STUDY ON LIFE QUALITY IN SURGICALLY TREATED HEAD & NECK CANCERS PATIENTS: A FOLLOW-UP STUDY

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Abstract

Aim. The aim this research was to evaluate the changes in quality of life (QoL) scores in relation to demographic and individual parameters, in patients diagnosed with head and neck cancers (HNC), at 3 and 6 months post-operative, when compared to baseline pre-operative scores. *Materials and Methods*. A prospective, quantitative study was conducted on a sample of 62 patients diagnosed with malignant tumors of the head and neck in the Oral and Maxillofacial Surgery Clinic of the "Sf. Spiridon" Emergency County Hospital in Iași, Romania (n=30), and in the Oral and Maxillofacial Surgery Department of the Suceava County Hospital, Romania (n=32). The patients were hospitalised and treated by surgical removal of tumora and standard radiotherapy. Data (pre-operative, 3 and 6 months post-operative) was collected with two quality of life questionnaires: the BIQoL (Body Image Quality of Life) questionnaire (that measures the quality of life based on self-image), and the EORTC QLQ-H&N35 questionnaire (that measures the parameters directly associated with the quality of life). Data analysis was performed using Microsoft Excel and SPSS 29.0 software. *Results. BIQoL* improves significantly from 0,6935 ± 1,22903 to 1,2624 ± 0,83559 at 6 months follow-up, corresponding to a positive moderate effect. Mild intensity disorders were recorded in some EORTC QLQ-H&N35 items at baseline. Mean values improved significantly at 6 months follow-up (pain – from 2.0363 to 1.1548; swallowing- from 1.4274 to 1.1339; mouth opening score- from 1.9032 to1.1964; dry mouth from 1.9677 to 1.1250; senses impairment- from 1.3871 to 1.0446; coughing from 1.5806 to 1.0357; speech impairment from 1.5574 to1.1012; social contacts from 1.8754 to 1.3536; sexual activity- from 2.5565 to 2.4043). *Conclusions.* The quality of life score based on one's own body image recorded a statistically significant increase at 3 months, continuing towards moderately positive at 6 months post-treatment. Statistically significant improvements were recorded for most of the scores evaluated by the EORTC QLQ-HN34 questionnaire (pain, swallowing difficulties, difficulties in opening the mouth, dry mouth syndrome, sensory impairment, cough, voice). Social contacts with worst scores at baseline, significantly improved at 6 months post-treatment for most patients treated for head and neck cancer. Post-treatment quality of life monitoring allows for pain management, addressing psychosocial issues, and reducing the potential loss of functionality after surgical and chemo/radiotherapy interventions in patients with head and neck cancer.

Keywords: *head and neck cancer, quality of life, BIQoL, EORTC QLQ-H&N35.*

INTRODUCTION.

The epidemiological data show a rising overall incidence of head & neck cancers (HNC) both in developed and developing countries, with a predicted 30% increase annually by 2030. Head and neck cancer accounts for more than 660,000 new cases and 325,000 deaths annually; it is ranked as seventh most common category

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of cancers [1,2]. Head & Neck Cancers have also significant impact on health-related quality of life (HRQOL) of survivors. Quality of life is defined by the World Health Organization as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns" [3]. HRQOL can be affected by physical, psychological and social disorders related to deterioration of various functions of the stomatognathic system components [4]. The quality of life for HNC patients can be assessed by quantitative methods (patient self-assessment through a questionnaire) or qualitative methods (semi-structured interviews) [5-7]. EORTC (European Organisation for Research and Treatment of Cancer) proposes the EORTC QLQ-H&N35 questionnaire for the HRQOL assessment.

Many parameters (changes in physical appearance, swallowing disorders, dental hygiene, digestion, speech, pain, role functioning, mobility, and psychological well-being) can deteriorate during first months of standard radiotherapy. Despite recovering nearly to baseline values of most of these parameters 12 months after treatment, 3-5 years follow-up studies reported long-lasting deterioration of salivary volume (xerostomia) and dysphagia associated with related symptoms (global health status, dry mouth and sticky saliva, swallowing, social eating and social contact) [8]. However, when intensity-modulated radiotherapy (IMRT) was used, most quality of life (QoL) items deteriorated during treatment or at the end of the treatment, and then recovered gradually to 1-2 years after IMRT, compared with their baseline level. Some xerostomia-related items still had significant lower scores at 2 years post-treatment following IMRT therapy [9, 10]; when compared with standard radiation therapy, salivary volume and swallowing function were significantly less damaged for patients submitted to IMRT therapy [11,12]. Depending on HNC severity, the physiological functions, aesthetics as well as psychological items (identity, self-esteem, self-image) can be damaged during and after treatment [13,14], leading to harmful behaviors such as physical inactivity and poor eating habits, which impair both quality of life and healing post-treatment period [15]. When planning the therapy, patient' preferences must be integrated in the decision-making process, as patient must choose between an aggressive radiation therapy with longer lifespan and negative consequences on speech/eating/swallowing, and less aggresive therapy associated to less harmful effects on quality of life but potentially with shorter lifespan expectations [16].

The aim of this research was to evaluate the changes in quality of life (QoL) scores in relation to demographic and individual parameters, in patients diagnosed with head & neck malignant tumor, at 3 and 6 months, when compared to baseline scores.

MATERIALS AND METHOD.

The prospective research was conducted on 62 patients diagnosed with malignant tumors in the oro-maxillo-facial area, hospitalized and diagnosed in the Oral and Maxillofacial Surgery Clinic of the "Sf. Spiridon" Emergency County Hospital in Iași (n=30) and in the Oral and Maxillofacial Surgery Department of the Suceava County Hospital (n=32).

Inclusion criteria were as follows: patients admitted, diagnosed with malignant tumors located in the head and neck area; patients aged >18 years; patients without psychiatric conditions that would affect their ability to make medical treatment decisions; patients without metastases; newly diagnosed patients with no previous curative surgeries; patients who agreed to participate in the study,

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expressed by signing the informed consent form. Exclusion criteria included: patients with inoperable cervico-facial tumor (T4, N2c-N3, Mx); patients with metastases (M1); patients with psychiatric conditions that would affect their ability to make medical treatment decisions; operated patients with tumor recurrence; patients who did not agree to participate in the study.

Prior to their enrollment, the patients signed the informed consent sheets after being informed about the study's objectives and procedures, risks and benefits, as well as the confidentiality of personal and medical data.

The patients' medical records were examined for details regarding the location and histological type of the tumor, comorbidities, and other relevant medical information. Patients were invited to complete the questionnaires pre-operative, at 3 and 6 months post-operatively, during their scheduled follow-up visits. Each patient was instructed to complete the two questionnaires individually in a private room. The questionnaires were self-administered and the patients had the occasion to clarify uncertainties during completion by discussing them with the researcher. The average time to complete one questionnaire was about 20 minutes.

Data collection was done using *BIQoL* and *EORTC QLQ-H&N35* questionnaires. The participants were surgically treated. At 3-months post-operative they completed second quality of life questionnaires. At 6-months post-operative they completed the third quality of life questionnaires.

The BIQoL questionnaire (Quality of Life Based on Self-Image) quantifies how individuals' body image experiences affect various aspects of life (self-esteem, social functioning, sexuality, emotional well-being, eating, physical activity, body care, etc.). Lower scores indicate negative effects on the quality of life, while higher scores indicate less impairment of the quality of life. BIQoL questionnaire uses a 7-point response format, ranging from very negative effects (-3), moderate negative effects (-2), mild negative effects (-1), no effect (0), mild positive effect (+1), moderate positive effect (+2), to very positive effects (+3) on body image in 19 life domains. The recorded values produce a composite score, calculated as the average of the 19 items on a 7-point response scale (ranging from -3 to +3). *EORTC QLQ-H&N35 questionnaire* assesses quality-of-life related items as follows: symptoms, side effects, functional impairments, body image, and sexuality [17]. QLQ-H&N35 includes 7 subscales in relation to pain (4 questions), swallowing (5 questions), senses (2 questions), speech (3 questions), eating in public (4 questions), social contact (5 questions), and sexuality (2 questions).

Initially, each participant received instructions to complete a section dedicated to the sociodemographic characteristics, i.e. age, gender, and social habits (smoking, alcohol consumption). In responses to this questionnaire, patients indicated symptoms or issues they had experienced in the past week. Higher scores indicate more pronounced problems, while lower scores indicate less intense issues..

The research was approved by the Research Ethics Committee of "Grigore T. Popa" University of Medicine and Pharmacy of Iași (87/06.2021).

Data Analysis

Analysis was conducted using Microsoft Excel and SPSS 29.0 software. For numerical data, we calculated descriptive statistical parameters, including the mean, standard error of the mean, standard deviation, minimum and maximum values, and the median. The questionnaire responses were characterized descriptively through frequency distributions, after which they were synthesized by calculating composite scores, consisting of the arithmetic means

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of individual responses to items in each category. The significance threshold was set at $p \leq 0.05$. The calculated scores were numerical variables, the Kolmogorov-Smirnov test indicated that their values did not follow a normal distribution, necessitating the use of non-parametric tests, namely Mann-Whitney (for comparing two groups) and Kruskal-Wallis (for comparing multiple groups). In rare cases where the normal distribution assumption was met, we used the t-Student test to compare values between groups and the ANOVA test to compare values between multiple groups. Chi-square test was used to test differences in qualitative variable values across different groups.

RESULTS

Participants

The female/male ratio in the study group was slightly in favor of males (n=38). About two-thirds of the participants come from rural areas, are married and live with other family members. Half of the participants have a primary education level (Table 1).

Table I. Socio-dempgraphic characteristics of the study group

		n	%
Gender	F	24	38,7
	M	38	61,3
Location	rural	45	72,6
	urban	17	27,4
Social status	married	41	66,1
	divorced	3	4,8
	single	2	3,2
	widower/widow	16	25,8
Live with	with family	45	72,6
	single	17	27,4
Educational level	without education	6	9,7
	primary school	31	50,0
	high school	17	27,4
	post-secondary studies	4	6,5
	faculty	4	6,5
Total		62	100,0

BIQoL (Body Image Quality of Life) scores

BIQoL questionnaire baseline scores (gender, age groups, patient location, social status, living with family or alone, education stage, comorbidities, tumor location) are exposed in Table 2.

Table 2. Baseline mean values of *BIQoL* scores

Scor C_I (KS test, p = 0,286)		N	Mean	Mean std.error	SD	Min	Max	Mediane	t-Student / ANOVA
Total		**62**	**0,6935**	**,15609**	**1,22903**	**-2,32**	**2,89**	**,6842**	
Gender	M	38	.6385	.22115	1.36328	-2.32	2.89	.6842	t = -0,441
	F	24	.7807	.20447	1.00170	-.79	2.37	.6579	p = 0,661
Age group	30-50 yrs.	5	1,4000	,68068	1,52204	-1,26	2,58	1,8947	F = 1,105
	51-70 yrs.	30	,7298	,20627	1,12981	-2,32	2,89	,6842	p = 0,338
	>70 yrs.	27	,5224	,24614	1,27899	-1,74	2,53	,4211	
Patient	Urban	17	.9845	.25553	1.05358	-1.11	2.53	.7895	t = 1,149

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location	Rural	45	.5836	.19122	1.28273	-2.32	2.89	.6316	p = 0,255
Social status	Married	41	.7202	.19468	1.24657	-1.74	2.89	.6842	t = 0,236
	Single	21	.6416	.26681	1.22266	-2.32	2.53	.6842	p = 0,814
Living with	Family	45	.6737	.17946	1.20383	-1.74	2.89	.6316	t = -0,205
	Alone	17	.7461	.32262	1.33022	-2.32	2.53	.7368	p = 0,838
Education stage	Absent	6	.0439	.41828	1.02458	-1.26	1.58	.0000	F = 2,496
	Primary	31	.3854	.24356	1.35611	-2.32	2.53	.2632	p = 0,053
	Highschool	17	1.0991	.22705	.93613	-.37	2.89	1.1579	
	Post-highschool	4	1.6184	.43315	.86629	.68	2.53	1.6316	
	Faculty	4	1.4079	.37793	.75586	.74	2.21	1.3421	
Comorbidities	No	18	.9211	.37080	1.57318	-2.32	2.89	1.6579	t = 0,931
	Yes	44	.6005	.16053	1.06482	-1.74	2.58	.6053	p = 0,355
Tumor location	Intraoral	33	,9952	,23001	1,32133	-2,32	2,89	1,1053	t = 2,120
	Other areas	29	,3503	,19174	1,03254	-1,74	2,32	,2632	p = 0,038*

BIQoL (Body Image Quality of Life) scores improves significantly after 6 months of follow-up. Baseline mean values (0,6935 ± 1,22903) significantly increased both to 3 months follow-up (0,9117 ± 1,03942), with a slightly positive effect, and at 6 months follow-up (1,2624 ± 0,83559), corresponding to a positive moderate effect. Also, baseline minimal value (-2,32), increases to -1, at 6 months follow-up (Table 3).

Table 3. Changes of C1 scores from baseline to 3 and 6 months of follow-up

Scor_C1								t test for pair samples		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	,6935	,15609	1,22903	-2,32	2,89	,6842	Baseline vs. 3 months	-2,154	,035*
3 months	58	,9117	,13648	1,03942	-2,32	2,68	1,0580	3 months vs. 6 months	-4,320	<,001**
6 months	57	1,2624	,11068	,83559	-1,00	2,74	1,3160	Baseline vs. 6 months	-6,182	<,001**

EORTC QLQ-HN35 scores

In tables 3-20 are exposed the scores reflecting the development of scores at 3 and 6 months follow-up, from EORTC QLQ-HN35 questionnaire.

The pain score, initially stands at an average of 2.0363 ± 0.80323, corresponding to a low-intensity level of pain. At the 3-month evaluation, the score significantly decreases statistically, reaching an average of 1.4741 ± 0.45809, and at the 6-month evaluation, the decreasing process continues, reaching an average of 1.1548 ± 0.27314, corresponding to slight or absent pain. Initially, the maximum value for the pain score is 3.75; at the 6-month evaluation, this value decreased to 2.25 (Table 4).

Table 4. Changes of C4 scores (pain) from baseline to 3 and 6 months of follow-up

C4_Pain								Wilcoxon test Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	2,0363	,10201	,80323	1,00	3,75	1,7500	Baseline vs. 3 months	-5,479	<,001 **
3 months	58	1,4741	,06015	,45809	1,00	2,75	1,2500	3 months vs. 6 months	-4,776	<,001 **
6 months	56	1,1548	,03650	,27314	1,00	2,25	1,0000	Baseline vs. 6 months	-6,172	<,001 **

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The swallowing score has low values at all three evaluated moments. Initially, its value is 1.4274 ± 0.72765 and decreases significantly statistically both at the 3-month evaluation and at the 6-month evaluation, ultimately reaching an average of 1.1339 ± 0.42094. Its maximum value, however (4 at baseline) decreases only to 3,75 at 6 months follow-up (Table 5).

Table 5. Changes of C4 scores (swallowing) from baseline to 3 and 6 months of follow-up

C4_Swallowing								Wilcoxon test Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	1,4274	,09241	,72765	1,00	4,00	1,0000	Baseline vs. 3 months	-3,977	<,001**
3 months	58	1,2112	,05892	,44869	1,00	3,00	1,0000	3 months vs. 6 months	-2,512	,012*
6 months	56	1,1339	,05625	,42094	1,00	3,75	1,0000	Baseline vs. 6 months	-3,490	<,001**

The denture quality score recorded a statistically significant improvement over time, from an initial average value of 1.9677 ± 0.88647 to an average value, at 6 months of follow-up, of 1.2857 ± 0.49412. Thus, initially the presence of the denture disorders is noted, in mild intensity, and after 6 months of monitoring they are almost absent. The maximum value of the score is initially 4.00 (indicating patients with severe dental problems), remains at 4.00 for the 3-month evaluation, and decreases to 3.00 at 6-month of follow-up (Table 6).

Table 6. Changes of C4 scores (denture quality) from baseline to 3 and 6 months of follow-up

C4_Denture quality								Wilcoxon test Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	1,9677	,11258	,88647	1,00	4,00	2,0000	Baseline vs. 3 months	-4,082	<,001**
3 months	58	1,5862	,08880	,67628	1,00	4,00	1,5000	3 months vs. 6 months	-3,391	<,001**
6 months	56	1,2857	,06603	,49412	1,00	3,00	1,0000	Baseline vs. 6 months	-4,620	<,001**

Regarding the mouth opening score, initially, patients report difficulties, characterized by an average score of 1.9032 ± 1.03559 (disorders in mild intensity). This score also shows a favorable evolution over time, with statistically significant decreases reported both at the 3-month evaluation, for which an average of 1.4138 ± 0.62223 is recorded, and at the 6-month follow-up, with an average of 1.1964 ± 0.40089. Initially, there were patients who reported major difficulties related to mouth opening (with the maximum score 4.00), but at the 6-month evaluation, the most severe situations are characterized by the maximum score 2.00, corresponding to minor difficulties in mouth opening (Table 7).

Table 7. Changes of C4 scores (open mouth wide) from baseline to 3 and 6 months of follow-up

C4_Open mouth wide								Wilcoxon test Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	1,9032	,13152	1,03559	1,00	4,00	2,0000	Baseline vs. 3 months	-4,207	<,001**
3 months	58	1,4138	,08170	,62223	1,00	3,00	1,0000	3 months vs. 6 months	-3,153	,002**
6 months	56	1,1964	,05357	,40089	1,00	2,00	1,0000	Baseline vs. 6 months	-4,558	<,001**

The symptom of dry mouth is also associated with the diagnosis under investigation;

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this symptom too records a statistically significant improvement over time, from an initial average value of 1.9677 ± 0.86778, to an average value of 1.4828 ± 0.59946 at 3 months, and respectively 1.1250 ± 0.33371 at 6 months. Initially, there are patients who report maximum values for this score (4.00), but after 6 months, the most severe situations correspond to a maximum score of 2.00. (Table 8).

Table 8. Changes of C4 scores (dry mouth) from baseline to 3 and 6 months of follow-up

C4_Dry mouth								Wilcoxon test Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	1,9677	,11021	,86778	1,00	4,00	2,0000	Baseline vs. 3 months	-4,452	<,001**
3 months	58	1,4828	,07871	,59946	1,00	3,00	1,0000	3 months vs. 6 months	-3,646	<,001**
6 months	56	1,1250	,04459	,33371	1,00	2,00	1,0000	Baseline vs. 6 months	-5,215	<,001**

The sticky saliva score follows a similar trend, from an initial average value of 1.8226 ± 0.93255, corresponding to a weak intensity, to an average value of 1.0893 ± 0.28774 reported at 6 months. It is also observed that both initially and at the 3-month evaluation, there are still patients who report a maximum value of 4.00 for this symptom, which translates to its maximum intensity; however, at the 6-month follow-up, the maximum reported value is 2.00, corresponding to the low values of saliva viscosity (Table 9).

Table 9. Changes of C4 scores (sticky saliva) from baseline to 3 and 6 months of follow-up

C4_Sticky saliva								Wilcoxon test Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	1,8226	,11843	,93255	1,00	4,00	2,0000	Baseline vs. 3 months	-4,456	<,001**
3 months	58	1,3966	,08848	,67381	1,00	4,00	1,0000	3 months vs. 6 months	-3,220	<,001**
6 months	56	1,0893	,03845	,28774	1,00	2,00	1,0000	Baseline vs. 6 months	-4,733	<,001**

Regarding the senses impairment score, the changes are not very pronounced. Initially, the reported average score is 1.3871 ± 0.56117 and it decreases significantly statistically at 3 months of evaluation, reaching an average of 1.0948 ± 0.23799; at the 6-month evaluation, the recorded average for this score is low and comparable to that observed at 3 months (1.0446 ± 0.14387) (Table 10).

Table 10. Changes of C4 scores (senses) from baseline to 3 and 6 months of follow-up

C4_Senses								Wilcoxon test Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	1,3871	,07127	,56117	1,00	3,00	1,0000	Baseline vs. 3 months	-3,696	<,001**
3 months	58	1,0948	,03125	,23799	1,00	2,00	1,0000	3 months vs. 6 months	-1,732	,083
6 months	56	1,0446	,01923	,14387	1,00	1,50	1,0000	Baseline vs. 6 months	-3,697	<,001**

The symptom that was observed most frequently in HNC patients was that of coughing, characterized by an initial average cough score of 1.5806 ± 0.66649, with a maximum of 4.00, indicating that the symptom is present and has a relatively low intensity – although some patients manifests it with maximum intensity. However, at 3 months, the intensity of this

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symptom significantly decreases statistically (1.2586 ± 0.47978) - a process that continues at the 6-month follow-up, when this symptom almost completely disappears (1.0357 ± 0.18726). At 6 months post-treatment, the maximum value is 2.00 (Table 11).

Table 11. Changes of C4 scores (cough) from baseline to 3 and 6 months of follow-up

C4_Cough								Testul Wilcoxon Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	1,5806	,08464	,66649	1,00	4,00	1,5000	Baseline vs. 3 months	-3,922	<,001**
3 months	58	1,2586	,06300	,47978	1,00	3,00	1,0000	3 months vs. 6 months	-3,000	,003**
6 months	56	1,0357	,02502	,18726	1,00	2,00	1,0000	Baseline vs. 6 months	-4,802	<,001**

The speech impairment score had a basline average score of 1.5574 ± 0.55351; at the 3-month evaluation, it significantly decreases statistically (1.3333 ± 0.32444), and at the 6-month evaluation, the process continues (1.1012 ± 0.17888). Thus, initially, speech impairment is present in the study group, although with mild intensity; the maximum recorded value is 3.00, which means that in isolated cases, some patients had moderate impairment of the speech. However, at the 6-month evaluation, the maximum recorded value decreased to 1.67 (Table 12).

Table 12. Changes of C4 scores (speech) from baseline to 3 and 6 months of follow-up

C4_Speech								Testul Wilcoxon Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	61	1,5574	,07087	,55351	1,00	3,00	1,3333	Baseline vs. 3 months	-3,968	<,001**
3 months	58	1,3333	,04260	,32444	1,00	2,33	1,3333	3 months vs. 6 months	-4,273	<,001**
6 months	56	1,1012	,02390	,17888	1,00	1,67	1,0000	Baseline vs. 6 months	-5,160	<,001**

The feeling ill score indicated that this subjective perception is initially present, although with low intensity, the associated score having an average value of 1.6613 ± 0.76702; the maximum score value is 4.00, meaning that some patients had a pronounced feeling ill. At the 3-month evaluation, the recorded average score significantly decreases statistically, reaching an average of 1.3448 ± 0.51476, a process that continues at the 6-month evaluation (1.0893 ± 0.28774). The maximum value at the 6-month evaluation was 2.00 (Table 13).

Table 13. Changes of C4 scores (feeling ill) from baseline to 3 and 6 months of follow-up

C4_Feeling ill								Testul Wilcoxon Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	1,6613	,09741	,76702	1,00	4,00	2,0000	Baseline vs. 3 months	-3,530	<,001**
3 months	58	1,3448	,06759	,51476	1,00	3,00	1,0000	3 months vs. 6 months	-2,982	,003**
6 months	56	1,0893	,03845	,28774	1,00	2,00	1,0000	Baseline vs. 6 months	-4,465	<,001**

The social contacts score also significantly improves statistically over time. Initially, it has an average value of 1.8754 ± 0.65234, corresponding to a reduced degree of impairment of the patients' social contacts; the maximum recorded value is 3.20, meaning that for some patients, social contacts were quite affected. At the 3-month evaluation, the social contacts

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score decreases significantly, a process that continues at the 6-month evaluation, when the recorded average for this score reaches 1.3536 ± 0.31448, corresponding to almost the absence of impairment of social contact. The maximum score value at 6 months of follow-up was 2.00. (Table 14).

Table 14. Changes of C4 scores (social contact) from baseline to 3 and 6 months of follow-up

C4_Social contact								Wilcoxon test Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	61	1,8754	,08352	,65234	1,00	3,20	2,0000	Baseline vs. 3 months	-3,574	<,001**
3 months	58	1,6448	,05904	,44963	1,00	2,60	1,6000	3 months vs. 6 months	-5,053	<,001**
6 months	56	1,3536	,04202	,31448	1,00	2,00	1,4000	Baseline vs. 6 months	-4,929	<,001**

Regarding the score for social eating, initially, the average value of the calculated score is 1.8226 ± 0.82032, indicating that patients have a certain reluctance, albeit reduced, to eat in public; the maximum score value is 4.00, corresponding to so patients for whom this activity is greatly affected. At the 3-month evaluation, the score significantly improves statistically, reaching an average of 1.5216 ± 0.47592, a process that continues at the 6-month evaluation, when the score dcreased significantly to 1.1741 ± 0.24271 (Table 15).

Table 15. Changes of C4 scores (social eating) from baseline to 3 and 6 months of follow-up

C4_Social eating								Wilcoxon test Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	1,8226	,10418	,82032	1,00	4,00	1,7500	Baseline vs. 3 months	-3,360	<,001**
3 months	58	1,5216	,06249	,47592	1,00	2,75	1,5000	3 months vs. 6 months	-5,249	<,001**
6 months	56	1,1741	,03243	,24271	1,00	1,75	1,0000	Baseline vs. 6 months	-4,927	<,001**

The patients' sexual activity score does not show a favorable evolution between baseline and 6-months of follow-up. The initially recorded average score is 2.5565 ± 1.17384; it slightly increases at the 3-month evaluation, reaching an average of 2.5638 ± 1.08656, after which it decreases insignificantly statistically at the 6-month evaluation, close to previous values, with a mean of 2.4043 ± 1.08166. (Table 16).

Table 16. Changes of C4 scores (sexual activity) from baseline to 3 and 6 months of follow-up

C4_Sexual activity								Wilcoxon test Signed Ranks		
	N	Mean	Mean Std.error	SD	Min	Max	Mediane		Statistics Z	p
Baseline	62	2,5565	,14908	1,17384	1,00	4,00	2,2500	Baseline vs. 3 months	-2,123	,034*
3 months	47	2,5638	,15849	1,08656	1,00	4,00	3,0000	3 months vs. 6 months	-,647	,518
6 months	47	2,4043	,15778	1,08166	1,00	4,00	2,0000	Baseline vs. 6 months	-1,818	,069

The values of the painkiller consumption score show that it is not characteristic of the patients and decreases rapidly over time. Initially, 71.0% of patients consume painkillers, but this percentage decreases strongly and statistically significantly both at the 3-month evaluation (25.9%) and at the 6-month evaluation (10.7%) (Table 17).

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Table 17. Changes of C4 scores (painkillers) from baseline to 3 and 6 months of follow-up

C4_Painkillers

Pearson Chi-squared = 50,413 / p < ,001**

	Baseline		3 months		6 months	
Categories	n	%	n	%	n	%
No	18	29,0	43	74,1	50	89,3
Yes	44	71,0	15	25,9	6	10,7
Total	62	100,0	58	100,0	56	100,0

The dietary supplement consumption scores show that it is almost absent in the study group, with minor differences between the three follow-up times. Initially, 14.5% of the patients reported using dietary supplements, a percentage that remains relatively close at the 3-month evaluation (10.3%) and decreases significantly at the 6-month (3.6%) (Table 18).

Table 18. Changes of C4 scores (dietary supplements) from baseline to 3 and 6 months follow-up

C4_Dietary supplements

Pearson Chi-squared = 4,086 / p = ,130

	Baseline		3 months		6 months	
Categories	n	%	n	%	n	%
No	53	85,5	52	89,7	54	96,4
Yes	9	14,5	6	10,3	2	3,6
Total	62	100,0	58	100,0	56	100,0

Regarding the values of the score for tube feeding, they show that it is not characteristic of the monitored patients. Initially, there were a few cases where patients submitted to this practice (4.8%), but, at both 3 and 6 months, all patients had completely abandoned this procedure (Table 19).

Table 19. Changes of C4 scores (tube feeding) from baseline to 3 and 6 months of follow-up

C4_Tube feeding

Pearson Chi-squared = 5,612 / p = ,060

	Baseline		3 months		6 months	
Categories	n	%	n	%	n	%
No	59	95,2	58	100,0	56	100,0
Yes	3	4,8				
Total	62	100,0	58	100,0	56	100,0

Initially, nearly a third of the patients experienced weight loss (32.3%). At the 3-month evaluation, only one patient still reports weight loss, and at 6 months, all patients state that they have not experienced any weight loss (Table 20).

Table 20. Changes of C4 scores (weight loss) from baseline to 3 and 6 months of follow-up

C4_Weight loss

Pearson Chi-squared = 37,715 / p < ,001**

	Baseline		3 months		6 months	
Categories	n	%	n	%	n	%
No	42	67,7	57	98,3	56	100,0
Yes	20	32,3	1	1,7		
Total	62	100,0	58	100,0	56	100,0

Weight gain is encountered in much fewer cases than weight loss; initially, 8.1% of patients (isolated cases) reported weight gain. At the 3-month evaluation, only one patient still reports weight gain, a situation that completely normalizes at 6 months, when no patients report any weight gain (Table 21).

Table 21. Changes of C4 scores (weight gain) from baseline to 3 and 6 months of follow-up

C4_Weight gain

Pearson Chi-squared = 6,557 / p = ,038*

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	Baseline		3 months		6 months	
Categories	n	%	n	%	n	%
No	57	91,9	57	98,3	56	100,0
Yes	5	8,1	1	1,7		
Total	62	100,0	58	100,0	56	100,0

DISCUSSIONS

Assessment of the quality of life in patients with head and neck cancer (HNC), is crucial to understand the impact of the disease and treatment on their life quality for improving care protocols by including more comprehensive measures of clinical, social, and rehabilitation support [18]. A limited number of studies have compared the quality of life of patients with head and neck cancer between the pre-operative stage and post-surgical stage (followed by radiotherapy). In this context, there is a significant demand for comprehensive studies that address the quality of life of patients with head and neck cancer. These studies will not only provide insights into the final outcome of the current treatment protocol but will also assist in making the necessary adjustments [19]. Our study aimed to compare the mean values of BIQoL and EORTC QLQ-H&N35 questionnaires items recorded at baseline (pre-operative) with those recorded at 3 months and 6 months post-operatively. This category of studies can be useful for practitioners in making optimal treatment decisions for HNC patients to minimize acute and long-term sequelae [20].

The responses to BIQoL questionnaire (items based on self-Image) at baseline showed that men, patients from rural areas with lower education levels, and patients with extraoral lesions have strong association between the presence of head and neck cancer and the decreased life quality. Related to the pre-operative responses to BIQoL questionnaire, a study reported also lower unfavourable scores at baseline for men, with advanced intraorally cancers, and patients with emotional disorders [21]. The same results were reported for patients with economic issues, sleep quality problems, fatigue, and pain [22]. Baseline mean values of BIQoL questionnaire for HNC patients in our study significantly increased both to 3 months and at 6 months follow-up. A study on body image-related disorders of HNC patients. found that 68% of patients exhibited various degrees of body image concerns, both pre-operative and post-operative body, scores being significantly correlated and recording a significant increase from pre- to post-operative stage. At 3 months, the percentage of patients who exhibited an increasing level of body image concerns was highest (89%). Factors correlated with body image concerns in HNC patients included the degree of tolerability of physical symptoms, difficulties in communication and eating, approaching the cancer diagnosis through denial, and a history of anxiety. When sociodemographic and medical variables were considered, post-operative body image concerns were predicted by initial body image and the degree of tolerability of physical symptoms [23].

The evolution over time of scores from the EORTC QLQ-HN35 questionnaire highlights statistically significant improvements.

The mean values of pain scores were low globally, slightly higher in men and in individuals from rural areas, as well as in patients without comorbidities and patients with intraoral lesions. The assessment of pain scores in diagnosed HNC patients is relevant as pain (located in oral cavity or neck) can be associated to discomfort (dry mouth sensation) and significant impairment of chewing, swallowing, and phonation, followed by psychosocial problems [22]. The pain scores in our study group decreased significantly statistically at 3 months and 6

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months post-operative; at 6-months follow-up the decreasing process continued to a level corresponding to almost no pain, although there were a small number of patients with low-intensity pain.

Our data showed low mean values of the swallowing score; significantly higher values were recorded in patients with intraoral lesions compared to other locations. Other studies reported decreased swallowing ability in patients with pharyngeal and laryngeal cancer [23,24]. As for the swallowing difficulties reported by patients in our study group, the mean values had a significant statistical decrease from the initial moment both at 3 months post-operative and at 6 months post-operative, although even at this time interval, there was a small percentage of patients who report significant swallowing difficulties.

We observed high mean values for dental scores, significantly higher in males, patients from rural areas, patients without comorbidities, as well as patients with intraoral cancers. However, a few studies associated head and neck cancers with low mean dental quality scores and impaired masticatory function [22,23]. In our study group, there was a statistically significant reduction over time for denture quality category, from the baseline to 6 months follow-up. The dynamics of the scores demonstrate the decrease in the intensity of dental disorders at 6 months follow-up.

Dry mouth sensation scores, slightly higher in males, patients from rural areas, patients with comorbidities as well as patients with labial or intraoral lesions. Scores regarding dry mouth symptom recorded statistically significant improvements over time, from the initial average value to 6 months post-treatment, a score equivalent to a weak intensity of the dry mouth symptom. Likewise, the sticky saliva initial scores corresponding to slight viscous saliva, significantly decreased at 6 months post-treatment, a value corresponding to the absence of this symptom. Impaired masticatory function is also associated with low salivary volume and quality scores, a common problem for the patients with HNC [22].

Sensory impairment scores (taste, smell) were low in our study group, slightly higher in males, patients from rural areas, and patients with lesions in the nasal region. This result supports data reported by other studies as impaired taste and smell are among the most important factors contributing to reduced quality of life of patients with HNC [22,23]. In our study group, the initial average score decreased significantly statistically at 3 months follow-up, although at 6 months follow-up the average value was similar to that recorded at 3 months. Thus, the sensory impairment of patients almost completely disappears at 3 months post-operative.

Mean values of the speech impairment score in our study group were low globally; this score was higher in urban patients, patients with comorbidities, and patients with intraoral or nasal region lesions. Voice impairment scores are significantly lower in other studies that assessed patients diagnosed with head and neck cancer [24,25]. Speech impairment significantly decreased at 3 months compared to baseline, a process that continued at 6 months follow-up. Initially, voice impairment is present in the patient cohort, although reduced in intensity, but a small percentage of patients suffered from moderate voice impairment. At 6 months follow-up, patients with initially severe speech impairment were reported slight speech impairment, demonstrating the significant improvement of this relevant parameter for life quality of HNC patients.

In our study group, the social life scores were low, with patients with intraoral cancers having the lowest mean values of this score. Also, social functioning scores were significantly lower for HNC patients when compared to health status and emotional scores [22]. The social contact score improves significantly

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statistically over time, from a degree of reduced social contact impairment of patients (a small percentage of patients with significantly affected social contacts), to the improvement of social contacts at 3 months follow-up, a process that continues with statistically significant differences at 6 months follow-up. While initially, patients present a certain degree of reluctance in eating in public, at 3 months follow-up the score improves significantly; at 6 months follow-up, patients' reluctance for social eating almost completely disappears.

Mean values of sexual activity scores were low in diagnosed HNC patients. This can be explained by impaired body image and mean age group > 60 yrs. for patients diagnosed with head and neck cancer [22,24]. The patients' sexual life score does not show a favorable evolution, the initial average score slightly increases at 3 months follow-up, after which it decreases insignificantly statistically at the 6-month follow-up. This evolution demonstrates that patients' sexual life is significantly affected both at the moment of diagnosis, and in the longer term (at 3 and respectively 6 months post-surgery).

Mean tube feeding scores found in our study group were high in patients with intraoral lesions, and low in patients with lesions in the head and neck region. We investigated the responses of patients that refuse the tube feeding: "it will disturb my body image" (88.33%), "inability to go out/interact with others" (80%), and "dependence on others for activities" (66.66%). This attitude and responses for refusal of tube feeding are similar to those reported in literature; however, psychological counselling increase the rate of acceptance of nasogastric tube feeding to 77% [26]. In our study group, only 4.8% of patients accepted this practice at the moment of diagnosis, but at 3 months, respectively at 6 months post-treatment, all patients completely abandoned tube feeding.

The most significant changes in health-related quality of life (HRQoL) for patients with head and neck cancer were observed in the first 3 months from the start of treatment, according to the study conducted by Sharma et al (2019) [19]. However, even after a year from the post-surgical stage, none of the variables returned to the initial pre-treatment values. Our data, regarding responses to EORTC QLQ-H&N35 questionnaire, showed that mean baseline values of "social contact" and "sexual activity" items were the most affected in HNC patients. Excepting "sexual activity" item, the scores of the other items returned close to their baseline mean values. Our results confirmed conclusions of similar studies performed on patients treated for HNC showing that HRQoL scores in HNC patients declined in first month after surgical treatment but generally returned to initial levels within a 12-month period [27,28]. However, Barrios et al (2015) demonstrated that a combination of therapies and advanced clinical stages of oral cancer negatively impact the HRQoL of patients [28]. Patients with oropharyngeal cancer recorded a worse HRQoL compared to those with oral cavity cancer. This discrepancy was attributed to the fact that patients with oropharyngeal tumours underwent surgical interventions followed by postoperative adjuvant therapy [28].

CONCLUSIONS

- The quality of life score based on one's own body image recorded a statistically significant increase (slightly positive) at 3 months, an increase that continued towards moderately positive at 6 months post-treatment.
- Statistically significant improvements were recorded for most of the scores evaluated through the EORTC QLQ-HN34 questionnaire (pain, swallowing difficulties, difficulties in opening the mouth, dry mouth syndrome,

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sensory impairment, cough, voice). Both social contacts and sexual life significantly improve at 6 months post-treatment for most patients treated for head and neck cancer.

- Post-treatment quality of life monitoring allows for pain management, addressing psychosocial issues, and reducing the potential loss of functionality after surgical and chemo/radiotherapy interventions in patients with head and neck cancer.
- Our study can make an important contribution to identifying and quantifying the psycho-socio-professional consequences faced by patients with head and neck cancers, as well as the factors that medical teams involved in their care should monitor to reduce the impact of postoperative sequelae on patients' daily lives. Our results confirmed the importance of individual psychotherapy for HNC patients from the pre-operative stage, and its maintenance during chemo and radiotherapy.

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