

**COMPARATIVE EVALUATION OF QUALITY OF LIFE IN HEAD AND NECK CANCER PATIENTS: RADIATION THERAPY VERSUS CHEMORADIATION USING EORTC QLQ-HN35****NAJMIATUL FITRIA<sup>1\*</sup>**, **NANDA SYAHNIZA MALAY<sup>2</sup>**, **MARDATILLAH MARDATILLAH<sup>3</sup>**,  
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**ABSTRACT**

**Objective:** Head and neck cancers are a group of neoplasms originating from the soft tissues in the neck region. Due to their proximity to vital anatomical structures, both disease progression and therapeutic interventions can result in significant complications that affect patients' quality of life (QoL). This study aimed to evaluate the QoL in patients undergoing radiation therapy compared to those receiving concurrent chemoradiation, using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire for Head and Neck Cancer 35 (EORTC QLQ-HN35) questionnaire.

**Methods:** A descriptive, cross-sectional research was led at Andalas University Hospital between March and May 2024. A total of 46 respondents were included: 25 patients undergoing radiation therapy and 21 receiving combination therapy. Sociodemographic and clinical data were collected, and QoL was assessed using the EORTC QLQ-HN35, a validated instrument. The Mann-Whitney U test was employed to compare QoL scores between treatment groups.

**Results:** Most participants were male, adults, married, with a high school education, and the most common diagnosis was nasopharyngeal cancer. Although patients undergoing combination therapy reported slightly higher average QoL scores than those receiving radiation, the difference was not statistically significant  $82.57 \pm 24.25$  versus  $77.56 \pm 19.76$ ,  $p=0.509$ .

**Conclusion:** The absence of substantial variances in QoL consequences between treatment groups suggests that other variables, such as clinical condition, psychological status, or social support, may play a more significant role in influencing QoL than treatment modality alone. While QoL scores were numerically higher in patients receiving combination therapy, the difference was not statistically significant. Further research is warranted to explore additional factors that affect QoL in patients with head and neck cancer.

**Keywords:** European Organization for Research and Treatment of Cancer Quality of Life Questionnaire for Head and Neck Cancer 35, Chemotherapy, Radiation, Head and neck cancer, Quality of life.

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**INTRODUCTION**

A subclass of head and neck neoplasms originating in the neck's soft tissues is known as head and neck cancers [1]. These diverse cancers arise from the synovium, muscle, adipose, or fibrous tissue [2]. Early detection of Ear, Nose, Throat, Head, and Neck (ENT-KL) cancers is challenging due to their hidden position and unique symptoms, according to the tissue origins of head and neck cancers [3]. This study aimed to measure health-related quality of life (QoL) between head and neck cancer patients who underwent radiation therapy and those who underwent concurrent chemoradiation therapy [4-6]. The patients' QoL was assessed using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire for Head and Neck Cancer 35 (EORTC QLQ-HN35). This questionnaire assesses patients' overall QoL and treatment-related symptoms specific to head and neck cancer. Previous studies have shown that productivity losses related to head and neck cancers are higher than those associated with other cancer types, thus affecting QoL [7]. Therefore, we aim to compare the QoL among head and neck cancer patients by considering the variables included in this study.

The EORTC QLQ-HN35 includes 35 queries, 30 of which evaluate head and neck ache, swallowing obstruction, sensory issues, cough appearance and hoarseness, problems with feeling sick, social eating,

social contact, and sexual activity over the past week [8]. Patients answer these questions on a four-level scale [9-11]. The other five questions pertain to the use of painkillers and nutritional supplements, a feeding tube, weight loss, and weight gain. The questions required a yes or no response [10]. Patient responses are aggregated across physical, functional, emotional, and social domains to evaluate how cancer and its treatment affect distinct aspects of patient functioning. Higher overall scores indicate a greater burden of disease and treatment-related problems, reflecting poorer QoL. A difference ( $\Delta$ ) score of at least 10 points on a 0-100 scale between two assessment points (pre- and post-radiotherapy) is considered clinically meaningful, indicating either improvement or deterioration in QoL. This threshold is widely applied in the literature. Changes of 20 points or more are interpreted as highly clinically significant [8,10].

**METHODS****Study design, setting, and variables**

This descriptive, observational study employed a cross-sectional design and collected prospective data through standardized, questionnaire-based interviews. This study was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology guidelines [12-14]. The study was conducted in the Radiology Department at Andalas University Hospital, Padang, Indonesia, over two

months, from March to May 2024. Primary data consisted of patient-reported outcomes collected through questionnaires. Secondary data were retrieved from medical records and the hospital information system (SIMRS). Sociodemographic variables included age, gender, marital status, and education level.

### Participants and sampling

Participants were selected using purposive sampling. Inclusion criteria were: (1) Adult patients ( $\geq 18$ -years-old) diagnosed with head and neck cancer, (2) Patients undergoing either radiation therapy or concurrent chemoradiation, and (3) Patients who provided informed consent. Exclusion criteria included patients whose medical records were incomplete, ambiguous, or illegible, and those who were deceased at the time of study collection. A total of 46 patients met the inclusion criteria and were enrolled in the study.

### Instrument

The assessment instruments for this study included the EORTC QLQ-HN35 questionnaire, the score interpretation table, the data collection sheet, and the informed consent form. A sociodemographic data collection form that included age, gender, social status, and education level. This instrument assesses symptoms and functional problems related to head and neck tumors. The EORTC QLQ-HN35 has been externally validated and is widely used in clinical trials and routine clinical practice [8,9,15]. Access to the questionnaire was obtained through registration on the official EORTC QoL website (<https://qol.eortc.org/>) with request ID: 61830 [16].

### Statistical analysis

Descriptive statistics summarized participant characteristics and QoL scores using means $\pm$ standard deviations or frequencies. Normality was assessed using the Shapiro–Wilk test; as data were non-normally distributed, non-parametric tests were applied. Group comparisons used the Mann–Whitney U test, while Fisher's Exact Test was applied for categorical variables with small expected counts. Primary outcomes compared QoL scores between treatment groups, with secondary analyses exploring clinical associations. Statistical significance was set at  $p < 0.05$ .

### Bias and data quality

To minimize selection bias, all patients who met the inclusion criteria during the study period were invited to participate. Interviewers were trained to standardize questionnaire administration and reduce interviewer bias. Recall bias was minimized by collecting information related only to recent and current health status. Missing data were verified against medical records and excluded only when irretrievable or inconsistent.

### Ethical considerations

The Research Ethics Committee of the Faculty of Pharmacy, Universitas Andalas, approved this study with number 37/UN.16.10.D.KEPK-FF/2024. All participants signed informed consent forms before inclusion in the study.

## RESULTS

A scoring system ranging from 0 to 120 is used to assess QoL, with lower scores indicating better QoL and higher scores indicating worse QoL. A score exceeding 60 indicates a distressing situation that worsens as the score increases. The table above presents the results of a study comparing QoL in patients with head and neck cancers undergoing radiation therapy versus those undergoing combined radiation and chemotherapy. The questionnaire scores reflect the severity of problems, with higher scores indicating more severe issues and lower scores indicating milder problems. A lower score indicates a better QoL for the patient, whereas a higher score indicates a worse QoL [8].

Table 1 presents a bivariate analysis using the Chi-square test to evaluate the relationship between sociodemographic and clinical characteristics and the type of treatment received (radiation vs. chemoradiation) among head and neck cancer patients. The findings indicate no statistically significant associations across all variables examined. Regarding sex, 41.3% of patients were female and 58.7% male, with similar proportions receiving either radiation or chemoradiation ( $p=0.515$ ). The age distribution showed that most patients were adults aged 18–59 years (78.3%), whereas older adults ( $\geq 60$  years) accounted for 21.7%; however, this difference did not significantly affect treatment

**Table 1: Sociodemographic characteristics of Head and neck cancer patients (n=46)**

Sociodemographic characteristics	n (%) Total	n (%) Radiation	n (%) Chemoradiation	p-value
Sex				
Female	19 (41.3)	11 (23.9)	8 (17.4)	0.515
Male	27 (58.7)	13 (28.3)	14 (30.4)	
Age (year)				
Adult (18–59)	36 (78.3)	19 (41.3)	17 (37.0)	0.876
Elderly ( $\geq 60$ )	10 (21.7)	5 (10.9)	5 (10.9)	
Marital status				
Married	42 (91.3)	22 (47.8)	20 (43.5)	0.511
Divorced	1 (2.2)	0 (0.0)	1 (2.2)	
Single	3 (6.5)	2 (4.3)	1 (2.2)	
Education level				
Elementary school	6 (13.0)	3 (6.5)	0 (0.0)	0.930
Junior high school	5 (10.9)	2 (4.3)	3 (6.5)	
Senior high school	21 (45.7)	11 (23.9)	10 (21.7)	
Diploma/bachelor	14 (30.4)	8 (17.4)	6 (13.0)	
Diagnosis				
Nasopharyngeal cancer	23 (50.0)	11 (23.9)	12 (26.1)	0.447
Oropharyngeal cancer	2 (4.3)	0 (0.0)	2 (4.3)	
Tongue cancer	7 (15.2)	5 (10.9)	2 (4.3)	
Glottic cancer	3 (6.5)	1 (2.2)	2 (4.3)	
Subglottic cancer	1 (2.2)	1 (2.2)	0 (0.0)	
Supraglottic cancer	2 (4.3)	1 (2.2)	1 (2.2)	
Salivary gland cancer	1 (2.2)	1 (2.2)	0 (0.0)	
Parotid cancer	2 (4.3)	2 (4.3)	0 (0.0)	
Tonsil cancer	1 (2.2)	0 (0.0)	1 (2.2)	
Sinonasal cancer	3 (6.5)	1 (2.2)	2 (4.3)	
Sublingual gland cancer	1 (2.2)	1 (2.2)	0 (0.0)	

Description: Statistical analysis using Chi-square

type ( $p=0.876$ ). Marital status was predominantly married (91.3%), with minimal variation in treatment distribution ( $p=0.511$ ). In terms of education, high school graduates constituted the largest group (45.7%), but again, no significant association was observed between education level and treatment modality ( $p=0.930$ ). Diagnostically, nasopharyngeal cancer was the most frequent (50%), followed by tongue cancer (15.2%), among others. Although the distribution of diagnoses varied across treatment types, the difference was not statistically significant ( $p=0.447$ ). None of the sociodemographic or clinical characteristics, including gender, age, marital status, education, or cancer type, was significantly associated with treatment type.

Table 2 presents the EORTC QLQ-HN35 scores by sociodemographic characteristics among patients receiving radiation therapy or chemoradiation for head and neck cancer. The data are analyzed using the Mann-Whitney U test to assess whether there are significant differences in QoL scores across sociodemographic groups for each treatment modality. The results of the Mann-Whitney analysis suggest that sociodemographic factors such as gender, age, marital status, and education level do not significantly affect the QoL outcomes, as measured by the EORTC QLQ-HN35 score, in patients receiving radiation or chemoradiation for head and neck cancer. No significant differences were observed in quality-of-life scores between female and male patients ( $p=0.569$ ), nor between adult (18–59 years) and elderly ( $\geq 60$  years) patients ( $p=0.613$ ). Similarly, marital status ( $p=0.588$ ) and education level ( $p=0.391$ ) did not significantly affect QoL outcomes across treatment modalities. Despite some variation in mean scores based on education level, these differences were not statistically significant. In addition, no significant difference in overall QoL scores was observed between radiation and chemoradiation ( $p=0.509$ ).

## DISCUSSION

The results of this study suggest that sociodemographic and clinical factors, including sex, age, marital status, education level, and cancer diagnosis, do not have a statistically significant relationship with the type of treatment received (radiation vs. chemoradiation) among head and neck cancer patients. Despite varying distributions in these characteristics, such as a higher proportion of males or more

patients in the younger adult age group, these factors did not seem to influence treatment modality choice. This lack of significance ( $p>0.05$ ) indicates that treatment decisions in this population may be driven by factors other than sociodemographic or basic clinical characteristics, such as clinical indications, physician preferences, or institutional protocols [17].

Sociodemographic and clinical factors do play a role in the progression of head and neck cancer, but their influence on treatment choice (e.g., radiation vs. chemoradiation) is not always significant. Instead, these factors more strongly affect QoL, treatment delays, and long-term outcomes [18]. Previous research shows that factors such as gender, age, marital status, education level, and cancer type do not have a statistically significant association with the choice of treatment in head and neck cancer patients [19]. Treatment decisions are often based on clinical indications, physician preferences, or institutional protocols rather than sociodemographic characteristics [20]. Another research study about socioeconomic status, employment, and marital status significantly affects patients' QoL after treatment [19,20]. Unemployed or single patients tend to report a lower QoL [21]. Cancer type, history of surgery, and employment status are independent predictors of QoL [22,23]. Lower socioeconomic status is associated with poorer survival rates. In addition, low social support and reduced post-treatment QoL are linked to greater regret over treatment decisions [24,25].

The results of the Mann-Whitney test indicate that sociodemographic characteristics such as gender, age, marital status, and education level do not significantly influence quality-of-life outcomes among head and neck cancer patients receiving radiation or chemoradiation therapy. Other studies also reveal no meaningful differences in quality-of-life scores between male and female patients, or between adult and elderly age groups, across treatment types. Similarly, marital status and education level did not significantly affect patients' QoL, despite some observable variations in average scores [26,27]. In addition, comparing the overall QoL between those receiving radiation and those receiving chemoradiation showed no substantial difference, suggesting that the type of treatment itself does not significantly impact QoL [9,20]. This is supported by previous research, where sociodemographic factors influence QoL rather than treatment choice [28]. These findings imply that sociodemographic factors may not be the key determinants of QoL in this population, and that other clinical or psychosocial variables may play a more prominent role. Further investigation is needed to explore these potential influences.

This finding aligns with the concept that treatment decisions for head and neck cancer may be more clinically nuanced and based on factors such as the stage and progression of the disease [29], comorbid conditions, or patient-specific health considerations [30]. It is also possible that other unmeasured variables, such as performance status, cancer location, or treatment accessibility, may play a more pivotal role in determining the type of treatment [31,32]. Further research exploring these factors, or employing multivariate analysis, could help clarify the determinants of treatment choice in this patient population.

Research has indicated that head and neck cancers result in greater productivity losses compared to other types of cancers. Among head and neck cancer patients, specific scales have a significant impact. The swallowing scale encompasses four elements that evaluate different degrees of swallowing difficulties, such as consuming liquids, mashed foods, solid foods, and experiencing choking while swallowing [33-35]. The speech scale is a clinical assessment that measures hoarseness and communication issues when speaking to others or using the phone. Patients with oral cancer consistently report the highest levels of pain, dental problems, and limitations in opening their mouths wide [36,37]. Pharyngeal cancer patients exhibit elevated levels of challenges related to swallowing, social eating, sticky saliva, nausea, reliance on pain medication, and weight loss. On the other hand, laryngeal cancer patients tend to score highly on the speech scale and exhibit frequent coughing [38,39].

**Table 2: Comparison EORTC QLQ-HN35 score between radiation and chemoradiation therapy**

Sociodemographic characteristics	EORTC QLQ-HN35 score - Radiation (mean±SD)	EORTC QLQ-HN35 score - Chemoradiation (mean±SD)	p-value
Gender			
Female	78.14 (±19.33)	78.40 (±30.43)	0.569
Male	76.82 (±21.226)	83.88 (±23.02)	
Age (year)			
Adult (18–59)	76.94 (±20.18)	84.22 (±23.75)	0.613
Elderly ( $\geq 60$ )	79.14 (±20.103)	72.67 (±30.24)	
Marital status			
Married	78.74 (±20.175)	83.16 (±25.18)	0.588
Divorced	0 (0)	65 (±7.17)	
Single	64 (±4.23)	89 (±5.13)	
Education level			
Elementary school	59.33(±12.66)	85(±32.97)	0.391
Junior high school	67.75(±28.99)	65 (±7.17)	
Senior high school	81.10(±19.56)	83(±26.94)	
Diploma/ bachelor's degree	84.88(±12.89)	83.50(±19.98)	
Total	77.56(±19.76)	82.57(±24.25)	0.509

Description: Mann-Whitney Test statistical analysis for test differences between two variables. Higher scores indicate greater symptom burden. Comparisons within very small subgroups might be cautious. EORTC QLQ-HN35: European Organization for Research and Treatment of Cancer Quality of Life Questionnaire for Head and Neck Cancer 35, SD: Standard deviation

This study offers several strengths. It employs the EORTC QLQ-HN35, a validated cancer-specific instrument that effectively captures symptom burden and functional challenges in patients with head and neck cancer. The use of the Mann-Whitney U test, suitable for small sample sizes and non-normally distributed data, enhances the reliability of the statistical analysis. By including various sociodemographic variables (gender, age, marital status, and education), the study provides a broad perspective on potential influences on QoL across two treatment types: Radiation and chemoradiation. However, several limitations are noted. One major challenge was the difficulty in data collection, as some patients were unwilling or unable to participate due to weakened physical condition following therapy. Fang *et al.* revealed that coping considerations included adapting to a new normal and increased involvement in cancer support and faith groups. The small sample size limits statistical power and generalizability. In addition, key clinical and psychosocial factors such as cancer stage, comorbidities, socioeconomic status, patient knowledge, family history, and mental health were not assessed, although they likely influence QoL [40]. The cross-sectional design captures only a single point in time and does not reflect changes in QoL over the treatment trajectory. Patients often experience significant difficulties in eating, speaking, breathing, hearing, and body image, which deeply affect their daily functioning and social roles. The study also notes that head and neck cancers tend to be more prevalent in males due to higher risk exposures, yet gender-based differences in coping were not explored. Future research should consider longitudinal designs with larger, more diverse populations and incorporate qualitative methods to capture patient experiences and to guide the comprehensive improvement of patient-centered care.

## CONCLUSION

This study provides important preliminary insights into the QoL of head and neck cancer patients undergoing radiation and chemoradiation therapy, revealing that sociodemographic factors such as gender, age, marital status, and education level do not significantly influence QoL outcomes. Using a validated, cancer-specific instrument and appropriate statistical methods, the research contributes valuable data to an area with limited local evidence. However, the findings should be interpreted with caution due to limitations, including a small sample size, challenges in patient participation, and the absence of clinical and psychosocial variables that may more directly affect QoL. In this small, cross-sectional analysis, we did not observe a significant difference in QoL scores between treatment modalities. These results highlight the need for more comprehensive, longitudinal, mixed-methods research to fully understand the multifaceted factors influencing QoL in this patient population and to inform more holistic, personalized approaches to care.

## ETHICS APPROVAL

Ethical approval was given by the Research Ethics Committee of the Faculty of Pharmacy, Andalas University, with number 37/UN.16.10.D.KEPK-FF/2024.

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## AUTHORS' CONTRIBUTIONS

The conception and design of the study were led by NF, with data acquisition performed by NSM and YS. NSM and NF handled the drafting of the manuscript. NF did forward translation. As the radiation oncologist, RR played a critical role in patient care. As the pharmacology supervisor, MM oversaw the study's pharmaceutical aspects. Their combined expertise contributed to the successful implementation and evaluation of this research.

## COMPETING INTERESTS

The author(s) have disclosed no relevant financial or non-financial interests.

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