Nutritional status and quality of life of patients with nasopharyngeal carcinoma

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Abstract. The aim of the present study was to assess the nutritional status and quality of life (QOL) of patients with nasopharyngeal carcinoma (NPC) undergoing treatment. The present cross-sectional study included 129 patients with NPC aged ≥18 years who were treated between February and December, 2024. The nutritional status was assessed using body mass index and the Patient-Generated Subjective Global Assessment (PG-SGA), while QOL was evaluated using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30). Multivariate analysis was conducted to determine the predictors of quality-of-life scales. Age (years), malnutrition (PG-SGA scores), sex (male vs. female), age (years), feeding route (oral vs. tube) and disease stage (I-IV) were analyzed using linear regression analysis. Based on the PG-SGA (scores ≥9), 74.4% of the patients were at risk of developing malnutrition. The average weight loss was 7.6±8.4 kg over 6 months and 2.9±5.3 kg over 1 month. The average global QOL score was 66.1±19. Significant differences in QOL domains (physical, role, emotional, cognitive and social function) and symptoms (fatigue, anorexia, pain, nausea, vomiting and constipation) were observed across nutritional status groups based on PG-SGA classification (P<0.05). On the whole, the [resemt study demonstrates that malnutrition is highly prevalent among patients with NPC and is significantly associated with poorer QOL. These findings highlight the importance of

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timely routine nutritional assessment and support as part of standard oncologic practice.

Introduction

Nasopharyngeal carcinoma (NPC) is the most prevalent type of head and neck cancer globally, accounting for ~120,434 new cases and 73,482 deaths annually (1). The highest age-standardized incidence rates (ASIRs) are observed in East and Southeast Asia, including Singapore, the Maldives and Indonesia (ASIRs ~7); Malaysia and Vietnam (~6); and China (~3) (2). In Vietnam, NPC ranks among the top 10 cancers, with 5,613 new cases (3.1% of all cancers) and 3,453 deaths (2.9%) annually. The current 5-year incidence rate is 16,007 individuals (3).

Radiotherapy is the main treatment for NPC. While early-stage cases may be effectively managed with radiotherapy alone, intermediate- and late-stage diagnoses often require concurrent radiotherapy and chemotherapy (2). A main concern during treatment is malnutrition, driven by both the disease and its treatment side effects. Radiation therapy, in particular, is associated with high malnutrition rates, with hypoproteinemia-related symptoms including weight loss, lower limb edema and cachexia (4,5). Malnutrition weakens the immune system, prolongs the period of hospitalization, aggravates the side-effects of radiotherapy, interrupts treatment schedules, and worsens the prognosis and quality of life (QOL) of patients (6,7).

Malnutrition often begins early in the course of treatment and worsens over time (8). Studies have reported that 20.2% of patients lose >10% of their body weight during chemoradiotherapy (9), and malnutrition prevalence can rise from 16.8% pre-treatment to 91.2% post-treatment (10). Wei *et al* (11) reported a severe malnutrition rate of 80.7% during radiotherapy, while Zhuang *et al* (12) found that 69.0% of patients were malnourished upon the completion of treatment.

Can Tho Oncology Hospital (Can Tho, Vietnam), a grade I facility serving as a specialized center in the Mekong Delta region of Vietnam, is the only hospital in Can Tho City equipped with a radiotherapy machine. Of note, >100 patients with NPC from across the region are treated annually at this

hospital. However, nutritional neglect during treatment often leads to delayed and prolonged periods of hospitalization.

To address this issue, a nutritional assessment program has been initiated to detect malnutrition early and guide timely interventions to improve the overall QOL of patients. The present study aimed to assess the nutritional status and QOL of patients with NPC at Can Tho Oncology Hospital in 2024, using the Patient-Generated Subjective Global Assessment (PG-SGA) and the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30). The PG-SGA is used to assess nutritional status, helping to identify malnutrition early for timely intervention. The EORTC QLQ-C30 evaluates the QOL, guiding improvements in patient care and overall well-being.

Patients and methods

Study population. The present study included patients with NPC treated at Can Tho Oncology Hospital from February, 1 to December, 31, 2024. The eligibility criteria included an age ≥18 years and a histopathological diagnosis of primary NPC. Patients with severe dementia or mental disorders precluding cooperation were excluded. All patients were fully informed and voluntarily consented to participate in the study. Ethics approval was first obtained from Can Tho Oncology Hospital on February 1, 2024 according to Decision no. 02/HĐĐĐ-BVUBCT (Cantho, Vietnam). The present study was also then approved by the Ethics Committee of Hanoi Medical University (Hanoi, Vietnam) under Decision no. NCS2024/ GCN-HMUIRB, dated May 15, 2024. It is understood that the study team provided the potential participants with study-related information on the contents and objectives of the study and sought their consent to participate by signing the consent form.

Study design. The present study was a descriptive cross-sectional study using convenience sampling. The sampling technique used was non-probability sampling. As regards sample size and sample selection, the sample size was calculated according to the formula for calculating the estimated sample size of 1 mean with the population sample size, as follows:

$$n = Z^2_{1-\frac{\alpha}{2}} \cdot \frac{p(1-p)}{(\varepsilon.p)^2}$$

where 'α' represents the type 1 error, α=0.05; $Z^2_{1-\frac{\alpha}{2}}$=1.96 (equivalent to 95% confidence level); and 'ε' represents the relative estimation error, ε=0.1. According to the study by Wei *et al* (11), 80.7% of patients wth NPC received chemoradiotherapy. Substituting into the formula, the sample size was n=92. In fact, the present study collected data from 129 patients.

The present study investigated patients diagnosed with NPC who received various treatment modalities, including chemotherapy (specifically cisplatin, carboplatin, gemcitabine, or 5-fluorouracil), radiotherapy alone, or a combination of chemoradiotherapy (utilizing cisplatin and 5-fluorouracil). Medical records provided the number, location, stage and size of primary tumors; the type of the most recent primary tumor; the number and types of treatments; and the start and end dates of each treatment.

Nutritional assessments and interventions are not standard practice for NPC in a research location. Nutritional therapy, encompassing both enteral and parenteral nutrition, was administered to patients at risk of malnutrition based on physician discretion rather than nutritionists. The records only indicated whether patients received nutritional therapy, without specifying the types of therapies prescribed or their adequacy for addressing malnutrition.

Assessment of nutritional status. Data were collected through structured questionnaires covering demographics, the PG-SGA-based nutritional assessment tool, and anthropometric and biochemical measurements. Body weight (kg) and height (cm) were recorded, and percentage weight loss was calculated as follows:

$$\% \text{ Weight loss} = 100 \text{x} \frac{(\text{Body weight at the time of interview} - \text{Body weight 1 or 6 months prior})}{\text{Body weight 1 or 6 months prior}}$$

The PG-SGA evaluates weight loss history, dietary intake, gastrointestinal symptoms, functional status and physical signs (e.g., fat/muscle wasting, edema) (13,14). Scoring thresholds were as follows: 0-1, well-nourished; 2-3, moderate or suspected malnutrition, warranting patient and family education; 4-8, severe malnutrition requiring intervention; and ≥9, critical malnutrition necessitating urgent nutritional support.

Assessment of QOL. QOL was assessed using the EORTC QLQ-C30, a well-validated cancer-specific tool (15), and has been validated in Vietnamese cancer populations (16). The questionnaire comprises 30 items covering five functional domains (physical, role, emotional, cognitive, and social), symptom scales (e.g., fatigue, pain) and a global health/QOL scale (17,18). Scores were calculated and linearly transformed (range 0-100), with higher functional/global scores indicating an improved QOL and higher symptom scores indicating worse symptoms (16).

Data collection. Self-report questionnaires collected demographic data (age, sex, education level, etc.) and disease-related information (cancer stage, treatment, etc.). All eligible patients who consented were asked to complete the self-report questionnaire, PG-SGA and QLQ-C30 upon their initial admission to the inpatient chemotherapy and radiotherapy department. The investigators assisted patients who had difficulty answering the questions, ensuring that all questions were fully answered within 10-15 min. Clinical staff completed the clinician-assessed PG-SGA section immediately upon receiving the questionnaires from the patients.

Statistical analysis. Data were entered using Epidata 3.1 and analyzed using SPSS 22 software (IBM Corp.). Descriptive statistics were reported as frequencies, percentages, and the mean ± standard deviation (SD). Differences in age groups, sex, education levels, cancer stages, treatment types (chemotherapy, radiotherapy, chemoradiotherapy, or others), and nutritional status (malnourished vs. well-nourished patients) were analyzed using the Chi-squared test. However, in the case that >20% of the cells had expected frequencies <5, Fisher's exact test was applied instead. The Mann-Whitney U test was used to compare PG-SGA scores and QOL scores

Table I. Demographic and clinical characteristics of the patients with NPC (n=129).

Characteristic	Count, n (%)
Age, years	
<60	97 (75.2)
≥60	32 (24.8)
Mean ± SD	52.4±12.5
Sex	
Male	96 (74.4)
Female	33 (25,6)
Education level	
Illiteracy	8 (6.2)
Primary school	56 (43.4)
Middle school	42 (32.6)
High school	17 (13.2)
Post-high school	6 (4.7)
Stage	
I-II	22 (17.1)
III-IV	107 (82.9)
Treatment	
Chemotherapy	78 (60.5)
Radiotherary	11 (8.5)
Chemo-radiotherary	28 (21.7)
Other	12 (9.3)
Feeding route	
Oral feeding	112 (78.7)
Tube feeding	17 (21.3)
PG-SGA	
≤1	2 (1.6)
2-3	3 (2.3)
4-8	28 (21.7)
≥9	96 (74.4)
Weight loss in 1 month	
<5%	88 (68.2)
≥5%	41 (31.8)

PG-SGA, Patient-Generated Subjective Global Assessment.

Table II. Anthropometric and biochemical characteristics of nutrition.

Parameter	Mean ± SD
Weight (kg)	55.2±10.3
Height (cm)	161.3±7.7
BMI (kg/m^2)	21.1±3.3
PG-SGA	15.98±9.3
Weight loss in 1 month (kg)	2.9±5.3
Weight loss in 6 months (kg)	7.6±8.4
WBC count, 10^9/l	8.8±9.3
Lymphocyte count, 10^9/l	1.7±2.7
Hemoglobin, g/l	115.8±19.4

PG-SGA, Patient-Generated Subjective Global Assessment; WBC, white blood cell.

due to non-normal distribution. The association between malnutrition and QOL was analyzed using linear regression analyses. In linear regression analyses using the enter method, the PG-SGA score, sex (male vs. female), age (years), feeding route (oral vs. tube) and disease stage (I-IV) were included as predictors. A value of P<0.05 was considered to indicate a statistically significant difference.

Results

The present study included 129 patients with NPC with a mean age of 52.4±12.5 years; 75.2% of the patients were <60 years of age. The male-to-female ratio was 2.91:1, and approximately half of the patients had a primary school education.

The majority of the patients were diagnosed at stage III-IV disease (82.9%) and were undergoing chemotherapy (60.5%). Severe malnutrition (PG-SGA ≥9) was observed in 74.4% of the patients, with a mean PG-SGA score of 15.98±9.3. Patients experienced an average weight loss of 2.9 kg in 1 month, and 31.8% of the patients lost >5% of their body weight (Table I).

The anthropometric and biochemical characteristics of the patients are presented in Table II. The mean weight and height of the patients were 55.2±10.3 kg and 161.3±7.7 cm, respectively (body mass index, 21.1±3.3 kg/m²). The mean PG-SGA score was 15.98±9.3. Patients lost an average of 2.9 kg in 1 month and 7.6 kg over a period of 6 months. The mean white blood cell and lymphocyte counts were 8.8x10^9/l and 1.7x10^9/l, respectively. The mean hemoglobin level was 115.8 g/l.

No significant differences were found in age, sex, treatments, education, or tumor stage (I/II vs. III/IV) between the malnourished and well-nourished patients (P>0.05). However, a significant association was found between the nutritional status (PG-SGA) and feeding route (P<0.05), with all patients with NPC using feeding tubes being malnourished. The analysis of the biochemical nutrition characteristics (white blood cell count, lymphocyte count and hemoglobin) did not reveal any no significant associations between these factors, nutritional status and QOL (P>0.05) (Table III).

The univariate association between nutritional status (PG-SGA scores) and QOL is presented in Table IV. The average scores for general health, physical, role-based, social, cognitive and emotional functioning decreased with malnutrition. Conversely, the average score of fatigue, nausea/vomiting, pain, appetite loss and constipation increased in the malnourished patients vs. the well-nourished patients (P<0.05).

To investigate the factors influencing the QOL of patients, a multivariate linear regression analysis was conducted. Independent variables included demographic characteristics, clinical features and nutritional status assessments that exhibited statistically significant associations in prior analyses (e.g., feeding route, age, disease stage, percentage weight loss over 1 month and PG-SGA score). All QOL scale scores were used as dependent variables. The PG-SGA score significantly predicted overall QOL, explaining 39% of the variance

Table III. Nutritional status according to PG-SGA and some related factors.

Characteristic	Well-nourished patients (n=33), (%)	Malnourished patients (n=96), (%)	P-value
Age, years			
<60	28 (28.9)	69 (71.1)	0.17[a]
≥60	5 (15.6)	27 (84.4)	
Sex			
Male	27 (28.1)	69 (71.9)	0.36[a]
Female	6 (18.2)	27 (81.8)	
Education level			
Illiteracy	0 (0)	8 (100)	0.21[a]
Primary school	14 (25)	42 (75)	
Middle school	13 (31)	29 (69)	
High school	3 (17.6)	14 (82.4)	
Post-high school	3 (50)	3 (50)	
Stage			
I-II	6 (27.3)	16 (72.7)	0.999[a]
III-IV	27 (25.2)	80 (74.8)	
Treatment			
Chemotherapy	26 (33.3)	52 (66.7)	0.09[b]
Radiotherary	1 (9.1)	10 (90.9)	
Chemo-radiotherary	5 (17.9)	23 (82.1)	
Other	1 (8.3)	11 (91.7)	
Feeding route			
Oral feeding	33 (29.5)	79 (70.5)	**0.01[b]**
Tube feeding	0 (0)	17 (100)	
Weight loss in 1 month			
<5%	32 (36.4)	56 (63.6)	**0.001[b]**
≥5%	1 (2.4)	40 (97.6)	
WBC count, 10^9/l			
<4	4 (21.1)	15 (78.9)	0.78[b]
≥4	29 (26.4)	81 (73.6)	
Lymphocyte count, 10^9/l			
<1	11 (21.2)	41 (78.8)	0.41[a]
≥1	22 (28.6)	55 (71.4)	
Hemoglobin, g/l			
<120	16 (21.6)	58 (78.4)	0.31[a]
≥120	17 (30.9)	38 (69.1)	

Data were analyzed using the [a]Chi-squared test, or [b]Fisher's exact test. Values in bold font indicate statistically significant differences (P<0.05). PG-SGA, Patient-Generated Subjective Global Assessment.

(adjusted R^2=0.39, F=15.95, P=0.001). The PG-SGA score also significantly affected different areas of QOL, including physical (37%), role (32%), emotional (17%), cognitive (17%), social (31%), fatigue (56%), nausea/vomiting (29%) and appetite loss (53%). Furthermore, the PG-SGA score and age significantly predicted pain symptoms (40% variance, adjusted R^2=0.40, F=42.24, P=0.001), while PG-SGA score, age and feeding route predicted constipation symptoms (31% variance, adjusted R^2=0.31, F=18.84, P=0.001) (see Table III for detailed data) (Table V).

Discussion

Malnutrition is common in patients with cancer, with a prevalence ranging from 20 to 70% depending on the cancer type, stage and clinical setting. This is often detected through screening tools and results primarily from inadequate food intake due to nutrition impact symptoms caused by the tumor itself, cancer treatments, or disease-related complications (18-20). The present cross-sectional study identified a high prevalence of malnutrition among NPC patients at Can

Table IV. Association between nutritional status according to PG-SGA and quality of life.

Characteristic	Well-nourished patients (n=33)		Malnourished patients (n=96)		P-value[a]
	Median	IQR	Median	IQR	
Global quality of life	77.8	50.0; 75.0	62.1	66.7; 95.8	**0.001**
Functioning scales					
Physical	97.2	80.0; 100	82.2	100; 100	**0.001**
Role	91.9	50.0; 100	68.9	91.7; 100	**0.001**
Emotional	87.6	66.7; 91.7	78.2	75.0; 100	**0.009**
Cognitive	97.5	83.3; 100	86.8	100; 100	**0.001**
Social	86.4	33.3; 100	63.7	66.7; 100	**0.001**
Symptom scale/items					
Fatigue	5.7	11.1; 44.4	31.4	0.0; 5.6	**0.001**
Nausea and vomiting	1.0	0.0; 33.3	16.7	0.0; 0.0	**0.001**
Pain	8.1	0.0; 0.0	31.6	0.0; 0.50	**0.001**
Dyspnea	2.0	0.0; 0.0	2.8	0.0; 0.0	0.500
Sleep disturbance	20.2	0.0; 33.3	28.8	0.0; 33.3	0.200
Appetite loss	9.1	33.3; 33.3	37.5	0.0; 16.7	**0.001**
Constipation	1.0	0.0; 0.0	9.8	0.0; 0.0	**0.023**
Diarrhea	2.0	0.0; 0.0	3.1	0.0; 0.0	0.401
Financial impact	28.3	0.0; 50.0	39.2	0.0; 66.7	0.178

[a]Data were analyzed using the Mann-Whitney U test. Values in bold font indicate statistically significant differences (P<0.05). EORTC QLQ-C30, European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 questionnaire; IQR, interquartile range; n, number of valid observations; PG-SGA, Patient-Generated Subjective Global Assessment.

Tho Oncology Hospital. The majority of the participants in the present study were experiencing moderate to severe malnutrition and were in need of nutritional assistance. Only 1.6% of the patients were well-nourished, while 74% of the patients had severe malnutrition (PG-SGA ≥9). These results align with those of previous longitudinal studies by Wei et al (11) (80.7% with PG-SGA ≥9) and Miao et al (22) (82% requiring nutritional intervention when weight loss ≥5%), although the present study observed a lower intervention rate in the patients with NPC. This discrepancy likely stems from the cross-sectional design pf the present study, which captured patients at varying treatment stages, unlike the studies by Wei et al (11) and Miao et al (22), which followed patients from the beginning to the end of radiotherapy or chemo-radiotherapy. Consequently, the present study sample likely included newly treated patients with an improved nutritional status compared to those nearing the end of treatment. Consistent with this, the study by Wei et al (11) demonstrated a significant increase in moderate to severe malnutrition post-treatment (PG-SGA ≥9: 0.7% pre-treatment vs. 80.7% post-treatment). Likewise, herein, the mean cross-sectional PG-SGA score (15.98±9.3) was higher than that of untreated patients (7.50±5.97), but lower than that of patients receiving prolonged radiotherapy for 4 weeks (17.75±5.56) and 6 weeks (20.50±6.76), as reported in the study by Ding et al (23).

Malnutrition and weight loss are widespread in patients with cancer, with reported weight loss in 20-80% of cases and up to 60% in patients with NPC (23,24). Excessive weight loss, often related to tumor characteristics and treatment-related side-effects, exacerbates chemotherapy toxicity, causes treatment interruption and is associated with poorer treatment outcomes (25,26). Previous research has demonstrated that severe weight loss affects the progression and recurrence of NPC, and excessive weight loss can be considered a factor related to survival (28). In the present study, to minimize recall bias, patient weight data were re-recorded from medical records documented 1 month prior. For weight 6 months prior, recall was aided by using suggestive questioning, cross-checking information via repetition and family input and linking times to events. If the patient still could not recall, their usual pre-illness weight was recorded. This approach improves the accuracy of reported weight changes. The result was that >30% of patients experienced ≥5% weight loss in 1 month, with an average weight loss of 2.9±5.3 kg. In northern China, 56% of patients experience similar weight loss at diagnosis, and the average weight loss post-treatment is 6.9 kg (26). Benkhaled et al (29) found that 86% of patients with NPC lost >10% of body weight by week 7 of treatment with intensity-modulated radiation therapy with or without chemotherapy. Such weight loss is linked to increased treatment toxicity, interruptions and worse outcomes. Despite its clinical importance, weight loss often goes undetected. Routine monitoring of weight and nutritional status should be integrated into NPC management pathways.

Timely nutritional support is crucial for patients with NPC undergoing radiation therapy who are at risk of developing malnutrition (6,18). Early nutritional intervention can maintain nutritional status and improve treatment

Table V. Results of multivariate linear regression analysis (enter) to predict scores on EORTC QLQ-C30 scales.

Dependent variable	Independent variable	R^2	Adjusted R^2	F	P-value	Unstandardized coefficients			
						b	SE b	t	P-value
Global quality of life	Model	0.63	0.39	15.95	0.01				
	PG-SGA				0.01	-1.18	0.24	-4.98	0.01
Physical	Model	0.61	0.37	14.66	0.01				
	PG-SGA					-1.31	0.28	-4.64	0.01
Role	Model	0.56	0.32	11.32	0.01				
	PG-SGA				0.01	-1.96	0.40	-4.96	0.01
Emotional	Model	0.41	0.17	4.93	0.01				0.01
	PG-SGA					-0.96	0.28	-3.38	0.01
Cognitive	Model	0.41	0.17	5.09	0.01				
	PG-SGA					-1.01	0.27	-3.77	0.01
Social	Model	0.56	0.31	11.14	0.01				0.01
	PG-SGA					-1.73	0.42	-4.13	0.01
Fatigue	Model	0.75	0.56	31.35	0.01				0.01
	PG-SGA					2.11	0.27	7.75	0.01
Nausea and vomiting	Model	0.54	0.29	10.16	0.01				0.01
	PG-SGA					1.83	0.30	6.15	0.01
Pain	Model	0.63	0.40	43.24	0.01				
	PG-SGA					1.98	0.22	9.13	0.01
	Age					-0.41	0.16	-2.57	0.01
Appetite loss	Model	0.73	0.53	27.46	0.01				
	PG-SGA					2.45	0.29	8.54	0.01
Constipation	Model	0.56	0.31	18.84	0.01				
	PG-SGA					1.27	0.17	7.35	0.01
	Age					-0.27	0.12	-2.30	0.02
	Feeding route					-14.90	4.70	-3.17	0.01

EORTC QLQ-C30, European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 questionnaire. PG-SGA, Patient-Generated Subjective Global Assessment; R^2, coefficient of determination; F, ANOVA; b, regression coefficient; SE b, standard error of b.

tolerance (30). Diet and nutritional education are continuous, emphasizing healthy cooking and small, frequent meals. Oral nutritional supplements are used when diet and education are insufficient (31). In the case that oral nutritional supplements are inadequate, enteral nutrition is initiated, and parenteral nutrition is considered if enteral nutrition fails to meet nutritional needs (32). The study Wang *et al* (33) on the association of nutritional counseling with the severity of radiation-induced oral mucositis in patients with NPC demonstrated that nutritional counseling was beneficial in reducing severe radiation-induced oral mucositis and PG-SGA ≥4. On the other hand, radiotherapy or chemo-radiotherapy lead to severe swallowing impairment in 50-70% of patients, necessitating enteral nutrition during or immediately post-treatment (34). In addition, the present study also found an association between nutritional status and feeding route (100% of patients with NPC need nutritional intervention when feeding through a tube; P<0.05; Table III). Enteral nutrition is indicated in patients who have nutritional issues (unable to tolerate at least 60%

of their energy and protein needs orally for 7-14 days, even with education, medication and supplements) (20,35) combined with dietary habits, finances and inadequate nutritional knowledge that can further complicate nutritional management. The truth is that at the authors' research site, a common option for nasogastric tube feeding is diluted white porridge, favored for its easy pump, particularly among patients with NPC and other types of cancer. However, its low nutritional content and the limited inclusion of energy-dense foods often result in an inadequate daily energy intake, heightening the risk of malnutrition. This highlights the critical need for improved nutritional strategies, such as integrating energy-rich foods into tube feeds and enhancing nutritional education for both patients and caregivers, and choosing locally available food sources to reduce costs. These measures are essential for preventing malnutrition and promoting improved health outcomes in patients with NPC.

The present study found that malnutrition significantly reduced global and functional QOL scores, while

increasing symptom burden, particularly fatigue, nausea and vomiting, pain, appetite loss and constipation (P<0.05), which is similar to findings from previous studies (36,37). Social and role function were found to be most affected by radiotherapy, likely due to physical changes (e.g., ulcerated skin and fatigue), emotional distress and body image concerns (38), resulting in social withdrawal during the treatment. Symptoms of pain (mainly caused by mucositis), fatigue, dry mouth and abnormal taste changes increased during radiotherapy, which markedly affects the appetite and eating habits of patients (30,31). In addition, almost all patients experienced abnormal taste, decreased salivation and dry mouth, which may be the main reasons for loss of appetite in patients with NPC undergoing radiotherapy (37). Fatigue is a common and distressing symptom experienced by patients with cancer. The combination of anorexia and early satiety in patients with cancer is associated with poorer overall health perception, role function and increased fatigue. These prevalent appetite disorders significantly impair the nutritional status and QOL of patients, particularly when occurring in conjunction. This can have profound effects on QOL and physical functioning (41,42). Fatigue is further exacerbated by concurrent chemotherapy and radiotherapy (43). In addition to sociodemographic and tumor-related factors and disease-specific symptoms, during treatment, tube feeding also has an impact on weight, nutritional status and QOL. It has been demonstrated that dietary counseling helps avoid weight loss and improves QOL. Previous studies have demonstrated that patients with head and neck cancer who received nutritional counseling during radiation therapy had a lower likelihood of weight loss, as well as a lower likelihood of deterioration in symptoms, functional scores and overall QOL (44,45). Early nutritional monitoring may prevent malnutrition and improve the QOL of patients with cancer, as suggested by a study on 312 patients that found an association between early monitoring and improved outcomes (46). Therefore, nutritional monitoring could be implemented during the early stages for NPC to improve its outcomes.

Convenience sampling and study samples being collected solely from one research center may bias results, limiting generalizability to all NPC. In the present study, the inclusion of all patients undergoing treatment limited the evaluation of how individual treatment-related side-effects affect nutrition and QOL. Future research is thus require to focus on single chemotherapy or radiotherapy regimens for more specific results. The present cross-sectional study cannot definitively prove causality between nutritional status and quality of life. Cross-sectional data limits our ability to determine if nutrition affects quality of life, or vice versa, or if other factors influence both. Future large cohort studies are warranted to confirm associations and the direction of influence.

In conclusion, malnutrition is highly prevalent among patients with NPC and is associated with significant weight loss, symptom burden and a reduced QOL. The present study highlights the need for early nutritional screening (e.g., PG-SGA), individualized dietary counseling and optimized enteral feeding using energy-dense, locally available foods. Enhancing caregiver education and initiating timely interventions can prevent nutritional decline, improve treatment tolerance, and ultimately enhance the clinical outcomes and QOL of patients.

Availability of data and materials

The data generated in the present study may be requested from the corresponding author.

Authors' contributions

All authors (KVV, HTTP, HTL, KND and ALTN) contributed to the conception and design of the study. HTTP, HTL and KND carried out the statistical analysis of the data. The study's investigators included HTTP, HTL, KND, ALTN and KVV. HTTP and HLT worked together to interpret the data. HTTP, ALTN and KND contributed to the initial draft of the text. HTTP, HTL, ALTN and KVV helped write, evaluate and revise the manuscript. HTTP and HTL confirm the authenticity of all the raw. All authors have read and approved the final manuscript.

Ethics approval and consent to participate

The present study was approved by the Ethics Committee of Hanoi Medical University (Hanoi, Vietnam) under Decision no. NCS2024/GCN-HMUIRB, dated May 15, 2024. It is understood that the study team provided the potential participants with study-related information on the contents and objectives of the study and sought their consent to participate by signing the consent form.

Patient consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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