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ORIGINAL RESEARCH

NUTRITIONAL STATUS AND QUALITY OF LIFE IN POST-CHEMORADIOTHERAPY ORAL CANCER PATIENTS: A CROSS SECTIONAL STUDY

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ABSTRACT

Objective: This study aims to evaluate the nutritional status, functional oral outcomes, biochemical nutritional markers, and "quality of life (QoL)" in patients with oral cancer who have completed chemoradiotherapy, to identify factors influencing recovery and guide supportive care.

Materials and Methods: A cross-sectional study was conducted at Taibah University Dental College and Hospital, Saudi Arabia, from January 2022 to December 2023. Fifty oral cancer patients post-chemoradiotherapy were enrolled. Nutritional status was assessed using the "Patient-Generated Subjective Global Assessment (PG-SGA)" and anthropometric measurements. Functional oral outcomes including maximal interincisal opening and xerostomia severity were evaluated. Biochemical markers such as serum albumin and "C-reactive protein (CRP)" were measured. QoL was measured with the QLQ-H&N35 and EORTC QLQ-C30 questionnaires. Relationships between nutrition, function, biochemical markers, and QoL domains were analyzed.

Results: The cohort comprised 60% males and 40% females, mean age 54.3 ± 11.2 years. Malnutrition was identified in 56% of patients. Functional impairments included a 40% trismus prevalence and moderate to severe xerostomia in 52%. Hypoalbuminemia and elevated CRP were present in 46% and 38% respectively. Malnourished patients exhibited significantly poorer QoL scores, especially in swallowing, pain, and social eating domains ($p<0.01$). Time since treatment completion correlated with nutritional and QoL improvement.

Conclusion: Malnutrition, functional deficits, and biochemical markers of inflammation are prevalent and interrelated in oral cancer survivors post-chemoradiotherapy, adversely impacting QoL. Multidisciplinary interventions addressing nutrition, oral function, and inflammation are critical for optimizing recovery.

***Keywords*:** Oral Neoplasms; Chemoradiotherapy; Nutritional Status; Quality of Life; Cross-Sectional Studie

INTRODUCTION

Oral cancer represents a significant global health burden, particularly in regions with high tobacco and betel quid usage. Despite improvement in multidisciplinary treatment approaches, including surgery, radiation, and chemotherapy, patients frequently experience substantial acute and chronic treatment-related toxicities adversely affecting

nutritional status and QoL. Chemoradiotherapy, while effective, often results in mucositis, xerostomia, dysphagia, taste alterations, and pain, all of which challenge adequate oral intake and assimilation of nutrients [1-3].

Malnutrition in oral cancer patients is multifactorial, reflecting tumor-related metabolic alterations, reduced oral intake, and side effects of aggressive treatment regimens. The prevalence of malnutrition has been reported between 30% and 80% in head and neck cancers, correlating with poorer treatment tolerance, increased morbidity, and diminished QoL. Understanding the interplay between nutritional status and patient-reported QoL outcomes post-chemoradiotherapy is essential for comprehensive care planning [3-6].

QoL assessments in oral cancer patients provide valuable insights into how functional, emotional, and social challenges impact recovery and daily living. Validated instruments such as the "European Organization for Research and Treatment of Cancer core questionnaire (EORTC QLQ-C30)" and the head and neck module (QLQ-H&N35) capture multidimensional aspects including pain, swallowing difficulties, social eating, and psychosocial distress. These measures enable clinicians to identify deficits requiring targeted interventions [7-10].

Although prior studies have examined nutritional status or QoL in isolation, integrated analyses remain limited, especially within the Saudi Arabian context. Notably, cultural, dietary, and healthcare access factors influence outcomes and necessitate regional data. This study addresses this gap by evaluating both nutritional status and QoL in a representative cohort of oral cancer survivors post-chemoradiotherapy at Taibah University Dental College and Hospital. The aims are to quantify malnutrition prevalence, characterize QoL deficits, and determine associations between nutritional impairment and QoL domains to inform multidisciplinary supportive care strategies.

MATERIALS AND METHOD

Study Design and Setting

This cross-sectional observational study was performed at Taibah University Dental College and Hospital, Madinah, Saudi Arabia, from January 2022 to December 2023.

Participants

Eligible participants included adults aged 18 years or more with histologically confirmed "squamous cell carcinoma SCC" of the oral cavity who had completed concurrent chemoradiotherapy at least one month prior. Exclusion criteria were recurrent cancer, presence of other malignancies, pre-existing severe systemic illness significantly impacting nutrition, and cognitive impairment precluding questionnaire completion.

Data Collection

Demographic data (age, sex), clinical data (tumor subsite, stage, treatment details, time since treatment completion), and anthropometric measurements (weight, height, "Body Mass Index [BMI]") were recorded. Nutritional status was assessed using the "Patient-Generated Subjective Global Assessment (PG-SGA)", which combines patient-reported history, physical examination, and weight history to classify nutrition as well-nourished, moderately malnourished, or severely malnourished [7].

QoL was evaluated through face-to-face structured interviews using the EORTC QLQ-C30 validated Arabic version, assessing global health status, functional scales, and symptom scales. The specific head and neck cancer module (QLQ-H&N35) evaluated domains such as pain, swallowing, social eating, senses, speech, and social contact [5].

Statistical Analysis

Data were calculated using SPSS version 26. Descriptive statistics included means ± standard deviations for continuous variables and frequencies for categorical variables. Comparisons of QoL scores across nutrition status groups were performed using ANOVA with Bonferroni post hoc tests. Pearson's correlation assessed relationships between time since treatment completion and nutritional/QoL measures. Statistical significance was set at $p < 0.05$.

RESULTS

The study enrolled 50 oral cancer patients; 30 males (60%) and 20 females (40%) with a mean age of 54.3 ± 11.2 years. Primary tumor sites included tongue (40%), buccal mucosa (28%), and floor of mouth (18%). Tumor staging was predominately Stage III-IV (68%). The mean interval since completion of chemoradiotherapy was 6.8 ± 3.5 months.

Nutritional Status Assessment

PG-SGA classified 22 patients (44%) as well-nourished, 20 (40%) as moderately malnourished, and 8 (16%) severely malnourished. Mean BMI was 21.5 ± 3.2 kg/m^2, with significantly lower BMI values in malnourished groups ($p<0.01$). Common reported symptoms impacting intake included mucositis (70%), xerostomia (62%), and taste alterations (56%).

Table 1. Nutritional Status

Nutritional Status	n (%)	Mean BMI (kg/m² ± SD)
Well-nourished	22 (44)	23.4 ± 2.1
Moderately malnourished	20 (40)	20.5 ± 2.3
Severely malnourished	8 (16)	17.8 ± 1.7

QoL Scores

Global health status mean score was 62.8 ± 18.5, with notable impairments in physical functioning (mean 58.3 ± 15.7), role functioning, and social functioning scales. Symptom scales showed high scores for fatigue, pain, and swallowing difficulties.

QOL scores stratified by nutritional status revealed significantly lower global health status and physical functioning in moderately and severely malnourished groups compared to well-nourished patients ($p<0.01$). Social eating and pain symptom scores from QLQ-H&N35 were particularly affected (Table 2).

Table 2. Quality of Life

QoL Domain	Well-nourished Mean ± SD	Moderately Malnourished Mean ± SD	Severely Malnourished Mean ± SD	p-value
Global health status	74.2 ± 8.5	62.5 ± 12.3	50.6 ± 10.7	<0.001
Physical functioning	69.8 ± 10.4	56.2 ± 11.9	45.1 ± 13.0	<0.001
Social functioning	67.3 ± 12.1	54.6 ± 14.4	42.8 ± 15.5	0.002
Pain	28.7 ± 9.8	42.3 ± 11.2	54.9 ± 10.7	<0.001
Swallowing difficulties	26.1 ± 8.4	39.7 ± 10.1	49.6 ± 9.2	<0.001

Oral Function and Symptom Outcomes

Table 3 details functional oral outcomes assessed by clinician-measured maximal interincisal opening (MIO), patient-reported xerostomia severity (via Xerostomia Questionnaire, XQ), and trismus prevalence. The mean MIO was 28.7 ± 6.3 mm, with 40% of patients exhibiting trismus (MIO < 25 mm). Xerostomia scores indicated moderate to severe dry mouth complaints in 52% of patients.

Table 3. Functional Oral Outcomes in Post-Chemoradiotherapy Oral Cancer Patients (n=50)

Parameter	**Mean ± SD or n (%)**
Maximal interincisal opening (mm)	28.7 ± 6.3
Trismus (MIO <25 mm)	20 (40%)
Xerostomia severity (moderate/severe)	26 (52%)

Biochemical Nutritional Markers

Table 4 presents key biochemical indicators of nutritional status and systemic inflammation. Mean serum albumin was 3.4 ± 0.5 g/dL, with hypoalbuminemia (<3.5 g/dL) present in 46% of cases. C-reactive protein (CRP) levels were elevated (>5 mg/L) in 38% of patients, suggestive of persistent inflammatory activity.

Table 4. Biochemical Nutritional and Inflammatory Markers (n=50)

Marker	Mean ± SD or n (%)
Serum albumin (g/dL)	3.4 ± 0.5
Hypoalbuminemia (<3.5 g/dL)	23 (46%)
C-reactive protein >5 mg/L	19 (38%)

Correlation Analysis

Time since treatment completion positively correlated with nutritional status improvement (r=0.48, p=0.001) and enhancement in QoL scores (global health status: r=0.52, p<0.001).

DISCUSSION

Current research systematically evaluated nutritional status and QoL in oral cancer patients after chemoradiotherapy within a Saudi Arabian tertiary care setting. The findings indicate a substantial burden of malnutrition (56% moderate to severe) persisting months post-treatment and significantly impacting patient-reported QoL domains.

The observed malnutrition prevalence aligns with international reports of 30%-80% in head and neck cancer populations. Treatment-induced toxicities such as mucositis, xerostomia, and taste alteration critically disrupt dietary intake, as seen in over half our cohort. The use of the PG-SGA tool allowed nuanced stratification, which facilitated targeted correlations with QoL impairments [8,3].

Our data substantiate the well-documented relationship between poor nutritional status and diminished physical, social, and global well-being [9-11]. Of particular note were deficits in social eating and pain domains—reflecting the profound functional and psychosocial sequelae of oral cancer treatment. These results reinforce the call for early nutritional assessment integrated with QoL monitoring to optimize multidisciplinary management strategies.

Adding these functional and biochemical parameters enhances the understanding of post-chemoradiotherapy oral cancer sequelae. Trismus prevalence at 40% aligns with prior reports documenting mouth opening reductions in 30–50% of patients, attributed to fibrosis and radiation-induced soft tissue contractures. Trismus negatively affects dietary intake, social interaction, and oral hygiene, thereby aggravating nutritional deficits and QoL impairments [12-15].

Xerostomia, reported by over half of patients, remains a persistent and distressing side effect of radiotherapy to the salivary glands. Its consequences extend beyond dryness to impair taste sensation, swallowing, and mucosal integrity, underlining the need for symptom-targeted therapies [15,16].

Hypoalbuminemia and elevated CRP signify the biochemical interplay between malnutrition and inflammation in this cohort. Inflammatory responses exacerbate muscle wasting and anorexia, perpetuating a vicious cycle of catabolism frequently documented post-cancer therapy. The observed considerable rate of these markers stresses the importance of integrating biochemical surveillance into nutritional assessments [13,15].

Overall, incorporation of functional and biochemical data alongside clinical and QoL measures presents a more holistic profile of recovery challenges faced by

oral cancer survivors. This comprehensive approach facilitates identification of patients at elevated risk for complications who may benefit from intensified multidisciplinary rehabilitation programs encompassing physiotherapy, saliva substitutes, and anti-inflammatory nutritional support. Correlation analysis suggested gradual improvement in nutrition and QoL with increasing time post-therapy, underscoring the dynamic recovery process. This reinforces the clinical imperative for continued nutritional and rehabilitative support beyond initial treatment phases [16].

The study's strengths include standardized assessments and regionally pertinent clinical data. Limitations encompass its cross-sectional design, modest sample size, and single-center scope limiting generalizability. Longitudinal studies with larger cohorts are recommended to define trajectories and refine intervention timing.

In the Saudi Arabian context, these findings are particularly salient given cultural and dietetic influences, coupled with variable healthcare resource access, emphasizing tailored support approaches.

CONCLUSION

Malnutrition remains a common and serious complication in post-chemoradiotherapy oral cancer patients, profoundly affecting multiple facets of QoL. This cross-sectional study from Taibah University Dental College and Hospital highlights the necessity for early and ongoing nutritional screening using validated tools alongside comprehensive QoL evaluations. Multidisciplinary interventions comprising dietitians, speech therapists, and psychosocial support are critical to ameliorate the adverse effects of intensive cancer treatment and enhance recovery outcomes in this population.

DECLARATIONS

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Ethics approval and consent to participate

The study was approved by the appropriate ethics committee and conducted according to relevant guidelines and regulations.

REFERENCES

1.Langius JAE, Zandbergen MC, Eerenstein SEJ, et al. Critical weight loss during radiotherapy influences prognosis in head and neck cancer patients. Nutr Cancer. 2013;65(1):83-9.

2.van den Berg MGA, Rasmussen-Conrad EL, van der Laan BFAM, et al. Nutritional status and quality of life in head and neck cancer patients treated with chemoradiotherapy. Clin Nutr. 2019;38(2):704-710.

3.Ravasco P, Monteiro-Grillo I, Camilo ME. Does nutrition influence quality of life in cancer patients undergoing radiotherapy? Radiother Oncol. 2003;67(2):213-220.

4.Kisorio LC. Nutrition and swallowing rehabilitation in patients with head and neck cancer. Curr Opin Support Palliat Care. 2021;15(4):377-383.

5.Aaronson NK, Ahmedzai S, Bergman B, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. J Natl Cancer Inst. 1993;85(5):365-376.

6.Bjordal K, Ahlner-Elmqvist M, Hammerlid E, et al. Development of a European Organization for Research and Treatment of Cancer (EORTC) quality of life questionnaire module and head and neck cancer: the EORTC QLQH&N35. Eur J Cancer. 1999;35(3): 205-213.

7.Ottery FD. Patient-Generated Subjective Global Assessment. In: McCallum PD, Polisena CGJ, editors. Cancer Nutrition and Cancer Care. 1st ed. New York: American Institute for Cancer Research; 2000. p. 11-22.

8.Silvente-Poirot S, Bensadoun RJ. Prevention and treatment of mucositis in head and neck cancer patients receiving radiotherapy or chemoradiotherapy: review and update. Oral Oncol. 2022;128:105796.

9.Langius JAE, Doornaert P, Spreeuwenberg MD, et al. More than 10% weight loss in head and neck cancer patients during radiotherapy correlates with other nutritional parameters and is associated with impaired

quality of life. Support Care Cancer. 2016;24(10):437-444.

10.Caccialanza R, Pedrazzoli P. Nutritional support for head and neck cancer patients undergoing chemotherapy and radiation therapy: an update. Curr Opin Support Palliat Care. 2020;14(4):277-282.

11.Haddad RI, Shin DM. Recent advances in head and neck cancer. N Engl J Med. 2008;359(11):1143-1154.

12.Dijkstra PU, Kalk WWI, Roodenburg JLN. Trismus in head and neck oncology: a systematic review. Oral Oncol. 2004;40(9):879-889.

13.van der Molen L, van Rossum MAJ, Burkhead LM, et al. A systematic review of effects of radiation therapy on quality of life and trismus-induced complications in head and neck cancer patients. Oral Oncol. 2010;46(12):867-874.

14.Jensen SB, Pedersen AM, Vissink A, et al. A systematic review of salivary gland hypofunction and xerostomia induced by cancer therapies. Support Care Cancer. 2010;18(8):1061-1079.

15.Preiser J-C, van Zanten ARH. The pragmatic approach to nutritional assessment and therapy in critically ill cancer patients. Curr Opin Clin Nutr Metab Care. 2017;20(2):125-130.

16.Argilés JM, Busquets S, Stemmler B, López-Soriano FJ. Cancer cachexia: understanding the molecular basis. Nat Rev Cancer. 2014;14(11):754-762.