

Nutritional Status and Quality of Life In Head and Neck Cancer Patients: Insights From A Nigerian Study

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Abstract

Background: Malnutrition is a significant challenge in head and neck cancer (HNC) patients, often exacerbated by tumor location, treatment side effects, and socioeconomic constraints. This study examines the relationship between nutritional status and quality of life (QoL) among HNC patients at the University College Hospital (UCH), Ibadan, Nigeria.

Methods: A cross-sectional study of 100 HNC patients was conducted. QoL was assessed using the European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30 and QLQ-H&N35 questionnaires. Nutritional status was evaluated using body mass index (BMI), serum albumin, and prealbumin levels. Logistic regression was performed to identify predictors of poor QoL.

Results: Malnutrition was identified in 45% of patients, significantly reducing QoL scores for physical, emotional, and social functioning ($p < 0.05$). Malnourished patients reported higher symptom burdens, particularly pain, dysphagia, and xerostomia. Additionally, 67% reported reduced sexual activity and 58% experienced body image disturbances. Logistic regression identified serum albumin <3.5 g/dL (OR = 2.89, 95% CI: 1.4–5.9) and BMI <18.5 kg/m² (OR = 3.45, 95% CI: 1.8–6.7) as independent predictors of poor QoL.

Conclusion: Malnutrition significantly impairs QoL in HNC patients. Early nutritional assessment and intervention, along with cost-effective supportive strategies, are crucial—especially in resource-limited settings—to improve patient outcomes.

Keywords: Nutritional status, quality of life, head and neck cancer, malnutrition, sexual dysfunction, body image, psychological distress, EORTC QLQ-C30, EORTC QLQ-H&N35

Introduction

Head and neck cancers (HNCs) represent a significant global health burden, particularly in low- and middle-income countries (LMICs), where access to comprehensive oncology care is limited [1]. These malignancies—including cancers of the nasopharynx, oral cavity, pharynx, and larynx—affect critical functions such as speech, swallowing, and breathing, resulting in profound nutritional challenges and reduced quality of life (QoL) [2].

The global incidence of HNC exceeds 900,000 cases annually, with LMICs disproportionately affected due to late-stage diagnoses, inadequate healthcare infrastructure, and greater exposure to risk factors such as tobacco use, alcohol consumption, and human papillomavirus (HPV) infection [3,4].

Malnutrition in HNC patients is multifactorial. Tumor-induced dysphagia, treatment-related toxicities (e.g., mucositis, xerostomia), and systemic inflammation contribute to significant weight loss, muscle wasting, and nutrient deficiencies [5]. These factors are exacerbated by the aggressive nature of HNC treatments, including surgery, radiotherapy, and chemotherapy, which impair oral intake and nutrient absorption [5, 6]. Studies from high-income countries

report malnutrition rates in HNC patients ranging from 30% to 50%, with even higher rates in advanced-stage disease [7, 8].

A study in Nigeria found that over 60% of HNC patients presented with advanced-stage disease [9, 10] highlighting the need for early detection and intervention. In addition to affecting survival and treatment outcomes, malnutrition profoundly impacts QoL, increasing treatment toxicity, reducing survival rates, and impairing physical, emotional, and social well-being. [11]. Malnourished HNC patients often experience severe symptoms such as pain, fatigue, and dysphagia, further diminishing their ability to perform daily activities and maintain social relationships [5, 12].

Furthermore, nutritional deficits can exacerbate psychological distress, including anxiety and depression [13], which are common among HNC patients due to the visible and functional impairments caused by the disease and its treatment. For example, Merran Findlay et al. reported that malnutrition was independently associated with lower QoL scores across multiple domains, including physical, emotional, and social functioning, in HNC patients undergoing radiotherapy [14].

While the relationship between malnutrition and QoL has been extensively studied in Western populations, limited data exist from Nigeria, where cultural and economic factors may further influence these outcomes. In a country where 40.1% of people are poor according to the 2018/19 national monetary poverty line, and 63% are multidimensionally poor, [15] access to nutritional support and psychosocial care is often inadequate, exacerbating the challenges faced by HNC patients. Additionally, the cultural stigma surrounding visible disfigurement and functional impairments may contribute to social isolation and poor treatment adherence, further compromising QoL [16].

This study aims to fill this critical gap by evaluating the relationship between nutritional status and QoL among HNC patients at UCH, Ibadan. By examining the prevalence of malnutrition, its impact on QoL, and predictors of poor outcomes, we seek to inform the development of targeted interventions to improve supportive care in resource-limited environments. Understanding these associations is essential for designing cost-effective, culturally appropriate strategies to enhance the well-being of HNC patients in Nigeria and similar settings.

Methods

Study Design and Population

A hospital-based cross-sectional study was conducted among 100 histologically confirmed head and neck cancer (HNC) patients undergoing treatment at the University College Hospital (UCH), Ibadan.

Inclusion Criteria

- Adults (≥ 18 years) with histologically confirmed HNC.
- Patients receiving chemotherapy, radiotherapy, or a combination.

Exclusion Criteria

- Patients with severe cognitive impairment affecting survey responses.
- Individuals with concurrent illnesses significantly affecting nutritional status (e.g., end-stage renal disease).

Sample Size Calculation:

Using the formula for estimating proportions in a cross-sectional study:

$$n = (Z\alpha/2)^2 * p * (1-p) / d^2$$

Where:

n: is the required sample size

Z $\alpha/2$: is the critical value of the standard normal distribution for your desired confidence level (e.g., 1.96 for a 95% confidence level)

- p = estimated population proportion
- $(1 - p)$ = complement of the population proportion
- d = margin of error

Using an estimated prevalence of 50% ($p = 0.5$) for adequate sample precision, the calculation yielded a required sample size of 96, which was rounded to 100 for feasibility.

Data Collection and Study Variables

Data were collected through structured questionnaires and medical record reviews. The following variables were analyzed:

1. Demographic and Clinical Variables

- Age, sex, educational level, occupation, marital status.
- Cancer site, histological type, tumor stage, treatment type (surgery, chemotherapy, chemo-radiation therapy).

2. Quality of Life (QoL) was assessed using the European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30 and QLQ-H&N35 questionnaires. These validated instruments measure general QoL in cancer patients (QLQ-C30) and head and neck cancer-specific symptoms (QLQ-H&N35). The questionnaires include scales for physical, emotional, cognitive, and social functioning, as well as symptom burden.

- The questionnaires were administered once per patient during the study period.
- Responses were scored using the EORTC scoring manual, and higher scores indicated better functioning or higher symptom burden, depending on the scale.

3. Nutritional status was evaluated using:

- Body Mass Index (BMI): Categorized using WHO classifications.
- Serum albumin (<3.5 g/dL) and pre-albumin (<15 mg/dL): Patients with values below these thresholds were classified as malnourished.
- Weight loss history: Documented based on patient recall over the past 6 months.

Each nutritional variable was measured once at the time of data collection.

Statistical Analysis

- Descriptive Statistics: Used to summarize demographic, clinical, and nutritional data (frequencies, means, standard deviations).
- Comparative Analyses:
 - QoL scores between groups (e.g., malnourished vs. non-malnourished) were compared using Student's t-test.
- Regression Analysis:
 - Logistic regression was performed to assess predictors of poor QoL, adjusting for demographic and clinical variables.
- Significance Level: A p-value < 0.05 was considered statistically significant.

Results

The results are presented systematically, addressing each variable studied and exposed in the methodology. **Tables 1, 2, and 3** provide detailed demographic data, QoL score comparisons, and logistic regression analysis results, respectively.

Table 1: Demographic and Clinical Characteristics of Study Participants

Characteristic	Overall (100)	Malnourished (45)	Well-Nourished (55)	p-value
Age(yrs, mean±SD)	58.3 ± 10.4	60.1 ± 9.7	56.8 ± 10.9	0.08
Sex (Male/Female)	62/38	30/15	2/23	0.42
Tumor Site (%)				
Oral Cavity	40%	20%	20%	0.05
Pharynx	35%	22%	13%	0.01
Larynx	20%	8%	12%	0.03
Salivary Gland	5%	3%	2%	0.37
Treatment (%)				
Surgery	20%	5%	15%	0.02
Radiotherapy	30%	15%	15%	0.09
Chemoradiotherapy	50%	25%	25%	0.13

Patient Characteristics:

The study included 100 patients (62% male, 38% female) with a median age of 58 years. The most common tumor sites were the oral cavity (40%) and pharynx (35%), consistent with global epidemiological patterns [10]. Malnourished patients were older (mean age: 60.1 years) compared to well-nourished patients (mean

age: 56.8 years), though this difference was not statistically significant ($p = 0.08$). Tumor site distribution and treatment modalities were comparable between groups, with no significant differences except for a higher proportion of pharyngeal tumors in the malnourished group ($p = 0.01$).

Table 2: Comparison of QoL Scores Between Malnourished and Well-Nourished Patients

QoL Domain	Malnourished (Mean ± SD)	Well-Nourished (Mean ± SD)	p-value
Physical Functioning	45.3 ± 12.4	68.2 ± 14.3	0.001
Emotional Functioning.	42.8 ± 13.1	65.7 ± 15.2	0.002
Social Functioning	39.5 ± 14.7	70.2 ± 16.3	<0.001
Pain Score	72.5 ± 10.5	45.6 ± 12.1	
Swallowing Difficulties	68.7 ± 11.3	38.2 ± 14.5	<0.001
Fatigue	70.1 ± 10.2	49.8 ± 13.6	0.001

Nutritional Status and QoL

Malnutrition was observed in 45% of patients, with significantly lower QoL scores across all domains ($p < 0.05$). Malnourished patients reported worse physical functioning (45.3 vs. 68.2, $p = 0.001$), emotional functioning (42.8 vs. 65.7, $p = 0.002$), and social functioning (39.5 vs. 70.2, $p < 0.001$). They also experienced higher symptom burdens, particularly in pain (72.5 vs. 45.6, $p < 0.001$), swallowing difficulties (68.7 vs. 38.2, $p < 0.001$), and fatigue (70.1

vs. 49.8, $p = 0.001$). These findings are consistent with earlier observations [11].

Additionally, sexual dysfunction was prevalent, with 67% of malnourished patients reporting reduced sexual activity and 58% experiencing body image disturbances. This aligns with previous findings that malnutrition and body image changes contribute to psychological distress in cancer patients [12].

Table 3: Logistic Regression Analysis of Predictors of Poor QoL

Predictor Variable	Adjusted OR (95% CI)	p-value
Serum Albumin <3.5 g/dL	2.89 (1.4–5.9)	0.004
BMI <18.5 kg/m ²	3.45 (1.8–6.7)	0.002
Advanced Tumor Stage (3 & 4)	2.78 (1.3–5.2)	0.006
Chemoradiotherapy	2.15 (1.1–4.1)	0.03
Pain Score > 60	3.20 (1.6–6.3)	0.002

Predictors of Poor QoL:

Logistic regression analysis identified serum albumin <3.5 g/dL (OR = 2.89, 95% CI: 1.4–5.9, $p = 0.004$) and BMI <18.5 kg/m² (OR = 3.45, 95% CI: 1.8–6.7, $p = 0.002$) as independent predictors of poor QoL. Advanced tumor stage (OR = 2.78, 95% CI: 1.3–5.2, $p = 0.006$) and a pain score > 60 (OR = 3.20, 95% CI: 1.6–6.3, $p = 0.002$) were also significant predictors. These findings highlight the critical role of nutritional status and symptom burden

Discussion

Our study demonstrates that malnutrition, observed in 45% of head and neck cancer (HNC) patients at the University College Hospital (UCH), Ibadan, is associated with significantly poorer quality of life (QoL). These findings align with global reports, which estimate the prevalence of malnutrition in HNC patients to range from 30% to 50% [7,8]. The multifactorial etiology of malnutrition in HNC—including tumor-induced dysphagia, treatment-related toxicities, and systemic inflammation—coupled with socioeconomic constraints in low- and middle-income countries (LMICs) likely contributes to the high prevalence rate observed in our study.

The adverse impact of malnutrition on QoL has been well-documented in the literature. For instance, low serum albumin levels and reduced body mass index (BMI) have been correlated with increased symptom burden and decreased physical functioning [5,17]. Our logistic regression analysis confirmed that both serum albumin <3.5 g/dL and BMI <18.5 kg/m² are independent predictors of poor QoL, consistent with previous work demonstrating that nutritional deficits exacerbate treatment toxicity and hinder recovery [5,6]. These findings underscore the importance of routine nutritional assessments in HNC patients, as serum albumin and BMI are valuable tools for identifying those at risk of poor QoL. Early intervention based on these markers could significantly improve patient outcomes.

In addition to physical symptoms, our study found a high prevalence of sexual dysfunction (67%) and body image disturbances (58%). These aspects of QoL are often underreported but are critical to overall well-being. The psychosocial impact of disfigurement, weight loss, and functional impairments can lead to decreased sexual activity and increased emotional distress [11,18,19]. Our findings echo those of recent studies emphasizing the need for integrated supportive care that includes nutritional support, psychosocial counseling, and rehabilitation services to address these issues [20]. Tailored interventions that address sexual health and body image concerns are necessary to provide holistic care for HNC patients, particularly in cultural contexts where these issues may be stigmatized.

The literature suggests that early nutritional intervention can improve treatment tolerance and QoL [21, 22]. In resource-limited settings such as Nigeria, where access to comprehensive nutritional support is scarce, cost-effective strategies such as locally available high-protein diets and community-based nutrition programs could be beneficial.

Furthermore, the study highlights the need for integrated multidisciplinary care that combines nutritional support with symptom management, psychosocial counseling, and rehabilitation programs to address the multifaceted challenges faced by HNC patients.

Limitations of the Study:

While our findings provide valuable insights, several limitations must be acknowledged. First, the study was conducted at a single tertiary care center, which may limit the generalizability of the results to other settings.

Second, the cross-sectional design of the study precludes the establishment of causal relationships between malnutrition and QoL. Longitudinal studies are needed to explore these relationships further and identify critical windows for intervention.

Third, the reliance on self-reported data for certain outcomes, such as sexual dysfunction and body image concerns, may introduce recall bias.

Future studies should incorporate objective measures and mixed-methods approaches to validate these findings.

Finally, the study did not account for the potential impact of specific treatments (e.g., surgery vs. chemoradiotherapy) on nutritional status and QoL, which could provide valuable insights for personalized care strategies.

Clinical and Policy Implications:

The findings of this study have important implications for clinical practice and policy. Routine nutritional screening using simple, cost-effective tools like BMI and serum albumin should be implemented to identify malnourished patients early in their treatment journey. Integrated multidisciplinary care that combines nutritional support with symptom management, psychosocial counseling, and rehabilitation programs is essential to address the multifaceted challenges faced by HNC patients. In resource-limited settings, cost-effective interventions such as locally available high-protein diets and community-based support programs should be explored to improve nutritional status and QoL. Additionally, patient-centered support that addresses sexual dysfunction and body image concerns through tailored interventions, including counseling and education, is critical to improving psychological well-being.

Conclusion

This study provides compelling evidence that malnutrition significantly impairs QoL in HNC patients, with serum albumin and BMI emerging as strong predictors of poor outcomes. The findings highlight the need for early nutritional assessment and intervention, particularly in resource-limited settings, where the burden of HNC is high and access to comprehensive care is limited. By addressing malnutrition and its associated challenges through integrated, patient-centered care, healthcare providers can improve the overall well-

being of HNC patients and enhance their quality of life. This study serves as a call to action for policymakers, clinicians, and researchers

to prioritize nutritional support as a cornerstone of cancer care in LMICs.

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