months. However, there was still worsening/deterioration in dry mouth symptoms, social contact, speech difficulties, and taste problems. There was no change in use of nutritional supplementation, and hence no significant weight changes.

Regarding patients' age and sex, most of our patients were between 50 to 60 years old (27 patients, 45% of all studied patients), with range between 20–70 years old and mean age of 54.2 years. Men predominated (45 patients, 75% of the study population). In the 2018 study by Driessen and colleagues [3] in 62 patients at a mean age of 32 to 65 years old, male patients were also in the majority (50 patients, 80.6% of the study cohort).

In our study, the most common primary site of HNC was the larynx (70%). Contrary to our study, in the study by Driessen et al. [3], most of patients (59.7%) had oropharyngeal cancer. This may be explained by the popularity of pipe smoking in Europe and America compared to cigarette smoking in our population.

Regarding pain experience, our study revealed that most patients had moderate pain, 33.3% in the period immediately after treatment while 3 months later most patients (55.0%) had no pain. The majority (76.7%) of patients used painkillers immediately after treatment and 30% three months later. Some of symptoms remained a significant problem at 3 months after completing chemoradiotherapy compared to baseline, namely fatigue and pain while in the study by Dreissen and colleagues [3], most of HR-QoL decreased during chemoradiotherapy. Four months after the end of treatment, HR-QoL improved, and it was restored to baseline. Pain was experienced by 18 patients of a total of 27 patients.

Regarding swallowing difficulty, there was a statistically significant difference between the period immediately after treatment and after 3 months, with 46.7% of patients having a moderate degree of swallowing difficulty after treatment and 48.3% having a mild degree of swallowing difficulty 3 months later.

Regarding speech difficulty, in our study, there was no statistically significant difference between the period immediately after treatment and after 3 months, with most patients having no improvement in speech, which is consistent with the results of the 2014 study by Vainshte et al. [4] in which almost 20% of patients reported further voice worsening at 18- and 24-month follow-up. Speech problems were also found in other studies that evaluated treatment outcomes. Conversely, the 2026 study by Janssens et al. [5] demonstrated that most patients reported no or few problems with swallowing (79%) or speech (64%).

Concerning the effect of treatment on mouth dryness and saliva consistency, our study found a statistically significant difference between the severity of dry mouth and sticky saliva symptoms in the period immediately after treatment and after 3 months. Most patients (46.7%) had never experienced sticky saliva during treatment, but 3 months later, they had moderate (35.0%) or severe (35.0%) salivation. In line with our study, the 2016 study by Janssens and colleagues [5] showed that moderate to severe clinical impact of the treatment was observed for nearly all items of QLQ-H&N35 module. At 6 months, the scores returned to baseline level except for the perception of dry mouth and sticky saliva. Also, in the 2019 study by Pearlstein et al. [6] dry mouth, sticky saliva, and the sense of taste did not return to baseline levels. Contrary to our study, Dreissen et al. [3] found that four months after the end of treatment, most of symptoms of HR-QoL increased, and it was restored to baseline for two items: dry mouth (15.3 versus 31.1,  $p < 0.001$ ) and sticky saliva (19.5 versus 32.4,  $p < 0.001$ ).

As regards sexual interest, as shown in our results, there was a statistically significant difference between the period immediately after treatment and after 3 months. Most patients (38.3%) had a moderate decrease in sexual interest, with improvement after 3 months. For 31.7% of patients, treatment had no effect on sexual interest. Our study results are so close to results of Dreissen and his colleague's study in 2018 [3], both results symptom scores sexuality was (14.2 versus 32.2,  $p < 0.001$ ) as shows an improvement after 4 months of treatment

## Conclusions

Patients who were receiving concurrent chemoradiotherapy have shown degrees of impairment in HR-QoL as measured by the extensively used worldwide questionnaire EORTC H, N35. EORTC H, N35 scores in our study varied from very low to average values, with the physical and functional well-being domains tending to be more affected.

These findings show that treatment affected HR-QoL in Egyptian patients in several domains. More studies are needed to decrease the toxicity of prophylactic or therapeutic agents and make radiation technologies more precise.

## Article Information and Declarations

### Data availability statement

Available on demand.

### Ethics statement

Ain Shams University, Faculty of Medicine Ethical Committee Members of Clinical Oncology approval is available upon request.

### Author contributions

H.A.A.: supervision and final revision; A.F.: statistics and results revision; D.S.: writing the article manuscript; M.Z.: contact patients and take questionnaire documentation.

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### Conflict of interest

The authors declare no conflict of interest.

### Supplementary material

None.

## References

1. Mehanna H, Paleri V, West CML, et al. Head and neck cancer—Part 1: Epidemiology, presentation, and prevention. *BMJ*. 2010; 341: c4684, doi: 10.1136/bmj.c4684, indexed in Pubmed: 20855405.
2. Siegel RL, Miller KD, Jemal A. Cancer Statistics, 2017. *CA Cancer J Clin*. 2017; 67(1): 7–30, doi: 10.3322/caac.21387, indexed in Pubmed: 28055103.
3. Dreissen CML, de Boer JP, Gelderblom H, et al. Induction chemotherapy with docetaxel/cisplatin/5-fluorouracil followed by randomization to two cisplatin-based concomitant chemoradiotherapy schedules in patients with locally advanced head and neck cancer (CONDOR study) (Dutch Head and Neck Society 08-01): A randomized phase II study. *Eur J Cancer*. 2016; 52: 77–84, doi: 10.1016/j.ejca.2015.09.024, indexed in Pubmed: 26655558.
4. Vainshtein JM, Griffith KA, Feng FY, et al. Patient-reported voice and speech outcomes after whole-neck intensity modulated radiation therapy and chemotherapy for oropharyngeal cancer: prospective longitudinal study. *Int J Radiat Oncol Biol Phys*. 2014; 89(5): 973–980, doi: 10.1016/j.ijrobp.2014.03.013, indexed in Pubmed: 24803039.
5. Janssens GO, Langendijk JA, Terhaard CH, et al. Quality-of-life after radiotherapy for advanced laryngeal cancer: Results of a phase III trial of the Dutch Head and Neck Society. *Radiother Oncol*. 2016; 119(2): 213–220, doi: 10.1016/j.radonc.2016.02.023, indexed in Pubmed: 27165613.
6. Pearlstein KA, Wang K, Amdur RJ, et al. Quality of Life for Patients With Favorable-Risk HPV-Associated Oropharyngeal Cancer After De-intensified Chemoradiotherapy. *Int J Radiat Oncol Biol Phys*. 2019; 103(3): 646–653, doi: 10.1016/j.ijrobp.2018.10.033, indexed in Pubmed: 30395903.