Journal of Carcinogenesis
Covering Genesis to Therapeutics

Journal of Carcinogenesis, ISSN: 1477-3163
2025; Vol 24: Issue 2s, https://carcinogenesis.com/

Quality of Life in Head and Neck Cancer Patients Following Neck Dissection: A Comprehensive Review

Mudasir Rashid Baba[1*], Negar Shafiei Sabet[2], Saeid Reza Doustjalali[2], Chan Sook Chin[1], Khin Thane Oo[3], Mon Mon Thawda Oo[3], Suprava Das[3], Su Wai Wai Lwin[4], Sahar Zaidi[5], Habiba Sundus[5], Muhammad Parial Shahani[2], Shushan Low[2], Thida Than2, Mohd Zin Bidin[2], Wai Ma Lin[6], Swe Swe Latt[7], Myat Myo Naing[8], Leela Anthony[9], Aye Aye Tun[9], Maheswaran Solayappan[10], Jegathambigai RN[11], Sutha Devaraj[11] and Nazmul MHM[11]

[1]School of Physiotherapy, Faculty of Medicine, Nursing and Health Sciences, SEGi University, Malaysia

[2]Faculty of Medicine, Nursing and Health Sciences, SEGi University, Malaysia

[3]Faculty of Medicine, Manipal University College, Malaysia

[4]School of Medicine, Faculty of Health and Medical Sciences, Taylor's University, Malaysia

[5]Department of Physiotherapy, Jamia Hamdard. New Delhi. India

[6]Department of Biology and Toxicology. Ashland University. Ashland, Ohio. USA

[7]Department of Public Health Medicine, RCSI & UCD Malaysia Campus, Penang, Malaysia

[8]Faculty of Medical Sciences, Newcastle University Medicine Malaysia, Iskandar Puteri, Johor Darul Ta'zim, Malaysia

[9]Faculty of Medicine, AIMST University, Bedong, Kedah, Malaysia

[10]Director of Research, RCSI & UCD Malaysia Campus, Penang, Malaysia

[11]Graduate School of Medicine, Perdana University, Damansara Heights, Kuala Lumpur, Malaysia

*Corresponding authors: Mudasir Rashid Baba, School of Physiotherapy, Faculty of Medicine, Nursing and Health Sciences, SEGi University, Malaysia. Email: dr.mudasira@gmail.com.

ABSTRACT

There is widespread agreement that surgical approaches offer an improved quality of life (QOL) in Head and Neck cancer (HNC) patients. And the surgery results have been examined by several available research tools, with particular emphasis on radical and modified neck dissections to determine the QOL in HNC patients. This study is to ascertain the QOL after neck dissection in patients with Head and Neck cancer. With the aid of current research tools, this review aims to quantify the health-related quality of life for head and neck cancer patients who have undergone neck dissection. The published search was operated from PubMed, Web of science, CINAHL, PEDro and Google Scholar to relate the impairment in quality of life after neck dissection in head and neck cancer patients. The published data record was commonly referred to from 1999 to 2022. We have not included any unpublished studies, clinical trial registries, or grey literature such as government or organization reports. Out of 250 searched articles only 18 studies fulfilled the inclusion and exclusion, Health- related Quality of life (HRQOL), and domains of various outcome measures showed an overall increase in QOL in patients with HNC who underwent Neck dissection. There has been a significant reduction in pain-related QOL, an improvement in prognostic value and a reduction in body pain in HRQOL, and a significant improvement in various areas of outcome measurement tools like SF-36, FACT-HN,EORTC.

KEYWORDS: *Head and neck cancer, Radical neck dissection, Quality of life, Neck dissection, Chemotherapy*

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How to Cite: Mudasir Rashid Baba, Negar Shafiei Sabet, Saeid Reza Doustjalali, Chan Sook Chin, Khin Thane Oo, Mon Mon Thawda Oo, Suprava Das, Su Wai Wai Lwin, Sahar Zaidi, Habiba Sundus, Muhammad Parial Shahani, Shushan Low, Thida Than, Mohd Zin Bidin, Wai Ma Lin, Swe Swe Latt, Myat Myo Naing, Leela Anthony, Aye Aye Tun, Maheswaran Solayappan, Jegathambigai RN, Sutha Devaraj and Nazmul MHM., (2025) Quality of Life in Head and Neck Cancer Patients Following Neck Dissection: A Comprehensive Review, *Journal of Carcinogenesis*, *Vol.24, No.2s*, 1079-1092.

1. INTRODUCTION

Head and neck cancer (HNC) represents a significant global health concern, ranking as the sixth most frequently diagnosed malignancy worldwide [1]. This classification encompasses various anatomical sites including the larynx, oral cavity, oropharynx, hypopharynx, nasopharynx, salivary glands, tonsil, nasal cavity, paranasal sinuses, and middle ear structures [2]. With an annual incidence exceeding 650,000 cases globally, HNC constitutes a substantial burden on healthcare systems. The mortality rate is considerable, with approximately 6% of newly identified cases resulting in more than 350,000 fatalities each year, highlighting the aggressive nature and challenging treatment landscape associated with these malignancies [3].

Head and neck cancer constitutes a relatively small but significant portion of all cancer diagnoses, accounting for approximately 3% of all malignant neoplasms [4]. Among these cases, Squamous Cell Carcinoma (SCC) represents the overwhelming majority, comprising about 90% of the histological subtypes identified in head and neck cancers. Recent epidemiological trends indicate a concerning pattern, with the prevalence of these malignancies showing a notable increase in recent years [4,5]. This growing incidence is particularly troubling given that head and neck cancers are characterized by substantial mortality rates and a high tendency toward recurrence after initial treatment. These factors combine to make head and neck cancer a particularly challenging disease category from both treatment and prognosis perspectives [5,6]. Research and clinical investigations focused on head and neck cancer (HNC) have consistently encountered significant challenges in accurately quantifying health status among affected patients. These difficulties extend particularly to the measurement of debility the degree of physical weakness or impairment and the assessment of quality of life.

The complex nature of HNC, with its varied anatomical locations and functional impacts on essential activities like breathing, speaking, eating, and facial aesthetics, creates substantial obstacles for developing standardized and comprehensive evaluation metrics [7]. These challenges ultimately complicate both treatment planning and the meaningful assessment of therapeutic outcomes in HNC patient populations. Diverse variety of tools are available to measure disease-specific QOL and general QOL [8].

Poor QOL is a significant disease outcome for HNC. The therapeutic approach for Head and Neck Cancer (HNC) employs a multi-modal strategy incorporating surgical intervention , radiation therapy and chemotherapeutic agents [9]. This combined treatment methodology aims to optimize survival outcomes while simultaneously preserving essential physiological functions and maintaining overall health status. The treatment plan balances aggressive disease management with careful consideration of functional preservation , recognizing that structures in the head and neck region serve critical roles communication , nutrition , respiration and physical appearance that profoundly impact patient's quality of life [10].

Health-related quality of life (HRQOL) has become a fundamental endpoint in oncology randomized controlled trials, offering valuable patient-centered insights that can significantly influence treatment decisions [11]. This metric derives particular importance from its ability to reflect aspects of the disease experience that matter most to patients themselves.

Research has demonstrated that HRQOL measurements, obtained through patient self-assessment tools, can serve as prognostic indicators for survival outcomes in various forms of cancer [12]. Notably, for individuals with advanced malignancies, baseline HRQOL evaluations conducted at treatment initiation have been established as independent predictors of Overall Survival (OS), separate from traditional clinical and pathological factors. This relationship highlights the potential utility of HRQOL not only as a quality metric but also as a prognostic tool in cancer management [13].

Research examining quality of life and functional consequences following neck dissection has gained considerable importance in the treatment landscape [14]. Literature findings consistently demonstrate that neck dissection procedures , particularly when combined with chemotherapy can have substantial implications for patient's QOL [15]. The most significant adverse outcomes reported are shoulder mobility limitations and persistent pain syndromes [7]. These functional impairments represent meaningful considerations in treatment planning and underscore the necessity of comprehensive post-surgical assessment strategies to mitigate their impact on patient's overall wellbeing.

Quality of life (QOL) is crucial for individuals with head and neck cancer (HNC), as emotional expression and social interactions rely on the structural and functional integrity of these regions [16]. Assessing QOL in HNC patients aids in treatment decision-making, recognizing those experiencing significant physical and psychosocial challenges, and formulating effective rehabilitation strategies.

HNC patients often experience treatment-related side effects that affect their lean body mass, physical function, quality of life, and fatigue management. During radiation therapy, their level of physical activity, including sports, daily tasks, and other movements, tends to decrease [3].

Shoulder impairment is commonly observed after Radical Neck Dissection (RND), leading to complications such as winged scapula, shoulder droop, difficulty in shrugging, and non-localized pain that worsens with movements like shoulder abduction. These issues can significantly impact daily activities, work-related tasks, and leisure activities [7,17].Radiation induced Soft tissue fibrosis may cause pain, reduced range of motion in the cervical region and stiffening of connective tissue and muscles (figure 1).

Few adverse effects that are related to Cancer and its treatment are weight loss , wasting seen in muscles , fatigue and compromised quality of life [15]. The choice of treatment depends on the location of the primary tumor, with surgical intervention being crucial for recovery. However, treatment often leads to lasting functional and cosmetic changes in these patients [5]. Surgical resection serves as a primary treatment approach for healing, particularly in the oral region of the head and neck [8].

Recent studies have extensively examined the effects of tumor treatments on patients' functional abilities and overall outcomes. [10]. Shoulder stiffness resulting from neck dissection is a well-documented concern in patients undergoing surgery for HNC and significantly impacts health outcomes.(11) Several studies have assessed the quality of life (QOL) in individuals with HNC following neck dissection . This review aims to compile these studies , explore QOL in HNC patients and highlight the various challenges associated with neck dissection.

2. METHODOLOGY

Problem Statement
To examine the quality of life (QOL) in HNC patients and the challenges associated with neck dissection, we conducted a literature search to gather relevant studies.

Search Strategy
Relevant studies were identified using the search terms "head and neck neoplasms", "neck dissection", "quality of life" across databases such as PubMed, Web of Science, CINAHL, PEDro, and Google Scholar. Additionally, article reference lists, Physiopedia, and Wikipedia were reviewed for supplementary sources. Only studies published between 1999 and 2022 were included in the search.

Selection Criteria
All relevant literature published between 1999 and 2022, including original studies on randomized controlled trials (RCTs), systematic reviews, and meta-analyses, was included in this analysis. Studies focusing on malignancies other than HNC and articles with full-text restrictions were excluded mentioned in figure 1.

3. RESULTS

A total of 250 studies matching the search criteria were identified using the specified keywords. After exclusions for various reasons, only 18 studies were selected for final inclusion in this review. These included five prospective studies, two retrospective studies, two literature reviews, five cross-sectional studies, two randomized controlled trials, one comparative study, and one systematic review, details about the studies are mentioned in table 1.

Table 1

Author/ Year	Study Design	Patients eligible	Intervention details	Outcomes	Conclusion
Oresto Gallo *et al.,* (2021)[31]	Cross sectional study	A total of 121 HNC[1] patients completed the survey.	HNC[1] patients who have previously undergone surgery, chemoradiotherapy,	Significant differences were observed between the two	HNC patients face a heightened risk of declining quality of life

			or a combination of both, with no evidence of disease for at least the past year.	groups in physical (80.5 vs. 85, p = 0.028), role (78 vs. 84, p = 0.030), and emotional functioning (76 vs. 81, p = 0.041), with poorer functioning in our patient group. When comparing LP[2] with other HNC[1] patients, social (76.6 vs. 88.9, p = 0.008) and physical functioning (75.5 vs. 86.1, p = 0.006) were significantly worse in the LP[2] group. Additionally, LP[2] patients reported a higher perception that others were afraid to be close to them (1.67 vs. 1.32, p = 0.020). No significant differences were found between LP[2] patients with and without a voice prosthesis	(QOL) [4] due to the ongoing COVID-19 pandemic.
Elâine Patrícia Alves de Araújo Gomes *et al*., (2020)[27]	Cross sectional study	The study population included men and women who met the following criteria: a confirmed diagnosis of head and neck cancer, completion of antineoplastic treatment, and a minimum of	-	In the quality of life analysis, the highest scores were observed in shoulder function, social performance, and overall well-being . Conversely, the lowest scores were reported for saliva , nausea and vomiting , and	The correlation analysis between the three instruments—UW[3]-QOL[6], EORTC [5]QLQ[6], and FACT-H&N[7]—showed a statistically significant relationship in assessing overall quality of life, as well as in specific domains such as

		six months since the treatment ended.		emotional well-being. A positive correlation was found between the questionnaires regarding overall quality of life and the domains of pain, appearance, activity, deglutition, chewing, speech, taste, saliva, mood, and anxiety.	pain, appearance, activity, swallowing, chewing, saliva, and anxiety.
Gane et al., (2018)[10]	Cross-sectional study		The self-reported disability, QOL[1] was measured with the Neck Dissection Impairment Index (NDII) [11], Quick Disabilities of the Arm, Shoulder and hand, and NDI[10]		QOL[1] and musculoskeletal disabilities following neck dissection are typically associated with factors in several areas, including physical motor function and treatment modalities
Gane *et al.,* (2017)[3]	Cross-sectional study		The patients completed two measures of quality of life including the NDII[1], a region- and disease-specific tool, and the assessment of QOL[1]-4 Domains		Positive nodal disease was related to better QOL[1], which may reflect response shift. Multi-modality treatment leads to worse QOL[1] while comparing with surgery only.
Rathod *et al.,* (2015)[8]	Randomized controlled trial	Studies included adult participants (older than 18 years of age) who were reported in English and acquired data prospectively.		With improved outcomes in HNC[2], survivorship considerations have become more important in the management of decision-making. QOL[1] is a significant	While global QOL[1] is maintained close to diagnosis level, functioning domains (especially physical functioning) and symptoms show considerable deterioration with

				finding reported by the patient.	treatment i.e., followed with specific treatment and factors that influenced the illness .
Capozzi *et al.,* (2015)[13]	Systematic review			Physical activity interventions were achievable, safe, and effective at mediating cancer and treatment-related side effects.	Early evidence exists to support the benefits of physical activity interventions in HNC[2] patients, each after and during treatment
Rigoni *et al.,* (2015)[5]	Comparative study	Thirty patients with advanced tumours (SCC[4] stage III or IV) and their thirty carers were included	Specific questionnaires EORTC[5] QLQ[6], H&N[7], CSI[8] were implemented during routine medical visits	The physical, cognitive and emotional functional scales were most impacted. Pain, fatigue and sleep disturbances were the most common symptoms	QOL[1] is comparable between patients and their health care providers. This result demonstrates that not only do patients have QOL[1] impairment, but their caregivers also have it and at similar proportions
Goldstein *et al.,* (2013)[7]	Review of literature		The literature review was performed using the Ovid Med line and Embase databases.In all, 306 abstracts and 78 full-text articles were reviewed, in which 42 articles were included.		There was significant variability in literature with respect to recovery and prevalence of shoulder morbidity in neck dissection [3].
Meyer *et al.,* (2009)[17]	Randomized trial	540 patients with HNC[2]	completed two HRQOL[3] instruments that are before the radiation therapy: the EORTC[5] QOL[1] Questionnaire EORTC[5] ,QLQ[6], Head and Neck Radiotherapy Questionnaire.	The physical function benchmark score EORTC[5] QLQ[6]was a predictor independent of OS[9].	Physical functioning provides prognostic values for the Overall survival that is beyond the established predictors in patients with HNC[2]. Assess HRQOL[3] may

					facilitate better predict survival of cancer patients.
Rogers *et al.,* (2009)[24]	Prospective study	In a group of 112 patients, 5 underwent RND[6], 43 MRND[7], 48 supra-omohyoid and 16 posterior-lateral neck dissections	Shoulder pain was related to dysfunction of SAN[8]. Study involves subjective evaluation of shoulder pain and objective evaluation of shoulder muscle strength.		The study concluded that shoulder morbidity associated with neck dissection is an important aspect of HRQOL[3] for patients directly undergoing surgical treatment for HNC should have efforts made to preserve the spinal accessory nerve (SAN)[8]whenever possible. involved with tumour .
Mukhija *et al.,* (2008)[34]	Retrospective study	58 patients with III or IV stage head and neck SCC[12] was conducted. 70 neck dissections were carried out in 58 patients with advanced neck disease	chemotherapy or radiotherapy		The rate of regional reappearance following SND[4] is comparable to reportable rates following modified/RND[6] Suggested findings are that SND[4] provides an applicable surgical possibility for advanced neck sickness in patients who have undergone adjuvant therapy.
Jones *et al.,* (2007)[28]	Retrospective study		The EORTC[9] core questionnaire is designed to be self-administered measuring overall physical condition and overall QOL[1].		Patients who had undergone laryngectomy scored well in all domains studied that reported comparatively in few residual problems
Inoue *et al.,* (2006)[29]	Cross-sectional study	The seventy-four patients who had			The patients, who had neck dissections where

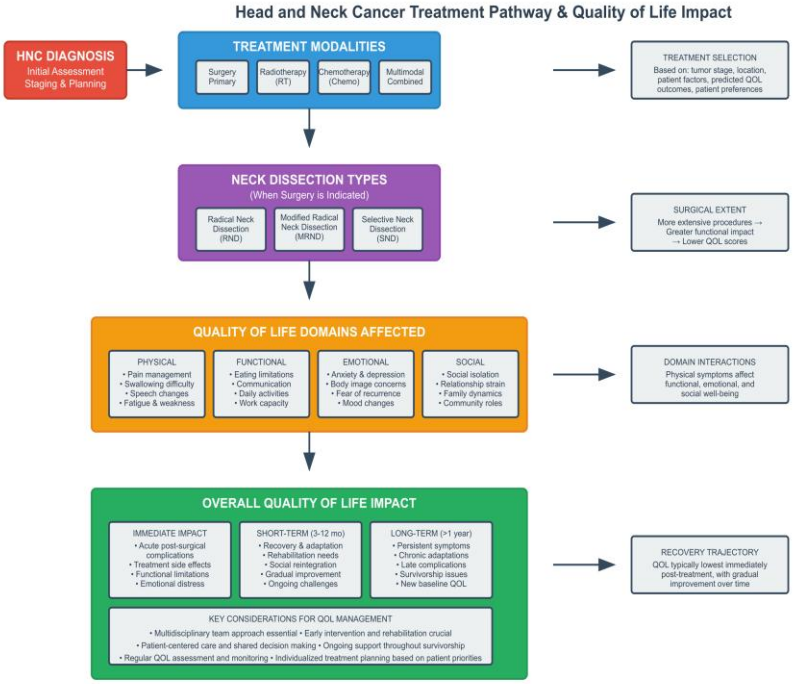
		undergone the neck dissection for treatment of HNC[2]. 41 patients were undergoing bilateral neck dissections, and also 33 patients underwent unilateral neck dissection. Level V lymphatic nodes were also dissected in 74 necks. Among these, the spinal accessory nerve (SAN)8 was removed in 29 cases of neck dissection.			Spinal accessory nerve, was spared had better and improved shoulder functions.When the spinal accessory nerve was preserved,the patients without dissection of level IV and V nodes had a better scores on pain measures.
Mehanna *et al.,* (2006)[26]	Prospective study	200 patients were diagnosed and also treated for the HNC[2]. The exclusion criteria were learning difficulty, blindness, and inability to understand	QOL[1] at 10 years measured by Auckland QOL[1] questionnaire	At 10 years following the diagnosis overall QOL[1] was decreased significantly by the average of 11 % when compared with before treatment	Late drop in QOL[1] of HNC[2] patients need further more investigation and corroboration
Schwartz *et al.,* (2001)[35]	Literature review	445 abstracts were reviewed	the articles using an instrument for comparing the HNC[2] therapy groups with QOL[1] outcomes	61 articles were examined and 40 different instruments were used. The terminology was used consistently in 21 of the 61 articles and also scientific study design used in 11 of 61 articles.	QOL[1] outcome shows promise for assisting with the treatment decisions in the HNC[2]
J E Terrell *et al.,* (2000)[18]	Prospective study		Evaluate the QOL[1] in patients with HNC[2] who have undergone neck dissection and compare it between	The results assess pain levels despite the use of pain medication,	Neck dissection that spares the spinal accessory nerve is associated with higher

			those with preserved and resected spinal accessory nerve (SAN).	along with the presence of headaches.	HNQOL[3] pain scores, reduced shoulder and neck pain, and a lower need for medication. Additionally, when level five dissection is avoided, patients experience even better HNQOL[3] pain scores, fewer complications, and less neck and shoulder pain.
Weymuller *et al.,* (2000) [19]	Prospective study	549 patients were collected from the database. Amongst this , 364 met the criteria for the histological findings (i.e., SCC)[4]and their cancer restrictions at four major anatomy sites.	QOL[1] prior to treatment was also evaluated using a self-administered questionnaire overseen by an interviewer.	Subsequent self-administered tests taken at 3, 6, 12, 24 and 36 months. Additional information concerning each patients cancer site, treatment, stage, type of surgical reconstruction, and life state.	It is very difficult to achieve statistically meaningful results in one institution. The QOL[1] composite score may not be a sensitive tool. Analysing individual domains can be more effective
Graeff *et al.,* (2000)[16]	Prospective study	One hundred seven patients were included for research purposes and treatments of cancer questionnaire,	EORTC[5] head and neck module, and centre for the epidemiological studies in depression scale before treatment, at 6,12,24,36 months later	Limited deterioration of physical functioning of many head and neck symptoms within 6 months with subsequent improvements.	Despite physical deterioration, there has been an improvement in depression symptoms and overall QOL[1]. Treatment for HNC[2] terminates in short-term morbidity most of this resolution within the year. During this study, the impact of the disease and its treatment on long-term survivors appears to be less severe than is often assumed [8]

Abbreviations used: QOL (Quality of life)[1], HNC(Head and Neck cancer)[2], HRQOL (Health related quality of life)[3], SND (selective neck dissection)[4],UW(University of Washington)[5],RND(Radical neck dissection)[6],MRND(Modified radical neck dissection)[7],SAN(Spinal accessory nerve)[8],EORTC(European organization for research and treatment of cancer,,

HNQOL (Head and neck quality of life)[3].,SCC (Squamous cell carcinoma)[4], EORTC (European organization for research and treatment of cancer)[5], QLQ (Quality of life questionnaire)[6], H&N(Head and neck)[7], CSI (Caregiver strain index)[8],OS(overall survival)[9],LP(laryngectomized population)[2],UW(University of Washinton)[3],QOL(Quality of Life)[4] ,EORTC (European organization for research and treatment of cancer)[5], QLQ (Quality of life questionnaire)[6],FACT-HN (Functional Assessment of Cancer therapy Head and Neck Scale)[7]

Figure 1



An illustrative flow diagram outlining the typical treatment pathway for head and neck cancer (HNC), including diagnosis, surgical interventions such as neck dissection, adjuvant therapies (radiotherapy, chemotherapy), and post-treatment rehabilitation. This figure emphasizes the multimodal nature of HNC management and its potential impact on quality of life (QOL).

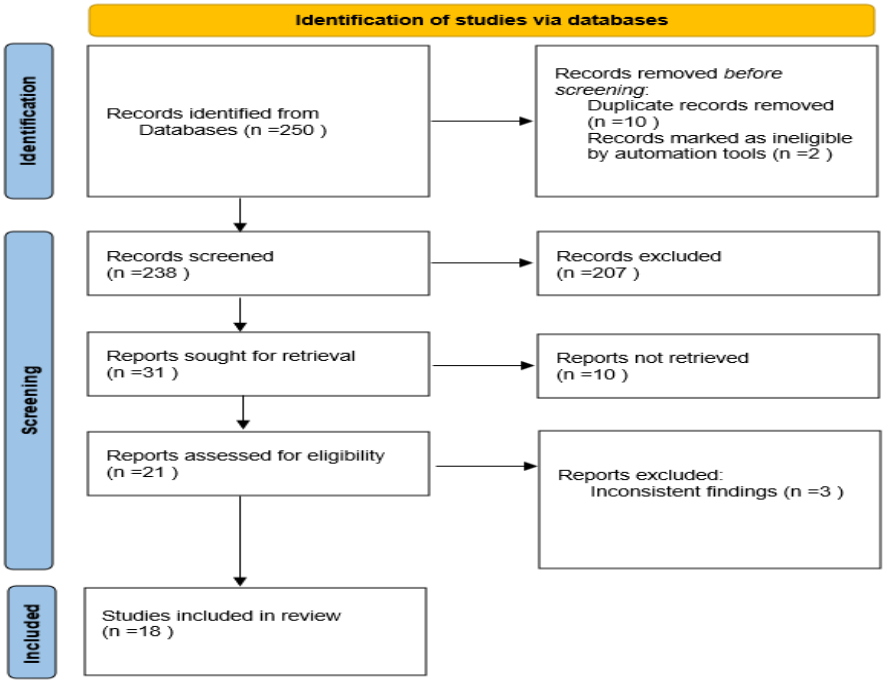
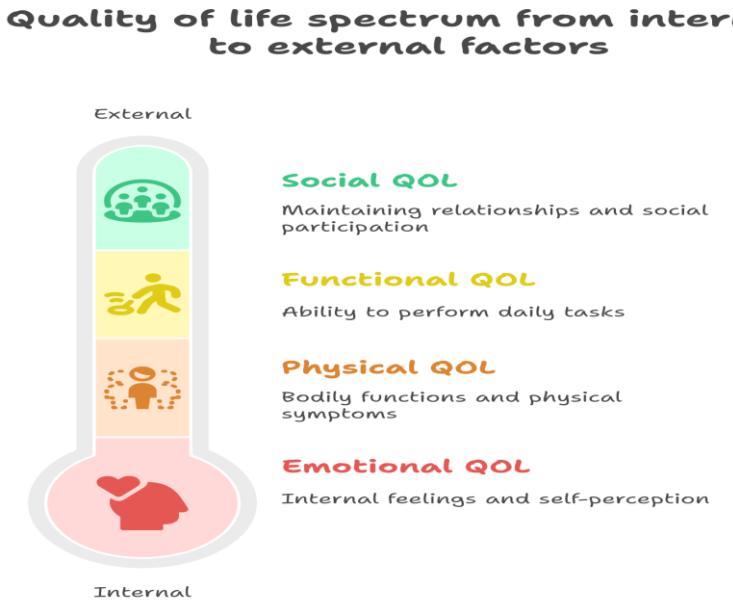


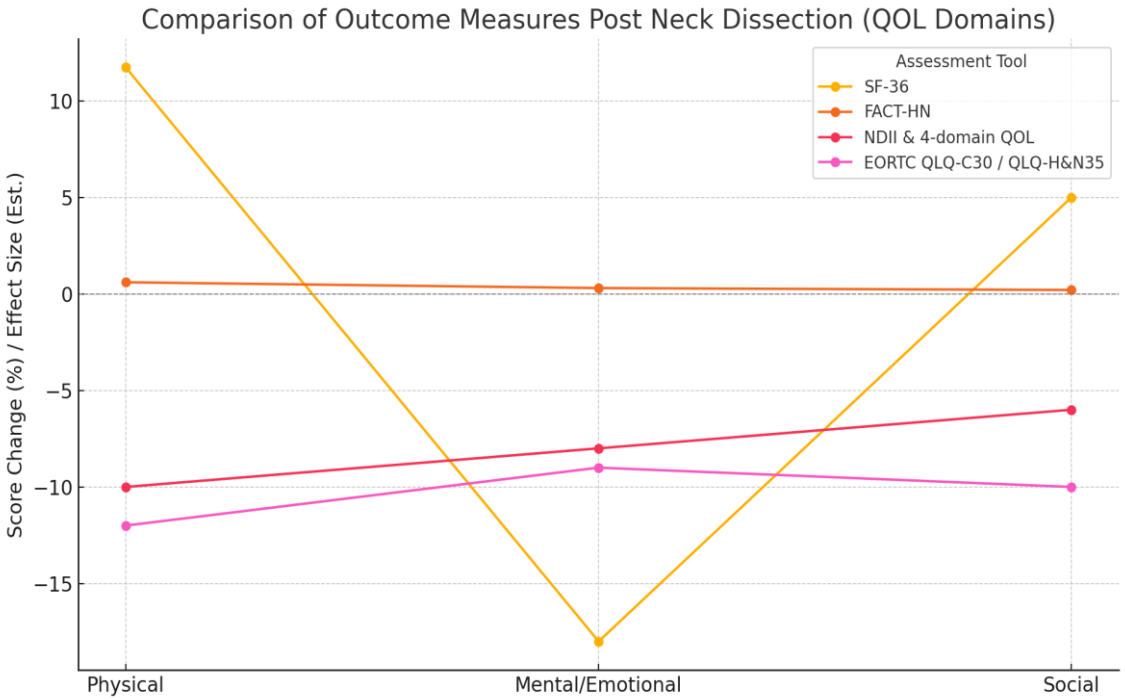
Figure 2

Figure 3



A conceptual model depicting the external (e.g., surgical extent, radiation, social support) and internal (e.g., psychological resilience, comorbidities, pain perception) factors that influence health-related quality of life (HRQOL) in patients with head and neck cancer. The diagram integrates both patient-centered and treatment-related variables to highlight multidimensional QOL determinants.

Figure 4



Line graph comparing changes in quality of life (QOL) across physical, mental/emotional, and social domains using four validated assessment tools: SF-36, FACT-HN, NDII, and EORTC QLQ-C30/QLQ-H&N35. The graph visualizes directional trends in QOL outcomes, showing that physical function improves with exercise interventions while mental and social domains often decline post-treatment, particularly in patients receiving multimodal therapy.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

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