

Assessing Quality of Life after Total Laryngectomy: A Systematic Review of Tools to Guide Personalized Rehabilitation

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Abstract

Objective

Total laryngectomy profoundly affects voice, swallowing, breathing, and social participation, with major physical, emotional, and psychological consequences. This systematic review evaluated quality of life (QoL) assessment tools used after total laryngectomy, focusing on their frequency of use, the domains assessed, and their limitations to support a comprehensive, patient-centered evaluation.

Data Sources

A systematic search of PubMed, the Cochrane Library, Google Scholar, and CORE identified studies published between 2015 and 2025 using the following keywords: total laryngectomy, laryngeal cancer, laryngectomized patients, quality of life, self-evaluation, and quality of life assessment.

Methods of Review:

A systematic literature search was performed according to predefined inclusion and exclusion criteria. After duplicate removal and title and abstract screening, full-text articles were independently assessed by two reviewers. Twenty-six studies were included in the qualitative synthesis.

Results

Among the included studies, 73% were observational and 20% were conducted in Italy. Twenty-six patient-reported outcome measures (PROMs) and complementary instruments were identified, with a mean of 2.8 instruments per study. Internationally, the VHI-30 was the most frequently used PROM (35%), followed by the SECEL and VR-QoL (31% each), whereas VR-QoL predominated in Italian studies (60%). QoL was generally poorest in the immediate postoperative period and improved over the following 8-21 months, although psychological distress frequently persisted. Voice rehabilitation, perioperative speech therapy, complication management, and social support were consistently associated with better outcomes.

Conclusions

Current QoL assessment remains heterogeneous and lacks a comprehensive multidimensional approach. Standardized, patient-centered evaluation integrating functional, psychological, and social domains is needed to better guide individualized rehabilitation after total laryngectomy.

Keywords: Total laryngectomy; Quality of life; Voice quality; Questionnaire

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Introduction

Total laryngectomy (TL) is a highly invasive procedure that results in the loss of laryngeal voice and profound changes in breathing and swallowing. Consequently, patients experience not only major physical and anatomical consequences but also significant psychological, emotional, and social consequences. Despite advances in surgical techniques and voice rehabilitation strategies, voice-related quality of life (QoL) remains a major concern after TL (1-2). Voice prostheses are widely regarded as the gold standard for voice rehabilitation, and patients rehabilitated with this method generally report better voice-related QoL (1,3). However, daily device management and prosthesis-related complications, such as leakage, pneumonia, and the need for routine prosthesis replacement, may adversely affect some aspects of overall QoL (4). The choice of voice rehabilitation method is also influenced by the patient's level of social participation in family and occupational settings. These factors affect not only voice quality but also the broader perception of QoL (3). QoL assessment itself is challenging because study populations are heterogeneous with respect to disease stage, comorbidities, and access to structured rehabilitation pathways (1).

QoL in patients undergoing TL typically worsens between diagnosis and the immediate postoperative period, often in association with depressive symptoms and anxiety, and subsequently improves during the first postoperative year (2,5). Sexuality, olfaction, voice, and mucus management are among the most compromised domains and may have a substantial impact on QoL (5). Physical, emotional, social, and economic factors, together with dyspnea, voice and sensory impairments, and the type and effectiveness of rehabilitation, therefore influence patients' overall QoL. Mertl J. et al. (6) reported that poorer QoL was frequently associated with difficulty maintaining employment and accepting disability. They also described aggressive behavioral traits that may arise from an inability to communicate effectively. These findings underscore the importance of personalized rehabilitation, validated assessment tools, and long-term QoL monitoring within a multidisciplinary care

pathway capable of addressing the complex challenges of recovery (2,7). Greater consensus regarding the selection of QoL instruments is therefore needed to improve patient assessment and facilitate the development of more effective rehabilitation strategies (2,5).

In this context, the use of validated and, ideally, multidimensional instruments is essential to capture the overall impact of TL on daily life. Such instruments should assess not only voice-related QoL but also self-perception, personal autonomy, social participation, occupational reintegration, and acceptance of and adaptation to life after laryngectomy.

Accordingly, this systematic review aimed to analyze and critically evaluate the instruments currently used in Italy and internationally to assess QoL after TL. Specifically, it provides an overview of the available assessment tools, highlights their strengths and limitations, and supports the informed selection of instruments according to the clinical and research priorities of this patient population.

Materials and Methods

To identify studies assessing QoL in patients undergoing TL, a systematic literature search was conducted in PubMed/MEDLINE, the Cochrane Library, Google Scholar, and CORE. The final search was performed on 2 January 2026 and covered publications from 1 January 2015 through 31 December 2025.

The same free-text search strategy was entered into the standard search interface of each database: ("total laryngectomy" OR "laryngeal cancer" OR "laryngectomized patients") AND ("quality of life" OR "self-evaluation" OR "quality of life assessment").

No database-specific controlled vocabulary, such as Medical Subject Headings (MeSH), or field restrictions were used. Consequently, terms were searched using the default searchable fields and functions provided by each database. Where available, filters were applied to restrict the results to English-language publications published between 2015 and 2025. When a language filter was unavailable, language eligibility was assessed during screening. Reference lists of eligible articles and relevant reviews were also manually screened to identify additional studies.

All retrieved records were exported to Microsoft Excel (version 16.112.3), where duplicates were identified and removed before screening. Two reviewers (V.M.T. and B.V.) independently screened titles and abstracts and subsequently assessed the full texts of potentially eligible reports. Disagreements were resolved through consultation with a third reviewer (C.S.).

Studies were eligible if they developed, validated, or applied PROMs and complementary instruments in patients undergoing TL; used a quantitative design, including psychometric validation, observational clinical, or cross-sectional studies; assessed functional, psychological, or social dimensions after TL; were original articles prospective or retrospective articles published in English; included at least 10 patients who had undergone TL; used of validated or non-validated QoL assessment instruments; and were published between 2015 and 2025. Studies were excluded if they included fewer than 10 patients; did not include

patients who had undergone TL; were not published in English; were reviews, editorials, or case reports; or provided insufficient or unusable data for QoL assessment.

The initial database search and reference screening identified 469 records. Before screening, 12 duplicates, 153 records published before 2015, and two non-English-language records were removed. Two reviewers (V.M.T. and B.V.) independently screened the titles and abstracts of the remaining 302 records. Ten records were excluded at this stage because they were reviews (n = 7), case reports (n = 2), or an editorial (n = 1). The full texts of 292 reports were then assessed for eligibility. Of these, 266 were excluded because the study population did not include patients undergoing TL (n = 54), the sample included fewer than 10 patients (n = 87), QoL was not assessed (n = 31), the study design was ineligible (n = 23), or the reported data were insufficient or unusable (n = 71). Ultimately, 26 studies met the eligibility criteria and were included in the review (Figure 1).

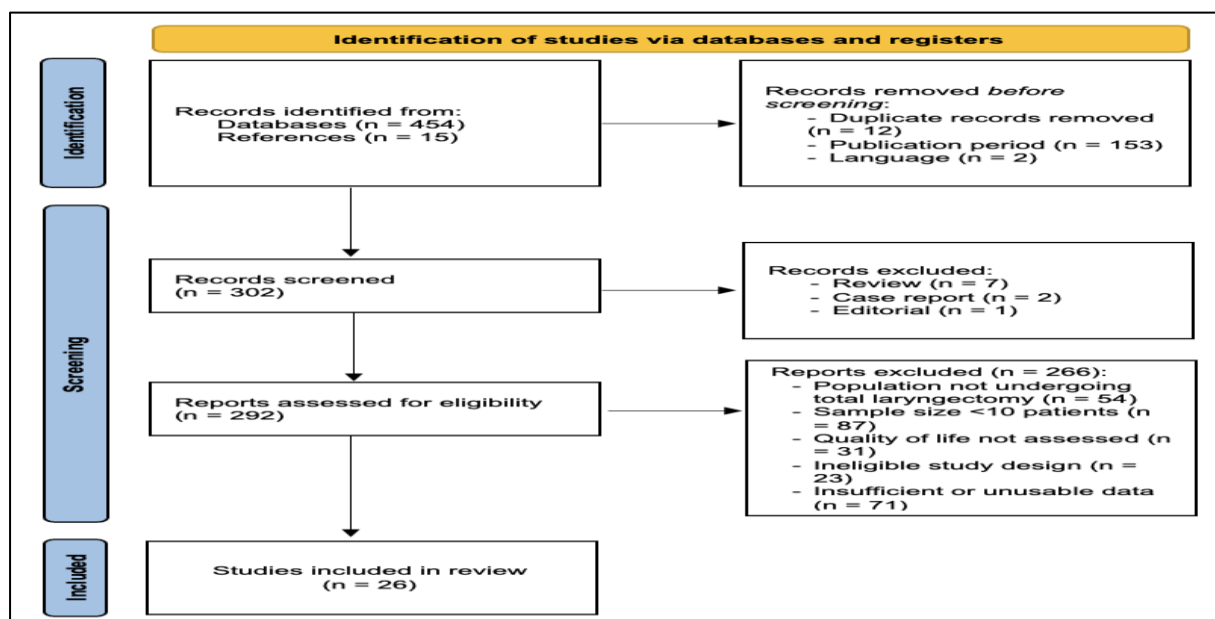


Fig 1. PRISMA 2020 flow diagram of the literature search and study selection process.

Risk-of-bias assessment

Two reviewers (V.M.T. and B.V.) independently assessed the methodological quality and risk of bias of the included studies using design-appropriate appraisal tools. Observational cohort and cross-sectional studies were evaluated using the corresponding Joanna Briggs Institute (JBI) critical appraisal

checklists. Randomized controlled trials were assessed using the Cochrane Risk of Bias 2 (RoB 2) tool, whereas studies evaluating the measurement properties of QoL instruments were assessed using the COSMIN Risk of Bias Checklist. Pilot non-randomized intervention studies were evaluated using the JBI checklist for quasi-experimental studies. Disagreements

were resolved through discussion or consultation with a third reviewer (C.S.). For consistency of presentation, risk-of-bias judgments were summarized as low, moderate, or high. Studies were classified as low risk when no important methodological concerns were identified; moderate risk when limitations reduced confidence in the findings but were unlikely to invalidate them; and high risk when one major concern or several combined concerns were likely to materially affect the findings.

Results

Study characteristics

Of the 26 studies included in the review, 73% (n = 19) were observational (cross-sectional, retrospective, or prospective cohort) studies. Methodological and validation studies accounted for 12% (n = 3), and pilot studies for 8% (n = 2), while randomized controlled trials and comparative studies each accounted for 4% (n = 1). Only 20% of the included studies were conducted in Italy (Table 1).

Table 1. Summary of included studies and PROMs or complementary instruments used to assess QoL and related domains after total laryngectomy

Authors (Year, Country)	Study Design	Study objective	Sample	PROMs and complementary instruments	Main QoL Findings
Tonsbeek et al. (2025, Netherlands) (11)	Prospective observational cohort	To evaluate longitudinal changes in health-related quality of life (HRQoL) after total laryngectomy (TL)	128/293 TL patients; mean age 67 years	VHI-30; HADS-A/D; EORTC QLQ-H&N35; EORTC QLQ-C30	HRQoL, voice and swallowing improve over time; anxiety and depression often persist
Murariu et al. (2025, Romania) (8)	Prospective observational cohort	To explore mid- to long-term QoL and functional outcomes after TL, focusing on adaptation, rehabilitation, and social reintegration	75 patients with laryngeal cancer (25% TL; others PL or CRT); mean age 64 years; 68% men	EORTC QLQ-H&N35; VHI-30; HADS-A/D; DASS	TL patients show greater functional and psychosocial impairment despite rehabilitation.
Pereira et al. (2025, Brazil) (14)	Cross-sectional observational study	To assess vocal symptoms, dysphagia risk, emotional distress, and QoL in TL patients	12 TL patients; mean age 64 years; mixed voice rehabilitation methods; 24-120 months post-surgery	VoiSS; EAT-10; SRQ-20; EORTC QLQ-C30	Vocal symptoms and psychological distress significantly worsen QoL.
Mohd Shakri et al. (2023, Malaysia) (22)	Methodologic al cross-sectional study	To translate and validate the Malay version of the SECEL questionnaire	83 TL patients (78 M, 5 F) using various communication methods	mSECEL; mVHI-10	mSECEL is a reliable tool for assessing communication-related QoL
Longobardi et al. (2023, Italy) (13)	Pilot randomized study	To evaluate the effectiveness of preoperative speech therapy counselling on psychological distress and voice acceptance after TL	27 TL patients with primary TEP (14 counselling vs 13 control)	PDI; IES-R; HADS; I-SECEL	Pre-operative counselling reduces anxiety and improves voice acceptance.
Mesolella et al. (2023, Italy) (19)	Retrospective cross-sectional study	To correlate expert-rated vocal quality with patient perception and QoL after TL	89 TL patients using different voice rehabilitation methods	V-RQOL; SECEL; IINFVo	QoL perception is not strictly related to type of alaryngeal voice
Laksar Klarić et al. (2023, Croatia) (23)	Methodologic al cross-sectional study	To translate, culturally adapt, and validate the Croatian SECEL questionnaire	50 TL patients; ≥12 months after treatment	SECEL; VHI; SF-36	Croatian SECEL shows good validity and reliability.
Haring et al. (2022, USA) (9)	Observational study	To assess communication difficulties in acutely aphonic patients and the impact of a tablet-based communication app	35 hospitalized patients after tracheostomy or TL	V-RQOL; ad hoc questionnaire	Acute voice loss causes significant communication-related distress

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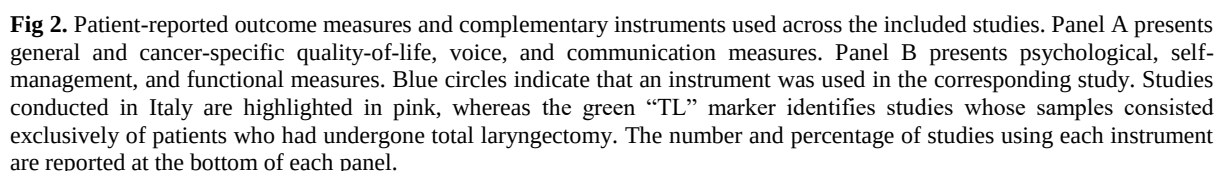
Wulff et al. (2021, Denmark) (5)	Cross-sectional observational study	To evaluate long-term HRQoL and late effects after TL	172 TL patients; 1.6–18.1 years post-treatment	EORTC QLQ-C30; EORTC QLQ-H&N35; V-RQOL; MDADI; HADS	Persistent late effects negatively affect long-term HRQoL
Vlachtsis et al. (2022, Greece) (28)	Retrospective observational study	To assess QoL in Greek TL patients and correlate outcomes with clinical-demographic variables	50 male TL patients; mean age 66.6 years	EORTC QLQ-C30; EORTC QLQ-H&N35	Overall QoL is generally satisfactory after TL
Villanueva et al. (2022, Spain) (29)	Validation study	To translate and validate the Spanish version of the SECEL questionnaire	101 TL patients; ≥9 months post-surgery	S-SECEL; VHI-30; HADS; EORTC QLQ-H&N35	Spanish SECEL is valid and reliable for QoL assessment.
Zhu et al. (2021, China) (30)	Randomized controlled trial	To evaluate the effectiveness of transitional care on QoL after TL	68 TL patients randomized to transitional care vs standard discharge	ESCA; health knowledge questionnaire; nursing satisfaction; MMAS-8; SF-36	Transitional care improves self-care and overall QoL
Dragičević et al. (2020, Serbia) (16)	Cross-sectional observational study	To compare self-perceived vocal handicap between esophageal and tracheoesophageal speech after TL	83 disease-free TL patients (43 ES; 40 TES)	VHI-30	Tracheoesophageal speech is associated with lower vocal handicap
Leemans et al. (2020, Netherlands) (10)	Observational study	To assess the relationship between demographic characteristics and QoL, functional limitations and participation restrictions after TL	1624 TL patients; male:female ratio 5:1; mean age 60–69 years	Atos Medical AB questionnaire (non-validated)	Women and patients <2 years post-TL report worse QoL. Daily activity limitations, social avoidance and pulmonary problems significantly impact QoL
Sluis et al. (2021, Netherlands) (15)	Prospective cohort study	To evaluate subjective and objective voice outcomes before and after TL	43 TL patients; follow-up at 12 months	VAS; VHI-10; EQ-5D-5L; AVQI	Voice-related outcomes worsen after TL but improve between 6 and 12 months. Time predicts objective and subjective voice measures, but not VHI-10 score
Souza et al. (2020, Brazil) (12)	Cross-sectional observational study	To analyze factors associated with reduced QoL after TL	95 TL patients; mean age 57.7 years	UW-QOL	QoL is higher in men, in patients >2 years post-TL and in those rehabilitated with TEP compared with ES or EL
Raquel et al. (2020, Brazil) (24)	Cross-sectional observational study	To compare QoL assessment tools in TL patients with esophageal speech	38 TL patients (19 speakers, 19 non-speakers)	VAS; VHI; V-RQOL; FACT-H&N; EORTC QLQ-C30; EORTC QLQ-H&N35; UW-QOL	Strong correlations among voice-related and cancer-specific QoL tools. EORTC and UW-QOL are effective regardless of speech acquisition
Guimarães et al. (2020, Portugal) (25)	Validation study	To translate and validate the Portuguese version of SECEL	129 TL patients	EP-SECEL; EORTC QLQ-C30; EORTC QLQ-H&N35	The Portuguese SECEL is valid and reliable for assessing communication-related QoL after TL
Cocuzza et al. (2020, Italy) (31)	Retrospective observational study	To evaluate factors influencing QoL in TL patients with TEP compared with ES	54 TL patients	V-RQOL; VHI	TEP patients report better QoL than ES patients. Prosthetic complications are associated with worse QoL outcomes

Longobardi et al. (2019, Italy) (26)	Pilot trial	To assess the impact of combined psychological and speech therapy after TL	32 TL patients randomized to SLP vs SLP + psychological support	IINFVo; SCL-90-R; I-SECEL; WHOQOL-B	Integrated psychological and speech therapy improves emotional adjustment, voice acceptance and overall QoL
Scott et al. (2019, South Africa) (20)	Retrospective observational study	To investigate QoL after TL and the influence of socioeconomic status	47 TL patients	UW-QOL; V-RQOL	QoL stabilizes after the first 2 years post-TL. Lower socioeconomic status is associated with better voice-related QoL perception
Allegra et al. (2019, Italy) (18)	Comparative observational study	To compare acoustic voice quality and QoL in ES vs TEP rehabilitation	67 TL patients	PRAAT; VHI; V-RQOL; VPQ	TEP provides better acoustic and perceptual voice outcomes; integrated rehabilitation addressing psychological status is needed to optimize QoL
Agarwal et al. (2015, India) (21)	Retrospective observational study	To evaluate the impact of TEP voice on QoL and socioeconomic factors	71 TL patients	VHI-30; V-RQOL	Voice-related QoL improves over time. Socioeconomic status and family support significantly influence V-RQOL
Perry et al. (2015, Australia) (27)	Cross-sectional observational study	To examine the contribution of function, psychological well-being and self-efficacy to QoL after TL	113 TL patients	WHOQOL-BREF; AusTOM; DASS-21; GSES	Psychological well-being is the strongest determinant of overall QoL, supporting faster functional recovery
Pereira da Silva et al. (2015, Portugal) (32)	Cross-sectional observational study	To assess the impact of TL on QoL	34 TL patients	EORTC QLQ-C30; SECEL; HADS	TL is associated with reduced functional capacity and increased psychological distress, highlighting the need for ongoing rehabilitation
Polat et al. (2015, Turkey) (17)	Cross-sectional observational study	To evaluate the effects of indwelling voice prosthesis on QoL and psychosocial outcomes	30 male TL patients	WHOQOL-BREF; BDI; BAI; RSES; ASES	Indwelling voice prosthesis significantly improves QoL, self-esteem and sexual function, while reducing depression

QoL; quality of life; HRQoL: health-related quality of life; TL: total laryngectomy; VHI-30: Voice Handicap Index - 30 items; HADS-A/D: Hospital Anxiety and Depression Scale - Anxiety/Depression subscales; EORTC QLQ-H&N35: European Organisation for Research and Treatment of Cancer Quality of Life questionnaire – head and neck; PL: partial laryngectomy; CRT: chemoradiotherapy; DASS: Depression Anxiety Stress Scales; VoiSS: Voice Symptom Scale; EAT-10: Eating Assessment Tool-10; SRQ-20: Self-Reporting Questionnaire-20; SECEL: Self-Evaluation of Communication Experiences after Laryngectomy; PDI: Peritraumatic Distress Inventory; IES-R: Impact of Event Scale-Revised; IINFVo: Impression, Intelligibility, Noise, Fluency, Voicing; V-RQOL: Voice Related Quality of Life; SF-36: 36-Item Short Form Health Survey; MDADI: MD Anderson Dysphagia Inventory; MMAS-8: 8-item Morisky Medication Adherence Scale; VAS: Visual Analogue Scale; EQ-5D-5L: EuroQol-5 Dimensions 5 Levels; AVQI: Acoustic Voice Quality Index; UW-QOL: University of Washington Quality of Life; FACT-H&N: Functional Assessment of Cancer Therapy Head and Neck; SCL-90-R: Symptom Checklist-90-Revised; WHOQOL-B: World Health Organization Quality of Life-BREF; VPQ: Voice Prosthesis Questionnaire; AusTOM: Australian Therapy Outcome Measures; DASS-21: Depression Anxiety Stress Scales – 21 items; GSES: General Self-Efficacy Scale; BDI: Beck Depression Inventory; BAI: Beck Anxiety Inventory; ESCA: Scale Exercise of Self-Care Agency; RSES: Rosenberg Self-Esteem Scale; ASES: Arizona Sexual Experiences Scale

Most studies (n = 24) evaluated QoL outcomes exclusively in patients who had undergone TL. Only two studies compared patients after TL with patients undergoing partial laryngectomy followed by chemoradiotherapy or with patients who had

undergone tracheostomy alone (8-9). Overall, 92% of the included studies limited comparisons to patients with the same pathology and surgical intervention, thereby reducing bias related to clinical and functional heterogeneity (Figure 2).



Analysis of the questionnaires used in the studies included in the review, focusing on studies conducted in Italy (pink) and on studies that specifically assessed patients who had undergone total laryngectomy (green).

TL: total laryngectomy; EORTC QLQ-H&N35: European Organisation for Research and Treatment of Cancer Quality of Life questionnaire – head and neck; VHI-30: Voice Handicap Index - 30 items; SECEL: Self-Evaluation of Communication Experiences after Laryngectomy; HADS-A/D: Hospital Anxiety and Depression Scale - Anxiety/Depression subscales; EQ-5D: EuroQol-5 Dimensions; UW-QOL: University of Washington Quality of Life; SRQ-20: Self-Reporting Questionnaire-20; VoiSS: Voice Symptom Scale; EAT-10: Eating Assessment Tool-10; VR-QoL: Voice-Related Quality of Life; SF-36: 36-Item Short Form Health Survey; ESCA: Scale Exercise of Self-Care Agency; PDI: Peritraumatic Distress Inventory; IES-R: Impact of Event Scale-Revised; VAS: Visual Analogue Scale; FACT-H&N: Functional Assessment of Cancer Therapy Head and Neck; SCL-90-R: Symptom Checklist-90-Revised; WHOQOL-B: World Health Organization Quality of Life-BREF; VPQ: Voice Prosthesis Questionnaire; BDI: Beck Depression Inventory; RSES: Rosenberg Self-Esteem Scale; ASES: Arizona Sexual Experiences Scale; DASS: Depression Anxiety Stress Scales; GSES: General Self-Efficacy Scale.

Patient-reported outcome measures and complementary instruments

Across the included studies, 26 different PROMs and complementary instruments were used to characterize QoL and related functional, psychological, and social domains after TL. Because these instruments are not conceptually equivalent, they were classified according to their primary measurement construct: general or cancer-specific QoL; voice- and communication-related outcomes; psychological and emotional well-being; swallowing and other functional outcomes; and self-care, adherence, and self-efficacy.

General and cancer-specific QoL measures included the EORTC QLQ-C30, EORTC QLQ-H&N35, UW-QOL, EQ-5D, SF-36, FACT-H&N, WHOQOL-BREF, and V-RQOL. Voice- and communication-related PROMs included the VHI-30, VHI-10, SECEL, VoiSS,

and VPQ. Psychological and psychosocial instruments included the HADS, SRQ-20, PDI, IES-R, SCL-90-R, BDI, BAI, RSES, ASES, and DASS-21. The ESCA and GSES assessed self-care and self-efficacy, respectively. Objective or clinician-rated voice outcomes, including acoustic measures derived using PRAAT and the AVQI, were considered complementary assessments rather than direct QoL measures. Ten instruments were used in the Italian studies: VHI-30, HADS, I-SECEL, V-RQOL, IES-R, PDI, SCL-90-R, WHOQOL-BREF, UW-QOL, and VPQ (Figures 2 and 3). On average, each study used 2.8 instruments, reflecting the multidimensional nature of QoL assessment after TL. The frequencies reported in Figures 2 – 4 therefore represent the use of PROMs and complementary measures across QoL-related domains rather than the exclusive use of direct QoL instruments (20).

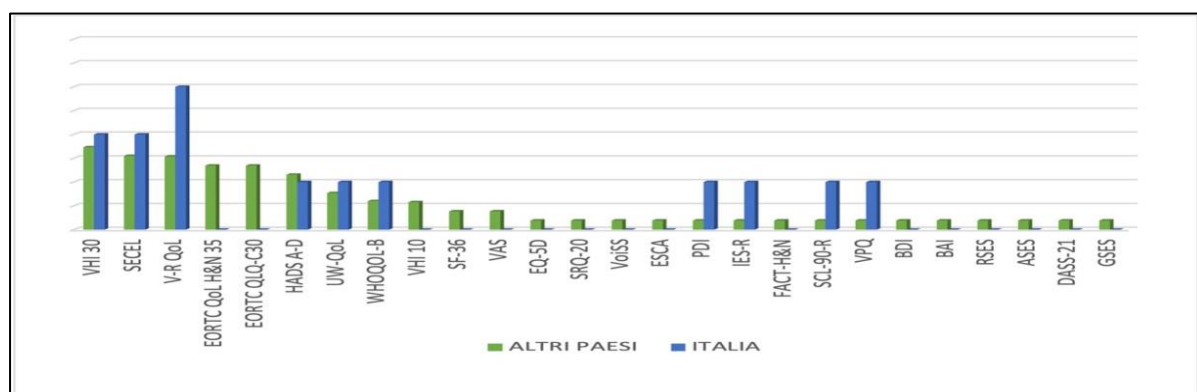


Fig 3. Frequency of PROM and complementary instrument use in studies conducted in Italy (blue) and other countries (green)

Distribution and frequency of PROM and complementary instrument use

Internationally, the VHI-30 was the most frequently used PROM for assessing voice-related disability after TL (35%), followed by the SECEL and the V-RQOL (31% each) and

the EORTC questionnaires (27%). In the Italian studies, VHI-30 and SECEL were each used in 40% of studies, whereas V-RQOL was used in 60%, almost twice the frequency observed in studies conducted outside Italy (Figure 4).

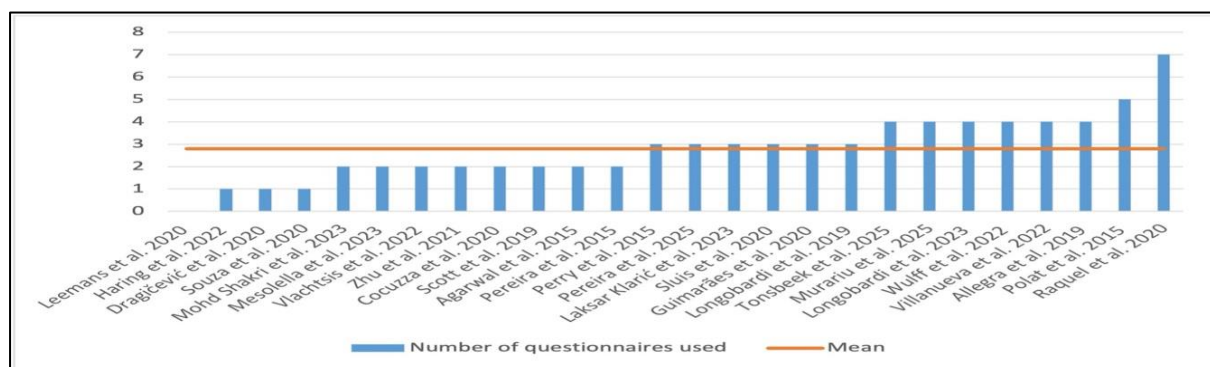


Fig 4. Number and mean number of questionnaires or complementary instruments used per study

Temporal trends in quality of life

The included studies indicate that QoL is generally poorer in the immediate postoperative period and tends to improve significantly between 8 and 21 months after surgery, with stabilization occurring at approximately 12 months postoperatively (8,22). Patients who were less than two years post-TL reported poorer QoL, particularly with respect to daily activities, social participation, and respiratory function (16,20). Overall, QoL appears to fluctuate during the first two postoperative years, followed by relative stabilization. Despite this improvement, patients after TL consistently reported limitations in swallowing, communication, and psychosocial adjustment. Speech therapy support was associated with improved speech intelligibility and QoL and facilitated reintegration into social and cultural settings (9).

Psychological and emotional outcomes

Emotional and psychological difficulties, particularly anxiety, depression, frustration, and difficulty accepting the new condition, tended to persist from the postoperative period through long-term follow-up (8-9).

Dedicated psychological instruments, such as the HADS, were used in approximately 20–23% of studies, reflecting increasing attention to emotional distress in this population. Notably, Italian studies used a broader range of psychological distress measures, including the PDI, IES-R, and SCL-90-R, each of which was used in approximately 20% of Italian studies but was absent from the international studies included in this review. This pattern suggests a greater emphasis in the Italian literature on psychological distress and the emotional impact of treatment.

Rehabilitation-related factors

Preoperative speech-language pathology counseling was associated with better psychological outcomes, including reduced anticipatory anxiety, sadness, and emotional distress in patients and caregivers, as well as greater acceptance of the new voice (12). The timing of postoperative speech therapy emerged as an important factor influencing voice-related QoL. Delayed rehabilitation was associated with poorer outcomes and less effective voice recovery (10). Time since surgery was predictive of both objective and subjective voice outcomes, as reflected by acoustic measures and self-assessment

instruments such as the AVQI, VHI-10, EQ-5D-5L, and VAS. However, the need for specific validation of the VHI-10 in patients after TL has been highlighted (21).

Voice rehabilitation and complications

Health-related QoL was adversely affected by postoperative complications, which also reduced adherence to rehabilitation (8). Voice-related QoL was poorer among prosthetic speakers who experienced fistula-related complications (e.g., granuloma formation or periprosthetic leakage) than among esophageal speakers. Nevertheless, patients using voice prostheses generally reported less voice-related disability and better QoL, acoustic quality, speech intelligibility, and communication effectiveness (19,32). Some studies found no significant difference in QoL associated with voice prosthesis use, highlighting substantial individual variability (25). Communication difficulties were most pronounced in noisy environments, and only 16% of patients reported complete adaptation to their new voice (13,28). These findings support the integration of psychological rehabilitation with speech therapy.

Sociodemographic factors

QoL also differed by sex, with men generally reporting better outcomes than women (20,22). In addition, lower socioeconomic status and stronger family support were associated with higher voice-related QoL in individual studies (27,29).

Risk-of-bias assessment

Study-level risk-of-bias assessments are reported in Table 2. Of the 26 included studies, one was judged to have a low risk of bias, 16 a moderate risk, and nine a high risk. The most frequent methodological concerns were non-random or convenience sampling, insufficient adjustment for clinical and rehabilitation-related confounders, small sample sizes, and reliance on self-reported outcomes. Several cross-sectional studies were also limited by their inability to establish temporal or causal relationships. Concerns in randomized and pilot intervention studies mainly involved insufficient reporting of allocation concealment, lack of blinding, small samples, and subjective outcomes. The review findings should therefore be interpreted cautiously. Although most studies used validated QoL instruments, the predominance of observational

and cross-sectional designs, together with recurrent selection and confounding concerns,

limits the certainty and generalizability of the evidence. Associations between.

Table 2. Risk-of-bias assessment

Authors (Year)	Study design	Appraisal tool	Main risk-of-bias concerns	Overall judgment
Tonsbeek et al. (2025) (11)	Prospective observational cohort	JB1 cohort	Selection based on availability of longitudinal PROM data; possible missing-data and attrition bias, although validated outcomes and longitudinal mixed models were used.	Moderate
Murariu et al. (2025) (8)	Prospective observational cohort	JB1 cohort	Treatment groups were determined clinically rather than randomly; substantial baseline clinical differences and residual confounding may affect comparisons.	High
Pereira et al. (2025) (14)	Descriptive cross-sectional study	JB1 analytical cross-sectional	Very small non-probability sample collected during pandemic restrictions; limited representativeness and no meaningful control of confounding.	High
Mohd Shakri et al. (2023) (22)	Cross-sectional validation study	COSMIN Risk of Bias	Rigorous translation and test-retest procedures, but limited assessment of dimensionality and an imbalanced sample by sex and communication method.	Moderate
Longobardi et al. (2023) (13)	Pilot randomized clinical trial	RoB 2	Small pilot sample; insufficient detail on allocation concealment and blinding, with subjective patient-reported outcomes vulnerable to knowledge of intervention.	High
Mesolella et al. (2023) (19)	Retrospective cross-sectional study	JB1 analytical cross-sectional	Validated instruments and appropriate analyses were used, but retrospective selection and limited adjustment for potential clinical confounders remain concerns.	Moderate
Laksar Klarić et al. (2023) (23)	Cross-sectional validation study	COSMIN Risk of Bias	Translation, convergent validity, internal consistency and test-retest reliability were reported; other domains could not be fully verified without the complete article.	Moderate
Haring et al. (2022) (9)	Observational intervention study	JB1 quasi-experimental	Small heterogeneous sample including tracheostomy and total laryngectomy patients; no randomized control group and limited control of confounding.	High
Wulff et al. (2021) (5)	Cross-sectional observational study	JB1 analytical cross-sectional	Large multicenter sample and validated measures, but cross-sectional design, possible non-response bias and residual confounding limit causal interpretation.	Moderate
Vlachtsis et al. (2022) (28)	Retrospective observational study	JB1 analytical cross-sectional	Retrospective single-center sample composed of men only; selection bias and limited confounder control reduce generalizability.	Moderate
Villanueva et al. (2022) (29)	Cross-sectional validation study	COSMIN Risk of Bias	Adequate sample, structured cross-cultural adaptation and multiple psychometric analyses; no major methodological limitation likely to invalidate the reported properties.	Low
Zhu et al. (2021) (30)	Randomized controlled trial	RoB 2	Randomization was reported, but allocation concealment, blinding and prespecified outcome reporting were insufficiently described; outcomes were largely self-reported.	High
Dragičević et al. (2020) (16)	Cross-sectional comparative study	JB1 analytical cross-sectional	Clearly defined groups and validated outcome measurement, but non-random group allocation and limited adjustment for clinical and rehabilitation-related confounders.	Moderate
Leemans et al. (2020) (10)	Cross-sectional observational study	JB1 analytical cross-sectional	Low response rate to an industry-distributed survey, use of a non-validated questionnaire and self-selection create substantial selection and measurement bias.	High
Sluis et al. (2021) (15)	Prospective multicenter cohort	JB1 cohort	Prospective design, repeated validated measures and defined follow-up; modest sample size and losses or incomplete measurements may introduce attrition bias.	Moderate
Souza et al. (2020) (12)	Cross-sectional observational study	JB1 analytical cross-sectional	Eligibility and outcomes were clearly defined and validated, but cross-sectional comparisons remain susceptible to selection and residual confounding.	Moderate
Raquel et al. (2020) (24)	Cross-sectional observational study	JB1 analytical cross-sectional	Small sample divided into two groups, cross-sectional correlations and limited control for clinical confounding reduce precision and internal validity.	High

Guimarães et al. (2020) (25)	Cross-sectional validation study	COSMIN Risk of Bias	Translation and core reliability and validity analyses were reported in a reasonable sample; some measurement-property domains and subgroup analyses were limited.	Moderate
Cocuzza et al. (2020) (31)	Retrospective comparative study	JB1 analytical cross-sectional	Validated patient-reported measures and defined groups, but retrospective non-random selection and incomplete adjustment for rehabilitation and clinical confounders.	Moderate
Longobardi et al. (2019) (26)	Pilot trial	JB1 quasi-experimental	Small pilot sample and limited information on randomization, allocation concealment and blinding; risk of baseline imbalance and performance bias.	High
Scott et al. (2019) (20)	Retrospective observational study	JB1 analytical cross-sectional	Small single-center sample, retrospective recruitment and possible socioeconomic and clinical confounding, despite use of validated QoL measures.	High
Allegra et al. (2019) (18)	Comparative observational study	JB1 analytical cross-sectional	Objective and validated subjective outcomes were used, but rehabilitation groups were not randomized and important clinical confounders were not fully controlled.	Moderate
Agarwal et al. (2015) (21)	Retrospective observational study	JB1 analytical cross-sectional	Defined sample and validated questionnaires, but retrospective selection, cross-sectional associations and incomplete confounder adjustment limit causal conclusions.	Moderate
Perry et al. (2015) (27)	Cross-sectional observational study	JB1 analytical cross-sectional	Validated measures and multivariable analyses strengthen the study, although cross-sectional recruitment and self-reported outcomes leave selection and temporal ambiguity.	Moderate
Pereira da Silva et al. (2015) (32)	Cross-sectional observational study	JB1 analytical cross-sectional	Validated outcomes were used, but the small single-center sample and limited control for treatment and rehabilitation confounders reduce precision and generalizability.	Moderate
Polat et al. (2015)(17)	Cross-sectional observational study	JB1 analytical cross-sectional	Small male-only sample and non-randomized prosthesis exposure with limited adjustment for clinical differences create substantial selection and confounding concerns.	High

JB1, Joanna Briggs Institute; RoB 2, Cochrane Risk of Bias 2; COSMIN, Consensus-based Standards for the Selection of Health Measurement Instruments; PROM, patient-reported outcome measure.

Discussion

This systematic review confirms growing scientific interest in QoL assessment after TL but also demonstrates substantial methodological heterogeneity and a lack of truly integrated assessment tools. Given the profound functional, psychological, and social consequences of TL, accurate QoL assessment is essential not only for measuring outcomes but also for guiding individualized rehabilitation and optimizing long-term patient-centered care.

One of the main issues identified in the literature is the lack of standardization in assessment timing and study populations. QoL should ideally be evaluated longitudinally at standardized time points, beginning in the immediate postoperative period and continuing at 6, 12, and 24 months, to capture the dynamic processes of functional adaptation,

psychological adjustment, and social reintegration. Comparisons should also involve clinically homogeneous populations and, when the research question concerns TL-specific outcomes, focus on patients who have undergone TL. Even within this group, however, substantial variability persists because of differences in tumor stage, type of alaryngeal voice, timing of voice rehabilitation, adjuvant radiotherapy, and comorbidities. These factors further emphasize the need for sensitive and reliable assessment instruments.

The absence of a single multidimensional questionnaire has led most studies to adopt multimodal assessment, often combining two or more instruments to evaluate different QoL domains. Although this strategy provides a broader view of patient outcomes, it also underscores the limitations of currently available

tools, which are often designed to assess isolated aspects such as voice-related disability, emotional distress, or respiratory function. Consequently, no single instrument currently captures the full complexity of QoL after TL.

Beyond the physical and psychological dimensions shared with other oncological populations, QoL assessment after TL must address condition-specific issues, including permanent tracheostoma and secretion management, aesthetic concerns, altered olfaction, sexual function, self-acceptance, and the functional use of alaryngeal voice. The literature indicates that QoL is influenced by multiple interacting determinants, including the type of voice rehabilitation (tracheoesophageal, esophageal, or electrolaryngeal speech), with voice prostheses generally associated with better outcomes despite device-related complications. Other relevant factors include age, social and occupational participation, access to speech therapy and preoperative counseling, psychological and caregiver support, environmental communication demands, and sex; women report lower QoL scores on average (33-34). Regarding instrument selection, this review highlights a notable difference between international and Italian practice. Internationally, the VHI-30 was the most frequently used instrument for assessing voice-related disability after TL, whereas V-RQOL predominated in Italian studies. This discrepancy is noteworthy given the limited use of EORTC modules in the Italian studies, despite their widespread validation and use across Europe. Although the VHI and V-RQOL are widely used, both were originally developed for laryngeal voices and may not fully reflect the characteristics of alaryngeal speech, suggesting a need for adaptation or further validation. Among the available instruments, the SECAL is more specifically focused on communication experiences after laryngectomy, although it has been applied to populations including both partial and total laryngectomy (17). Dedicated instruments such as the HADS remain useful for assessing emotional distress. Clinical and rehabilitative variables also have an important influence on QoL outcomes. Adjuvant radiotherapy, participation in structured speech therapy programs, and access to psychological support contribute to the complexity of QoL profiles after TL. In particular, combining

speech therapy with psychological interventions has been associated with improved speech intelligibility, acquisition and acceptance of a new voice, and reduced psychological distress and depressive symptoms. Continuous monitoring of emotional well-being is therefore important because psychological distress is a key determinant of overall QoL in this population (26,28,30,31,33). Taken together, these findings identify two major unmet needs: (1) a truly multidimensional QoL assessment tool specifically designed for patients after TL that systematically integrates physical, emotional, social, and condition-specific domains; and (2) voice-related questionnaires specifically validated or adapted for alaryngeal speech. Addressing these gaps could improve the accuracy, comparability, and clinical relevance of QoL assessment and support more personalized, effective, and patient-centered rehabilitation pathways.

The risk-of-bias assessment further reduces confidence in the available evidence. Only one study was judged to have a low risk of bias, whereas 16 had a moderate risk and nine a high risk. The predominance of observational and cross-sectional designs, together with recurrent selection and confounding concerns, limits generalizability and precludes causal conclusions regarding rehabilitation strategies and QoL outcomes. Additional limitations should also be acknowledged.

QoL instruments rely primarily on patient-reported information and may be influenced by emotional state, cultural background, disease acceptance, clinical setting, and the timing and mode of administration. Differences in the explanations or assistance provided during questionnaire completion may further affect responses and reduce comparability across studies.

The included studies were also heterogeneous in their populations, measurement instruments, assessment schedules, and rehabilitation pathways. These sources of variability should be considered when interpreting the findings and reinforce the need for standardized administration procedures and comprehensive, multidimensional assessment (30).

Conclusion

This systematic review confirms that QoL assessment after TL is both essential and

inherently complex. The multidimensional impact of TL on voice, swallowing, breathing, emotional well-being, social participation, and daily functioning requires instruments that are not only validated but also sensitive to the specific needs of people living with alaryngeal speech. Current instruments are informative but often address isolated domains and may not fully capture patients' lived experiences. Internationally, the VHI-30 is the most frequently used instrument, whereas V-RQOL predominates in Italian studies, highlighting regional differences and the need to harmonize and adapt assessment strategies.

QoL is influenced by multiple interacting factors, including the type and timing of voice rehabilitation, psychological support, management of complications, and social context. Optimal outcomes therefore extend beyond surgical success and require a multidisciplinary approach integrating speech therapy, psychological care, and individualized rehabilitation planning.

Patient-centered strategies tailored to each individual's functional and psychosocial profile may improve not only measurable outcomes such as speech intelligibility and physical function but also emotional adjustment, social reintegration, and overall QoL. Future progress in QoL assessment and rehabilitation after TL will depend on comprehensive, adaptable tools and care pathways that reflect the specific needs and priorities of each patient.

Disclosure

The authors declare no conflicts of interest, including specific financial interests, relationships, or affiliations relevant to the subject of this manuscript.

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