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Evaluating Nurse-Led Interventions and Symptom Trajectories in Head and Neck Cancer Patients Undergoing Radiotherapy

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ABSTRACT

Patients with head and neck cancer (HNC) frequently endure multiple distressing symptoms that can substantially compromise their quality of life. This study aimed to assess the use of nurse-led consultations (NLCs) and examine whether these interventions influenced symptom burden. We performed a retrospective review of clinical data collected in routine practice to evaluate the delivery of NLCs and monitor symptom progression using the M.D. Anderson Symptom Inventory (MDASI). The analysis included patients receiving standard care (n = 72) and those who participated in NLCs (n = 62) at a radiation oncology unit from 2017 to 2019. Symptom assessments were conducted at three intervals: T0 (pre-treatment), T1 (mid-treatment, weeks 3–4), and T2 (late treatment, weeks 5–6). In the NLC group, over 80% of patients underwent assessments for nutrition, smoking, oral health, and swallowing/chewing function, whereas pain evaluation was less consistently performed. Interventions related to patient education (16%) and coordination of care (7%) were comparatively limited. Symptom severity increased over the treatment course, with no statistically significant differences between patients receiving NLCs and those receiving standard care. The findings indicate that nurse-led consultations did not significantly alter symptom burden during radiotherapy. Further research with larger patient populations, systematic process evaluation, and long-term follow-up is warranted to better understand the potential role of NLCs in managing symptoms for HNC patients.

Keywords: Head and neck cancer, Nurse-led intervention, Symptom management, Radiotherapy, Patient-reported outcomes

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Introduction

Head and neck cancers (HNC) rank among the top six cancers worldwide, with over 800,000 new cases and nearly 500,000 deaths reported annually [1]. This group encompasses tumors arising from the hypopharynx, oropharynx, lip, oral cavity, nasopharynx, and larynx [2]. Oral cancer is particularly common, ranking eleventh globally, and is strongly associated with tobacco, areca nut, alcohol, and high-risk human papillomavirus (HPV) types 16 and 18. HPV-driven oropharyngeal and oral cancers often respond better to treatment, opening avenues for preventive measures and less intensive therapy in HPV-positive patients [3]. Tobacco, alcohol, and HPV infection remain the most critical risk factors for HNC development [4, 5].

Treatment for HNC is typically multimodal, including surgery, radiotherapy, and chemotherapy, depending on tumor site, stage, patient comorbidities, and individual preferences [6, 7]. Early-stage tumors (T1–T2) are generally managed surgically, often using minimally invasive robotic techniques [8]. Patients diagnosed with stage I or II disease may receive surgery or radiotherapy, while carcinoma in situ is usually treated surgically [9]. Despite advances in therapy, patients frequently experience a high burden of symptoms, which can severely impact health-related quality of life (HRQoL) and complicate treatment adherence [10–13]. Common issues include pain, fatigue, reduced appetite, diarrhea, dry mouth, shortness of breath, and sleep disturbances [12–14].

Research indicates that up to 50% of patients report moderate-to-severe systemic symptoms, with symptom prevalence during radiotherapy ranging from 60% to 70% [15, 16].

Given the complexity of HNC treatment and the need for ongoing monitoring, integrated care approaches are essential [17]. Nurses are central to these approaches, offering symptom assessment, education, support, and coordination of care for side effects such as mucositis, radiodermatitis, and malnutrition [18–22]. Nurse-led interventions supporting post-treatment recovery have been appreciated by patients, although improvements in HRQoL and self-management skills are not consistently observed [23].

Routine assessment of both physical and psychosocial symptoms is increasingly incorporated into follow-up care. Patient-reported outcome measures (PROMs) have proven useful in monitoring symptoms during radiotherapy, and their use has been associated with improved HRQoL, reduced hospitalizations, and sometimes better survival outcomes [24–30]. Incorporating PROMs into nurse-led consultations may further enhance patient-centered care, yet evidence on their effectiveness in HNC remains limited [31].

In 2017, a nurse-led consultation program was introduced at the Radiotherapy Outpatient Clinic of Lausanne University Hospital. A multidisciplinary team of nurses, physicians, radiotherapy staff, and nutritionists developed the program to improve patient care coordination and support throughout treatment.

The primary aim of this study was to describe how the nurse-led consultation was implemented and examine its potential relationship with symptom burden in HNC patients. We specifically compared PROMs collected during routine care with those from patients receiving the nurse-led intervention, using the M.D. Anderson Symptom Inventory Head and Neck Module (MDASI-HN) [32] at three time points during radiotherapy.

Materials and Methods

Study design and setting

This study is a retrospective review of routinely collected clinical data conducted at the Department of Radiation Oncology, Lausanne University Hospital (CHUV). Prior to March 2018, HNC patients received standard nursing care, which included routine clinical assessments, patient education, and provision of relevant information. From March 2018 onwards, a structured nurse-led consultation (NLC) program was implemented for HNC patients undergoing radiotherapy, emphasizing symptom evaluation, risk assessment, patient education, and care coordination.

Study population

Eligible participants were adults (≥18 years) diagnosed with HNC who received at least five weeks of radiotherapy. Two patient groups were compared: those receiving standard care only (routine care group) and those receiving the nurse-led consultation in addition to routine care (NLC group). All participants were required to be fluent in French.

Data collection

Data were extracted for patients receiving routine care between March 2017 and March 2018, while data for the NLC group were collected from March 2018 to June 2019.

Routine care

Standard care consisted of weekly physician follow-ups alongside daily availability of nursing staff. Nurses managed treatment-related side effects, provided guidance for self-care, and referred patients to other healthcare professionals when necessary. Nursing interventions were initiated based on patient requests or clinical observations by healthcare staff, addressing issues such as oral pain, swallowing difficulties, fatigue, appetite changes, skin reactions, and weight loss.

Nurse-led consultation

The NLC was designed to help patients manage the physical, psychological, and social challenges associated with HNC and its treatment. This was achieved through education, emotional support, and coordination of care with other healthcare providers. The program drew on the framework proposed by Wells *et al*. [33] and McMillan's Cancer Support model, incorporating holistic needs assessment, individualized care planning in collaboration with

patients, and coordination of health and wellbeing services [34, 35]. The intervention was adapted to fit the existing outpatient radiotherapy workflow following discussions within a multidisciplinary workgroup.

The first consultation occurred between simulation and the start of radiotherapy and lasted approximately 40 minutes. It included patient history, assessment of nutritional risk (using the Kondrup score and weight), smoking habits, and evaluation of symptoms such as pain in the head and neck region, oral health, and swallowing or chewing difficulties. Preventive education was provided, and referrals were made to specialists such as dietitians, tobacco cessation counselors, speech therapists, oncologists, or maxillofacial surgeons when necessary.

The second consultation took place during weeks 3–4 of radiotherapy and lasted about 30 minutes. This session focused on adherence to care recommendations, symptom progression, and coordination with other healthcare providers for follow-up or additional assessments. Patients requiring further support were referred to interdisciplinary team members, including HNC specialists, nutritionists, or speech therapists.

The third consultation, held at the end of treatment (weeks 5–6), also lasted approximately 30 minutes. It assessed ongoing care adherence, symptom status, and patient education on post-treatment warning signs, alongside coordination of continued care. The same nurse did not necessarily conduct all three consultations for each patient.

All nurses participating in the NLC program were trained by a clinical nurse specialist in patient screening, education, and care coordination procedures. The planned maximum was three consultations per patient, each lasting 30–45 minutes, aligned with the 6–7 week radiotherapy schedule. A third consultation was particularly recommended for patients aged 75 or older, those with cognitive impairments, those receiving combined therapies, or patients developing grade 3 mucositis.

Additionally, weekly multidisciplinary meetings (1 hour) were established, involving the radiation oncologist, medical oncologist, radiation oncology nurse, dietitian/nutritionist, and the specialized nutrition nurse, to discuss patient management and care planning.

Data collection

Data for evaluating the nurse-led consultation (NLC) were obtained from electronic patient records by one of the study authors (M.S.) following a study-specific coding guide, with verification by a second author (J.W.).

Patient-reported outcomes were collected using the M.D. Anderson Symptom Inventory Head and Neck Module (MDASI-HN), a validated instrument designed to assess symptom burden and its impact on daily functioning in HNC patients [32]. The MDASI-HN includes general cancer-related symptoms, head and neck-specific symptoms, and functional interference items. Patients rated each symptom over the previous 24 hours on a scale from 0 (none) to 10 (worst).

Assessments were conducted at three points during radiotherapy: before the first treatment week (T0), during weeks 3–4 (T1), and during weeks 5–6 (T2). Additional demographic, behavioral (smoking and alcohol use), and clinical information (tumor stage, location, recurrence, and treatment regimen) were also extracted from the electronic records.

Statistical analysis

Descriptive statistics summarized participants' demographic and clinical data. Continuous variables were presented as means with standard deviations, while categorical variables were reported as counts and percentages. Symptom severity was grouped as mild (1–3), moderate (4–6), and severe (7–10).

To examine changes in symptom burden over time between the two groups, linear mixed-effects regression models were used, accounting for baseline T0 values. Models incorporated random effects at the patient level and fixed effects for group, time, and the interaction between group and time. All analyses were conducted using Stata version 16 (StataCorp, College Station, TX, USA).

Ethics

This study was approved by the Cantonal Ethics Committee of Vaud (CER-VD, project number 2018-01095).

Results and Discussion

From March 2017 to June 2019, 201 patients (107 receiving routine care and 94 in the NLC group) were initially screened **(Figure 1)**. A total of 141 patients met the eligibility criteria (75 routine care, 66 NLC), and 134 patients were included in the final analysis after exclusions for incomplete data (72 routine care, 62 NLC).

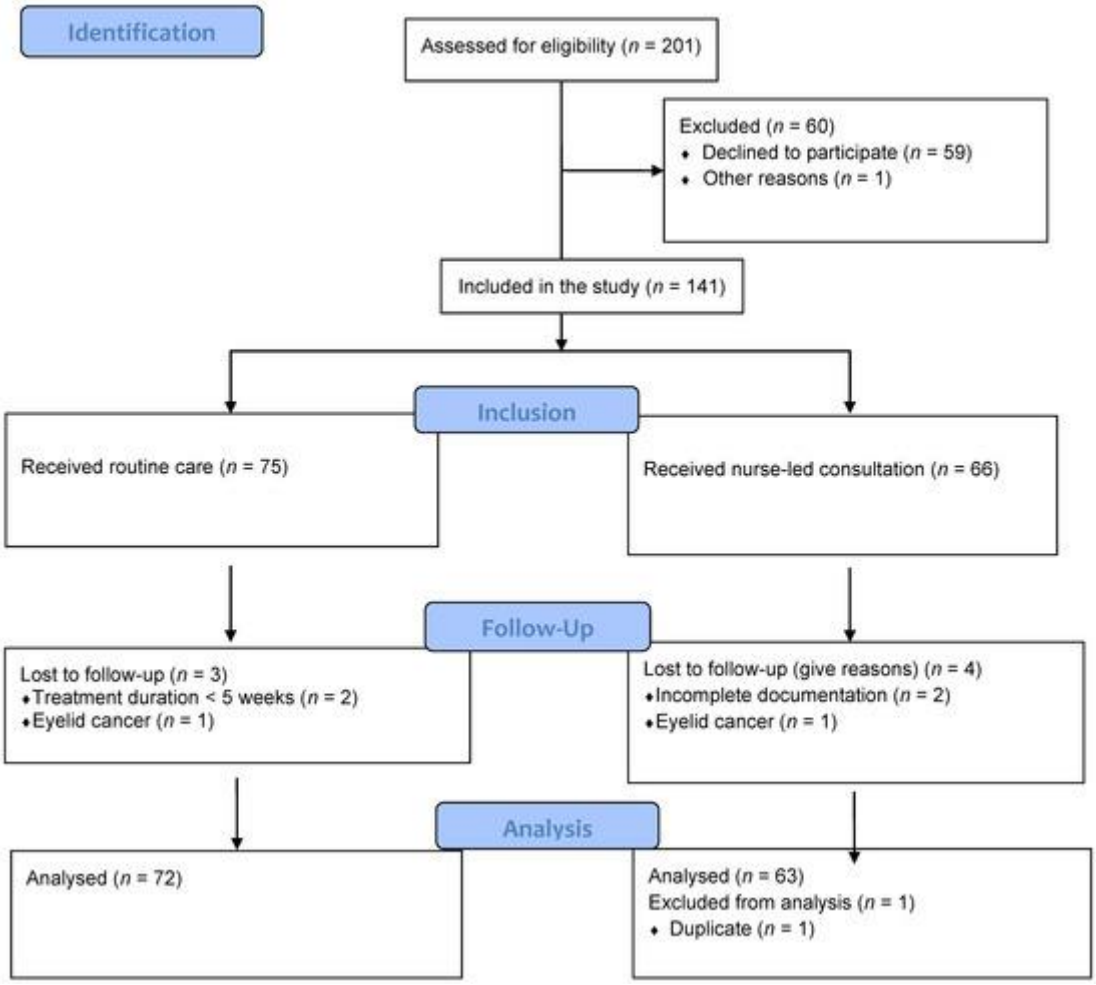


Figure 1. Participant enrolment process.

Participant demographics and clinical profile

Table 1 presents the demographic and clinical data of the study participants. The average age across the cohort was 63.6 years (SD 11.5), with negligible differences between the routine care group (63.7 years, SD 11.0) and the nurse-led consultation group (63.6 years, SD 12.1). The study population was largely male, accounting for 76.4% of the routine care group and 75.8% of the nurse-led consultation group.

A significantly greater proportion of patients in the routine care group had existing comorbidities (88.9%) compared to those receiving nurse-led consultations (62.9%; p = 0.0001). Prior cancer history did not vary significantly between the groups. Notably, recurrence was more common among participants in the nurse-led consultation group (22.5%) than in the routine care group (9.7%).

Table 1. Demographic and clinical characteristics of patients by treatment group.

Characteristics	Routine Care	NLC	p-Value
Age (mean, SD)	63.7 (11.0)	63.5 (12.0)	0.62
Gender, N (%) Male Female	55 (76.4) 17 (23.6)	47 (75.8) 15 (24.2)	0.93
Marital Status, N (%) Married Not married	39 (54.2) 33 (45.8)	29 (46.7) 33 (53.2)	0.39
Alcohol Use, N (%) Yes No	33 (45.8) 39 (54.2)	32 (51.6) 30 (48.4)	0.50
Smoking, N (%) Yes No	26 (36.1) 46 (63.9)	14 (22.6) 48 (77.4)	0.08
Weight Before RT (kg), mean (SD)	72.6 (13.9)	71.7 (14.9)	0.29
Pre-existing Conditions, N (%) Yes No	64 (88.9) 8 (11.1)	39 (62.9) 23 (37.1)	<0.0001

Prior Oncological Disease, N (%) Yes No	21 (29.2) 51 (70.8)	20 (32.3) 42 (67.7)	<0.000
Cancer Recurrence, N (%) Yes No	7 (9.7) 65 (90.3)	14 (22.6) 48 (77.4)	0.04
Cancer Site, N (%) Oropharynx Oral cavity Nasopharynx Larynx Hypopharynx Salivary glands Nasal cavity Thyroid	27 (37.5) 15 (20.8) 2 (2.8) 11 (15.3) 11 (15.3) 4 (5.6) 0 (0.0) 2 (2.8)	33 (53.2) 1 (1.6) 4 (6.4) 3 (4.8) 3 (4.8) 8 (12.9) 7 (11.3) 1 (1.6)	<0.000
Stage, N (%) I II III IV Unknown	3 (4.2) 9 (12.5) 17 (23.6) 42 (58.3) 1 (1.4)	4 (6.4) 9 (14.5) 13 (20.9) 29 (46.7) 7 (11.3)	0.14
Treatment Type, N (%) Radiotherapy only RT + other	6 (8.3) 66 (91.6)	8 (12.9) 54 (87.1)	0.38
Radiotherapy Sessions (mean, SD)	32.2 (1.4)	32.5 (1.3)	0.29
Radiation Dose (Gy), mean (SD)	63.6 (6.8)	64.4 (6.7)	0.68
RT Interruption, N (%) Yes No	12 (16.7) 60 (83.3)	12 (19.3) 50 (80.6)	0.68
Tube Feeding During RT, N (%) Yes No	29 (59.7) 43 (40.3)	14 (77.4) 48 (22.6)	0.02
Hospitalization During RT, N (%) Yes No	12 (16.7) 60 (83.3)	7 (11.3) 55 (88.7)	0.37
Total Patients, N (%)	72 (100.0)	62 (100.0)	—

NLC: nurse-led consultation.

Over half of the participants who received nurse-led consultations (53.2%) were diagnosed with oropharyngeal cancer, while this subtype accounted for just 37.5% of patients in the routine care group. In contrast, tumors of the oral cavity, larynx, and hypopharynx were more prevalent among patients receiving standard care, representing 20.8%, 15.3%, and 15.3%, respectively, compared with 1.6%, 4.8%, and 8.0% in the nurse-led group. Feeding tube placement occurred more frequently in the nurse-led consultation cohort, affecting 77% of patients versus 59% in the routine care group ($p = 0.02$). No meaningful differences were noted between the groups for other demographic or clinical variables, such as sex, marital status, alcohol and tobacco use, treatment modality, or hospitalization history.

Nurse-led consultation implementation

The nurse-led consultations were structured around comprehensive assessments and individualized interventions **(Table 2)**. Nutritional status was evaluated for nearly all patients throughout the intervention, with screening rates of 98.4% during the second follow-up and above 97% at the final consultation. In comparison, the delivery of educational content was less consistent, provided to 58% of patients at the first consultation, 17.5% at the mid-treatment assessment, and 29.3% at the final visit. Coordination of care activities followed a similar pattern, with 30.2%, 20.6%, and 22% of patients receiving these services at T0, T1, and T2, respectively. Smoking status was systematically assessed for 97% of participants at the initial consultation, 93.7% at T1, and 83% at T2. Smoking cessation education and related care coordination were offered to smaller proportions of patients, with 15.9% receiving education and 6.4% receiving coordination at T0, decreasing to 5% and 1.6% at T1.

Table 2. Number of nursing interventions provided, according to the intervention domain during the consultations at three different times during radiotherapy treatment.

Consultations		**T0 N = 63**	**T1 N = 63**	**T2 N = 41 ***
Variables	**Interventions**	**n (%)**	**n (%)**	**n (%)**
Nutrition	Screening	63 (100)	62 (98.4)	40 (97.6)
	Education	37 (58.7)	11 (17.5)	12 (29.3)
	Coordination	19 (30.2)	13 (20.6)	9 (22.0)
Smoking	Screening	61 (96.8)	59 (93.7)	34 (83.0)
	Education	10 (15.9)	6 (9.5)	0
	Coordination	4 (6.4)	1 (1.6)	0
Pain	Screening	44 (69.8)	41 (65.1)	26 (63.4)
	Education	3 (4.8)	16 (25.4)	11 (26.8)
	Coordination	4 (6.3)	0	1 (2.4)
Oral cavity status	Screening	60 (95.2)	59 (93.7)	NA
	Education	60 (95.2)	46 (73.0)	NA

	Coordination	0	0	NA
Swallowing/chewing capacity	Screening	57 (90.5)	51(81.0)	NA
	Education	0	0	NA
	Coordination	6 (9.5)	3 (4.8)	NA

Note: N = 41 patients met criteria for the third consultation. T0 represents the first nursing session conducted between the simulation scan and the start of radiotherapy, T1 indicates the mid-treatment follow-up (weeks 3–4), and T2 refers to the final consultation at the end of treatment (weeks 5–6). NA indicates data not reported.

At the first consultation (T0), roughly 70% of patients underwent pain assessment, decreasing slightly to 65.1% at T1 and 63% at T2. Pain-related education was initially provided to a small portion of patients (4.8% at T0) but increased to around one-quarter by the mid- and end-treatment consultations (25% at T1, 26% at T2). Coordination of care for pain management was infrequent, with 6.3% of patients receiving it at T0 and 2.4% at T2. Screening for oral cavity health was carried out in nearly all patients at T0 (over 95%) and slightly fewer at T1 (93.7%). Educational guidance on oral health was provided to 95.2% at T0 and 73% at T1. Swallowing and chewing ability was assessed in 90.5% at T0 and 81% at T1, while care coordination was implemented in about 10% at T0 and 4.8% at T1.

The nurse-led sessions focused on three core intervention types: screening, education, and coordination, applied across five domains: nutrition, smoking, pain, oral cavity condition, and swallowing/chewing function. Screening was consistently the most frequent intervention, performed in more than 80% of patients for nutrition and smoking at all three consultation points **(Table 2)**. Education was concentrated mainly in the first two consultations, reaching 16% and 10% of patients, respectively. Coordination with other healthcare professionals was limited, occurring in 7% of patients during the first consultation and 2% during the second.

Table 3 details the collected data by intervention domain. Patients' median weight decreased from 70 kg (IQR: 19.9) at T0 to 67.4 kg (IQR: 14.8) at T2. Nutritional risk, assessed via the Kondrup score, showed that over 90% of patients were evaluated at baseline, with more than 20% scoring ≥3 (median 3.0, IQR 1.0) and referred to dietitians. Regarding smoking status, 73% of participants reported being non-smokers at T0, while 23.8% were active smokers. Among smokers, one-third were ambivalent about quitting, nearly half expressed motivation to quit, and about one-quarter continued active smoking.

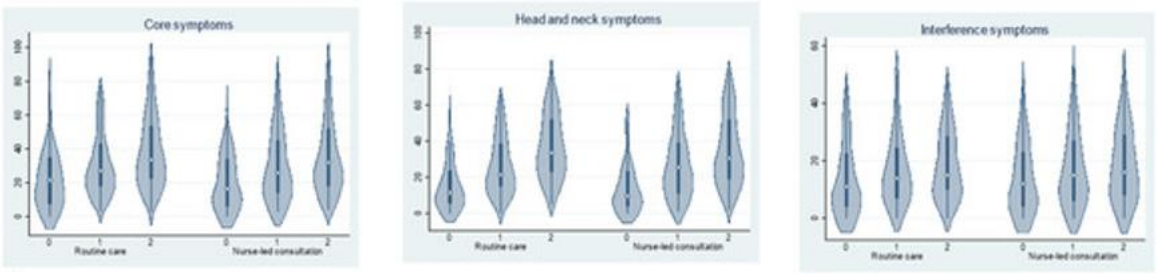
Table 3. Results of the data collection during nurse-led consultations.

Variables		**T0 N = 62**		**T1 N = 62**		**T2 N = 41**	
		n (%)	**MED (IQR)**	**n (%)**	**MED (IQR)**	**n (%)**	**MED (IQR)**
Nutrition							
Weight	Screening	62 (100)		62 (98.4)		40 (97.6)	
	Kg		70 (19.9)		67.2 (17.4)		67.4 (14.8)
Kondrup [a]	Screening	57 (90.5)	2.0 (1.0)	NA	NA	NA	NA
	Kondrup ≥ 3	13 (20.6)	3.0 (1.0)				
Smoking	Screening	61 (96.8)		59 (93.7)		34 (83.0)	
Status	Non-smoker	46 (73.0)		48 (76.2)		32 (78.1)	
	Smoker	15 (23.8)		11 (17.5)		2 (4.9)	
Attitude [b]	Ambivalent	5 (33.0)		3 (27.0)		1 (50.0)	
	Motivated	7 (47.0)		4 (36.0)		1 (50.0)	
Consumption	Screening	11(73.0)		10 (91.0)		2 (100)	
	n/day [c]		20 (21)		10.0 (10)		25 (10)
Pain	Screening	44 (69.8)		41 (65.1)		26 (63.4)	

	Score EVA [d]	0 (3.0)	2.0 (4.0)		3.0 (5.0)
Oral status	Screening	60 (95.2)	59 (93.7)	NA	NA
	Score OAG [e]	1.5 (3.0)	3.0 (3.0)		
Swallowing/chewing capacity (dysphagia)	Screening	57 (90.5)	51 (81.0)	NA	NA
	Absence	45 (71.4)	38 (60.3)		
	Presence	5 (7.9)	9 (14.3)		
	Dysphagia associated with other symptoms [f]	7 (11.1)	4 (6.4)		

T0 = between third and fourth weeks of radiotherapy, T2 = between fifth and sixth weeks of radiotherapy, MED = median, IQR = interquartile range, [a]: Kondrup nutrition risk score values possible between 0 and 5; [b]: attitude towards smoking cessation (refers to smokers only); [c]: number of cigarettes per day (refers to smokers only); [d]: VAS with possible values between 0 and 10; [e]: Oral Assessment Guide (OAG) with possible values ranging between 1 and 16; and [f]: drooling, coughing, change of voice after meals, and accumulation of food in the mouth.

Figure 2 illustrates how the data were distributed across the primary MDASI-HN dimensions for both the routine care and nurse-led consultation groups at the three assessment time points.



a) b) c)

Figure 2 presents the distribution of scores across the main MDASI-HN dimensions—core symptoms (a), head and neck-specific symptoms (b), and symptom interference (c)—for both the routine care and nurse-led consultation groups at three time points.

Table 4 summarize the raw mean scores for each MDASI-HN item at baseline and the two follow-up assessments by treatment group. **Table 4** also shows the mean scores adjusted for baseline differences.

Table 4. M.D. Anderson HN mean scores and baseline-adjusted differences for routine care group (RC) and nurse-led intervention group (NLC).

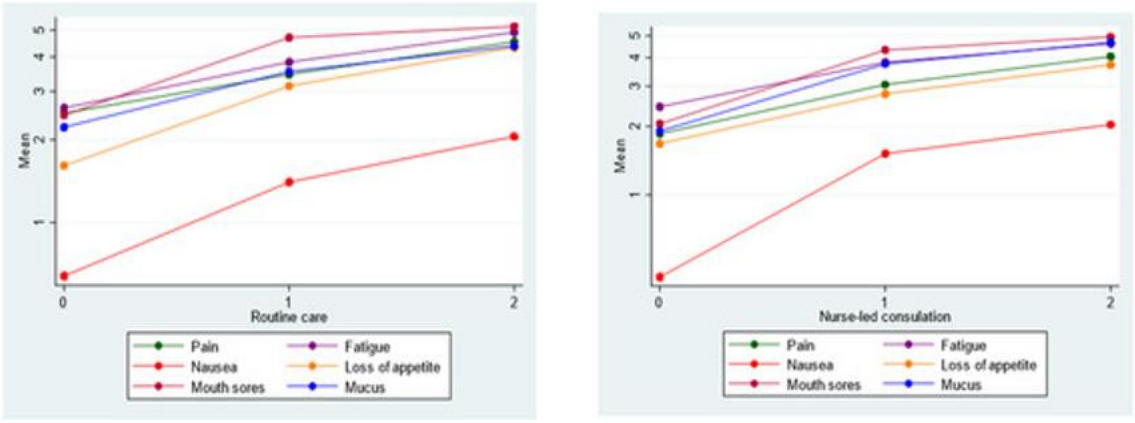
MDASI-HN Dimensions	T1 (3rd–4th Week)				T2 (5th–6th Week)			
	Mean (RC)	Mean (NLC)	Mean Difference (95% CI)	p-Value	Mean (RC)	Mean (NLC)	Mean Difference (95% CI)	p-Value
Core symptoms								
Pain	3.4	3.0	0.40 (−1.35–0.53)	0.39	4.5	4.0	−0.49 (−1.45–0.46)	0.31
Fatigue	3.8	3.8	−0.01 (−0.84–0.82)	0.98	4.9	4.6	−0.30 (−1.13–0.52)	0.47
Nausea	1.4	1.5	0.11 (0.66–0.88)	0.77	2.0	2.0	−0.02 (−0.94–0.89)	0.96
Disturbed sleep	2.3	2.7	0.37 (−0.55–1.29)	0.43	2.5	2.8	0.24 (−0.63–1.12)	0.58
Being distressed (worried)	2.7	2.9	0.18 (−0.72–1.09)	0.69	2.8	2.9	0.13 (−0.78–1.04)	0.77
Shortness of breath	1.9	1.9	0.06 (−0.75–0.88)	0.87	2.0	1.9	−0.09 (−0.90–0.70)	0.81
Difficulty remembering	2.7	2.9	0.18 (−0.72–1.09)	0.69	2.8	2.9	0.13 (−0.78–1.04)	0.77
Lack of appetite	3.1	2.7	−0.36 (−1.37–0.64)	0.47	4.3	3.7	−0.60 (−1.64–0.43)	0.25
Drowsiness	2.3	2.2	−0.07 (−0.84–0.70)	0.85	3.2	2.9	−0.24 (−1.17–0.68)	0.60

Dry mouth	4.7	4.3	0.23 (−1.27–0.81)	0.45	5.1	4.9	−0.23 (−1.27–0.81)	0.66
Sadness	2.5	2.9	0.41 (−0.58–1.39)	0.41	2.7	2.9	0.18 (−0.84–1.20)	0.72
Vomiting	0.6	0.7	0.02 (−0.55–0.61)	0.92	1.5	1.0	−0.43 (−1.25–0.38)	0.29
Numbness/tingling	1.1	1.5	0.42 (−0.24–1.10)	0.21	1.7	1.8	0.12 (−0.75–1.00)	0.77
Head and neck symptoms								
Mucus	3.5	3.7	0.21 (−0.78–1.21)	0.67	4.4	4.6	0.27 (−0.68–1.22)	0.57
Difficulty with swallowing/chewing	4.4	3.8	−0.57 (−1.61–0.46)	0.28	5.3	4.6	−0.63 (−1.69–0.42)	0.24
Coughing/choking	1.7	1.6	0.32 (−1.30–0.65)	0.86	1.6	1.7	−0.32 (−1.30–0.65)	0.51
Difficulty with voice/speech	3.1	3.2	0.07 (−0.86–1.02)	0.87	3.9	3.9	−0.02 (−1.05–1.01)	0.96
Burning/rash	2.5	2.3	0.52 (−1.56–0.50	0.31	4.4	3.9	−0.52 (−1.56–0.50)	0.31
Constipation	1.8	2.2	0.37 (−0.58–1.33)	0.63	2.7	2.4	−0.24 (−1.25–0.77)	0.63
Problem with tasting food	4.0	3.7	−0.37 (−1.55–0.79)	0.53	5.8	5.1	−0.64 (−1.83–0.54)	0.28
Mouth/throat sores	3.4	3.5	0.11 (−0.97–1.20)	0.83	4.4	4.3	−0.03 (−1.13–1.06)	0.94
Problem with teeth or gums	2.3	3.0	0.69 (−0.27–1.67)	0.16	2.8	3.0	0.20 (−0.80–1.21)	0.69
Interference symptoms								
General activity	3.4	3.4	0.07 (−0.88–1.03)	0.87	4.0	4.1	0.09 (−0.88–1.07)	0.84
Mood	2.9	3.3	0.36 (−0.61–1.33)	0.46	3.5	3.3	0.36 (−0.61–1.33)	0.46
Work	3.8	3.4	−0.46 (−1.58–0.64)	0.41	3.7	4.0	0.35 (−0.72–1.42)	0.52
Relationships with others	2.4	2.3	−0.12 (−0.98–0.73)	0.77	2.8	2.7	−0.11 (−0.98–0.75)	0.79
Walking	2.2	2.1	−0.17 (−1.09–0.75)	0.71	2.7	1.7	−0.96 (−1.85–0.08)	0.03
Joy of living	2.6	3.5	0.93 (−0.08–1.95)	0.07	2.6	3.3	0.66 (−0.35–1.67)	0.20

At the conclusion of radiotherapy (T2), patients who participated in the nurse-led consultation alongside routine care reported slightly lower average pain scores compared to those receiving routine care alone (4.0 versus 4.5), though the difference was minor. Trends toward improvement were also observed for other core symptoms, including fatigue (4.6 vs. 4.9) and reduced appetite (3.7 vs. 4.3), favoring the consultation group, but these differences did not reach statistical significance.

For symptoms specific to head and neck cancer, the consultation group experienced less difficulty with swallowing and chewing (4.6 vs. 5.3), milder taste disturbances (5.2 vs. 5.8), and lower levels of oral burning or rash (3.9 vs. 4.4) than the routine care group. In terms of symptom interference, the nurse-led consultation group reported less impact on walking (1.7 vs. 2.7).

Across both groups, symptom severity for pain, fatigue, nausea, appetite loss, mouth sores, and mucus production tended to increase over the course of treatment, with similar trajectories observed regardless of group assignment **(Figure 3)**.



a) b)

Figure 3. Change in symptoms in the routine care (a) and consultation group (b) at three different times during radiotherapy treatement.

At the end of radiotherapy (T2), some differences were noted between the routine care group and those receiving nurse-led consultations. Specifically, higher proportions of patients in the routine care group reported severe pain and fatigue (30% vs. 24%), drowsiness (20.8% vs. 11%), moderate-to-severe appetite issues (25% vs. 19%), and severe burning/rash (33% vs. 20%).

Discussion

This study examined the implementation of a nurse-led consultation for head and neck cancer patients and its potential impact on symptom burden compared with standard care. Overall, patients in the routine care group experienced a higher prevalence of severe symptoms, including pain, fatigue, drowsiness, coughing/choking, burning/rash, walking difficulties, and appetite problems. Mixed-model analyses revealed no statistically significant differences between groups, except for walking, which showed improvement among patients receiving nurse-led consultations.

Evaluation of the consultation content indicated generally good adherence to screening and assessment protocols across the three planned sessions, with approximately 70% of patients assessed for pain. Educational and referral interventions were implemented to some extent, although they were not consistently applied even when needs were identified.

A notable temporal effect was observed: mean levels of pain, fatigue, nausea, appetite loss, mouth sores, and mucus increased over the course of treatment in both groups. This trend may reflect cumulative effects of radiotherapy, which intensify progressively and vary across individuals.

Several factors may explain the absence of statistically significant benefits from the nurse-led consultations. Routine oncology care may have already addressed key patient needs. Additionally, PROMs were not directly integrated into nurse or physician workflows, meaning interventions were primarily based on clinical judgment rather than MDASI-HN responses. Limiting the consultation to education and coordination, without additional symptom-targeted interventions, may have reduced observable benefits. Staffing variability and limited consultation frequency (maximum three sessions due to resource constraints) may also have influenced outcomes. Patients with more complex conditions, including metastatic disease, likely required additional time and visits to adequately address their needs.

The timing of evaluation may further have affected results; early assessments might not capture the true impact of newly implemented interventions. Existing literature on nurse-led consultations in HNC patients is limited. To our knowledge, this is the first study evaluating a nurse-led consultation using the validated MDASI-HN tool. Comparable studies have examined symptom burden longitudinally in oropharyngeal cancer patients, finding improvements in quality of life over time regardless of treatment modality [36], or reduced symptom severity in patients receiving couple-based interventions [37]. Our findings are consistent with prior reports showing increasing pain during radiotherapy [16–42].

The use of mixed models represents a methodological strength, allowing for analysis of longitudinal data. Implementation of nurse-led consultations also contributed to standardizing care according to evidence-based guidelines and improving access to information, education, and self-management strategies for all patients, rather

than only addressing those with severe symptoms. Furthermore, the intervention facilitated clearer role definitions among care team members, enhanced communication, and enabled proactive identification and prevention of potential complications.

This study has several limitations. First, the sample size in each group was relatively small, which restricted the ability to conduct more detailed analyses regarding the intervention's effects. Therefore, the results should be interpreted with caution. Second, the study was conducted at a single institution, potentially limiting the generalizability of the findings to other clinical settings or patient populations. Third, the analysis relied on routinely collected health data, which were not originally gathered for research purposes. Fourth, detailed documentation of the consultation process was limited. Finally, the study outcomes were restricted to routinely collected patient-reported outcome measures (PROMs), and the inclusion of additional variables—such as factors mediating or moderating symptom burden—could have provided a more comprehensive understanding of the impact of nurse-led consultations on patient experience and quality of life.

Conclusion

The introduction of nurse-led consultations did not result in statistically significant improvements in symptom burden among head and neck cancer patients. While there were no significant differences in core symptom changes from the start to the end of radiotherapy between groups, the nurse-led consultation group demonstrated slightly better mean scores for certain symptoms, including pain, fatigue, and appetite, at T1 and T2. These findings underscore that symptom burden persists over time, and in some cases intensifies, highlighting the ongoing need for effective interventions to address these challenges in HNC patients.

Future research should include larger patient cohorts to better evaluate the effects of nurse-led interventions. It will be important to refine the content of consultations to align with patient needs and to assess long-term outcomes. Additionally, process evaluations of nurse-led interventions are crucial to identify contextual factors that may influence effectiveness and to optimize implementation strategies.

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