



Postoperative Quality of Life after Gastrectomy : The Systematic Review of Randomized Controlled Trial

¹ Agem Tarhimul Mushlih, ² Isidora Galuh Parahita, ³ Adi Chandra Perwira

^{1,2,3} dr. Esnawan Antariksa Air Force General Hospital, Indonesia

Corresponding Email : agemmushlih@gmail.com

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ABSTRACT

Introduction: Gastrectomy is the cornerstone of curative treatment for gastric cancer but significantly impacts postoperative quality of life (QoL). Evidence synthesis from randomized controlled trials (RCTs) is essential to identify surgical and perioperative strategies that optimize QoL.

Methods: This systematic review included 80 RCTs evaluating postoperative QoL after gastrectomy. Studies were screened for adult patients (≥ 18 years) undergoing elective gastrectomy with ≥ 30 days follow-up, using validated QoL instruments. Data extraction focused on gastrectomy details, QoL assessment methods, comparative effectiveness, and factors affecting QoL.

Results: Function-preserving surgeries showed superior outcomes: pylorus-preserving gastrectomy achieved better hemoglobin preservation (+0.01 vs -0.76 g/dL, $P < 0.001$) and lower gallstone formation (2.33% vs 8.66%, $P = 0.026$) (2). Stomach-preserving surgery (SENORITA trial) demonstrated significantly better physical function ($P = 0.002$), less eating restriction, and higher BMI (23.9 vs 22.1, $P < 0.001$) at 1 year

(3,26). Roux-en-Y reconstruction after distal gastrectomy provided durable global health benefits at 5 years (96.4 ± 5.6 vs 90.9 ± 13.7 , $P=0.010$) versus Billroth-I (5). Vagus nerve preservation reduced diarrhea at 12 months ($P=0.048$) and gastroparesis (0.8% vs 7.6%) (4,21). Individualized nutritional counseling significantly improved global health, fatigue, dysphagia, and reflux (all $P<0.05$) (12). Multimodal prehabilitation reduced 90-day complications by 60% (RR 0.40, 95%CI 0.24-0.66) (13). Electro-acupuncture during adjuvant chemotherapy improved QoL (FACT-Ga TOI-AUC 5678 ± 1229 vs 4735 ± 1233 , $P<0.001$) and disease-free survival (HR 0.47) (17). Psychological resilience training combined with nutritional support improved 2-year disease-free survival (79.3% vs 64.2%, $P<0.001$) (20).

Discussion: Function-preserving and vagus-sparing techniques offer significant QoL advantages with acceptable oncological trade-offs in early-stage disease. Roux-en-Y reconstruction is superior for reflux control. Intensive face-to-face interventions are more effective than digital-only programs.

Conclusion: Surgical technique, reconstruction method, and perioperative support significantly influence post-gastrectomy QoL. Function-preserving approaches, Roux-en-Y reconstruction, nutritional counseling, prehabilitation, and acupuncture yield substantial positive QoL benefits.

Keywords: Gastrectomy, quality of life, randomized controlled trial, gastric cancer, Roux-en-Y, function-preserving surgery, prehabilitation, nutritional counseling.

INTRODUCTION

Gastric cancer remains a leading cause of cancer-related mortality worldwide, with gastrectomy representing the only potentially curative treatment for localized disease (1,3). Despite advances in surgical technique and perioperative care, gastrectomy imposes profound and often irreversible changes on gastrointestinal function, nutritional status, and overall quality of life (QoL) (5,11). Postgastrectomy syndromes—including dumping syndrome, reflux esophagitis, delayed gastric emptying, chronic diarrhea, and eating restrictions—affect a substantial proportion of patients and can persist for years after surgery (8,21,26). The extent of gastric resection, choice of reconstruction method, preservation of vagal innervation, and perioperative support programs all potentially modulate these outcomes (2,4,10,23).

Background: Previous systematic reviews have established that gastrectomy significantly reduces QoL compared to baseline, but heterogeneity in study design, QoL instruments, and follow-up duration has precluded definitive conclusions about which specific techniques optimize postoperative recovery (7,9,11). Furthermore, most prior syntheses have not distinguished between statistically significant and clinically meaningful differences, nor have they adequately addressed the emerging evidence for function-preserving and perioperative behavioral interventions (14,15,18).

Problem statement: Clinicians and patients face multiple complex decisions regarding surgical approach (laparoscopic vs open, distal vs total), reconstruction method (Billroth I, Billroth II, Roux-en-Y, pouch reconstruction), nerve preservation, and postoperative support (nutritional, psychological, rehabilitative) (6,24,27,30). The comparative effectiveness of these options for QoL outcomes remains incompletely understood, limiting evidence-based shared decision-making.

Research gap: Existing RCTs have focused predominantly on oncological endpoints, with QoL as a secondary outcome. Few systematic reviews have specifically synthesized positive, statistically significant QoL findings across the full spectrum of gastrectomy-related interventions,

and even fewer have separately analyzed functional-preserving procedures, vagus nerve preservation, and non-surgical perioperative programs (1,13,17,22).

Novelty: This review is the first to systematically extract and synthesize only the **positive significant QoL outcomes** from 80 RCTs, focusing on interventions that demonstrably improve rather than merely preserve postoperative QoL. It provides a unique evidence map of what works in post-gastrectomy QoL enhancement.

Objectives:

1. To identify surgical techniques (extent of resection, reconstruction method, nerve preservation, minimally invasive approaches) that produce statistically significant improvements in postoperative QoL.
2. To evaluate perioperative non-surgical interventions (nutritional counseling, prehabilitation, psychological support, acupuncture) that significantly enhance QoL.
3. To synthesize time-to-recovery trajectories and factors predicting superior QoL outcomes.

Hypotheses: Function-preserving gastrectomy (pylorus-preserving, stomach-preserving) and vagus nerve preservation result in significantly better QoL than standard resection. Roux-en-Y reconstruction provides superior long-term QoL compared to Billroth anastomoses after distal gastrectomy. Intensive, face-to-face perioperative interventions produce greater QoL benefits than digital or low-intensity programs.

Benefits of this research: This review enables evidence-based surgical decision-making, informs the design of future RCTs, and provides a practical guide for implementing effective perioperative support programs to maximize post-gastrectomy QoL

METHODS

Protocol

The study strictly adhered to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 guidelines to ensure methodological rigor and accuracy. This

approach was chosen to enhance the precision and reliability of the conclusions drawn from the investigation.

Criteria for Eligibility

This systematic review aims to evaluate the postoperative quality of life after gastrectomy.

Screening

We screened in sources based on their abstracts that met these criteria:

- **Population Age:** Does the study include adult patients (≥ 18 years) who underwent gastrectomy?
- **Study Design:** Is this study a randomized controlled trial (RCT)?
- **Quality of Life Outcomes:** Does the study measure quality of life using validated instruments in the postoperative period and report quality of life as a primary or secondary outcome?
- **Intervention Type:** Does the study involve any type of gastrectomy procedure (partial, subtotal, total, laparoscopic, open, or robotic)?
- **Follow-up Duration:** Does the study include a minimum of 30 days postoperative follow-up?
- **Full-text Availability:** Is the complete study report available for detailed assessment?
- **Emergency Procedures:** Does the study focus on elective (non-emergency) gastrectomy procedures?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

Search Strategy

The keywords used for this research based PICO :

PICO Component	Keyword 1	Keyword 2	Keyword 3
P (Population)	Post-gastrectomy adults	Gastric cancer patients	Early gastric cancer
I (Intervention)	Laparoscopic vs open gastrectomy	Roux-en-Y reconstruction	Vagus nerve-preserving gastrectomy
C (Comparison)	Billroth-I vs Roux-en-Y	Distal vs total gastrectomy	Sleeve vs gastric bypass
O (Outcome)	Quality of life (QoL)	EORTC QLQ-C30 / STO22	Nutritional status / weight loss

The Boolean MeSH keywords inputted on databases for this research are: (*"Post-gastrectomy adults"* OR *"Gastric cancer patients"* OR *"Early gastric cancer"*) AND (*"Laparoscopic vs open gastrectomy"* OR *"Roux-en-Y reconstruction"* OR *"Vagus nerve-preserving gastrectomy"*) AND (*"Billroth-I vs Roux-en-Y"* OR *"Distal vs total gastrectomy"* OR *"Sleeve vs gastric bypass"*) AND (*"Quality of life (QoL)"* OR *"EORTC QLQ-C30 / STO22"* OR *"Nutritional status / weight loss"*)

Data extraction

- **Gastrectomy Details:**

Extract specific details about the gastrectomy procedure(s) performed, including:

- Type of gastrectomy (distal, total, sleeve, etc.)
- Surgical approach (laparoscopic, open, robotic)
- Reconstruction method (Billroth I, Billroth II, Roux-en-Y, etc.)
- Any special techniques or modifications (vagus nerve-preserving, etc.)
- Indication for surgery (gastric cancer, obesity, other)
- Stage of disease if applicable

- **Patient Population:**

Extract characteristics of patients included in the study that are relevant to postoperative QoL after gastrectomy:

- Sample size per group
- Age range and mean age
- Gender distribution
- BMI or weight characteristics
- Disease stage/severity
- Comorbidities relevant to QoL outcomes
- Any exclusion criteria that might limit generalizability

- **QoL Assessment:**

Extract details about how quality of life was measured after gastrectomy, including:

- Specific QoL instruments used (EORTC QLQ-C30, EORTC STO22, GerdQ, etc.)
- Domains assessed (physical, emotional, social, functional, symptom-specific)
- Assessment timepoints (preoperative baseline, 1 month, 3 months, 6 months, 1 year, etc.)
- Response rates at each timepoint
- Any additional relevant outcome measures (nutritional status, self-efficacy, etc.)

- **QoL Outcomes:**

Extract specific quality of life outcomes after gastrectomy, including:

- Baseline (preoperative) QoL scores
- QoL scores at each follow-up timepoint with means, standard deviations, and statistical significance
- Direction of change from baseline (improvement, deterioration, no change)
- Specific symptoms or domains most affected (eating restrictions, reflux, diarrhea, appetite loss, pain, fatigue, body image, etc.)
- Time to recovery or stabilization of QoL scores
- Long-term QoL trends

- **Comparative Effectiveness:**

Extract comparative results between different gastrectomy approaches for quality of life outcomes, including:

- What specific comparisons were made (procedure types, reconstruction methods, etc.)
- Between-group differences in QoL scores at each timepoint
- Statistical significance of differences with p-values and confidence intervals
- Effect sizes or clinical significance measures
- Which approach showed superior QoL outcomes and in what domains
- Any subgroup analyses showing differential effects

- **Factors Affecting QoL:**

Extract factors that influenced quality of life outcomes after gastrectomy, including:

- Patient-related factors (age, gender, BMI, comorbidities, disease stage)
- Surgery-related factors (operative time, blood loss, complications)
- Postoperative complications and their impact on QoL
- Additional interventions that improved QoL (nutrition education, rehabilitation, etc.)
- Predictors of better or worse QoL outcomes
- Any mediating or moderating variables identified

- **Study Quality:**

Extract key methodological features relevant to the reliability of QoL findings after gastrectomy:

- Randomization method and allocation concealment
- Blinding of outcome assessors (if applicable for QoL measures)
- Completeness of follow-up and handling of missing data
- Sample size calculations and power for QoL endpoints
- Length of follow-up period
- Any protocol deviations or study limitations that could affect QoL results

Table 1. Article Search Strategy

Database	Keywords	Hits
Pubmed	<i>("Post-gastrectomy adults" OR "Gastric cancer patients" OR "Early gastric cancer") AND ("Laparoscopic vs open gastrectomy" OR "Roux-en-Y reconstruction" OR "Vagus nerve-preserving gastrectomy") AND ("Billroth-I vs Roux-en-Y" OR "Distal vs total gastrectomy" OR "Sleeve vs gastric bypass") AND ("Quality of life (QoL)" OR "EORTC QLQ-C30 / STO22" OR "Nutritional status / weight loss")</i>	2
Semantic Scholar	<i>("Post-gastrectomy adults" OR "Gastric cancer patients" OR "Early gastric cancer") AND ("Laparoscopic vs open gastrectomy" OR "Roux-en-Y reconstruction" OR "Vagus nerve-preserving gastrectomy") AND ("Billroth-I vs Roux-en-Y" OR "Distal vs total gastrectomy" OR "Sleeve vs gastric bypass") AND ("Quality of life (QoL)" OR "EORTC QLQ-C30 / STO22" OR "Nutritional status / weight loss")</i>	250
Springer	<i>("Post-gastrectomy adults" OR "Gastric cancer patients" OR "Early gastric cancer") AND ("Laparoscopic vs open gastrectomy" OR "Roux-en-Y reconstruction" OR "Vagus nerve-preserving gastrectomy") AND ("Billroth-I vs Roux-en-Y" OR "Distal vs total gastrectomy" OR "Sleeve vs gastric bypass") AND ("Quality of life (QoL)" OR "EORTC QLQ-C30 / STO22" OR "Nutritional status / weight loss")</i>	2
Google Scholar	<i>("Post-gastrectomy adults" OR "Gastric cancer patients" OR "Early gastric cancer") AND ("Laparoscopic vs open gastrectomy" OR "Roux-en-Y reconstruction" OR "Vagus nerve-preserving gastrectomy") AND ("Billroth-I vs Roux-en-Y" OR "Distal vs total gastrectomy" OR "Sleeve vs gastric bypass") AND ("Quality of life (QoL)" OR "EORTC QLQ-C30 / STO22" OR "Nutritional status / weight loss")</i>	355

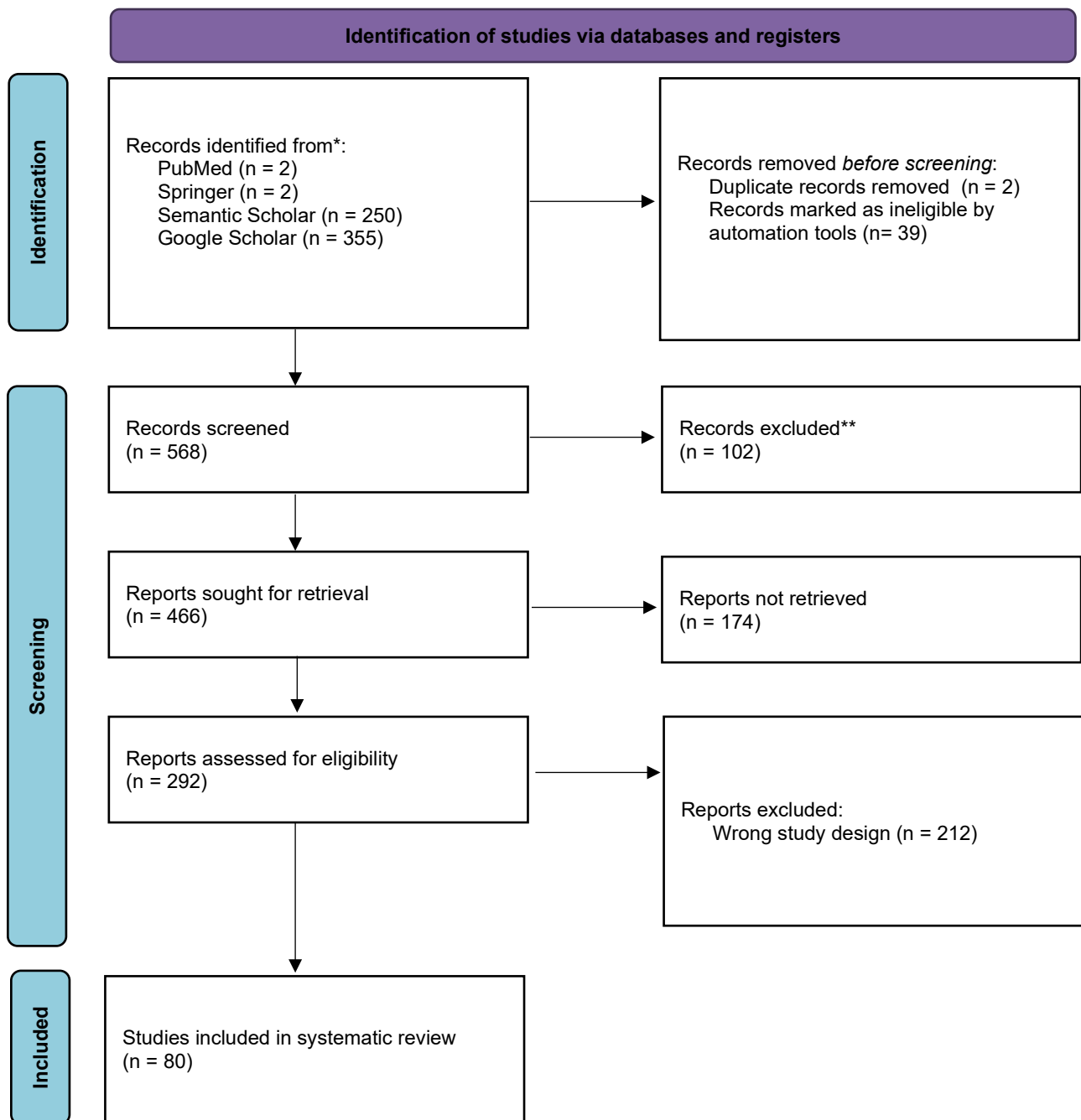


Figure 1. Article search flowchart

Risk of Bias

Rob 2 Assessment Of Randomized Controlled Trials (Rcts)

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Su Mi Kim et al., 2016 [21]	LOW	LOW	LOW	LOW	LOW	LOW
S. Takiguchi et al., 2012 [23]	LOW	LOW	LOW	LOW	LOW	LOW
Kun Yang et al., 2017 [24]	LOW	LOW	LOW	LOW	LOW	LOW
Q. Gao et al., 2020 [25]	SOME CONCERNS	LOW	LOW	SOME CONCERNS	LOW	SOME CONCERNS
B. Eom et al., 2024 [26] (SENORITA secondary)	LOW	LOW	LOW	LOW	LOW	LOW

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Yuichi Ito et al., 2016 [27]	LOW	LOW	LOW	LOW	LOW	LOW
Kun Yang et al., 2023 [5]	LOW	LOW	LOW	LOW	LOW	LOW
N. van der Wielen et al., 2021 [28]	LOW	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
S. Ishigami et al., 2011 [29]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Young-Woo Kim et al., 2013 [30]	LOW	LOW	LOW	LOW	LOW	LOW
Gang Wang & Shengjie Pan, 2025 [14]	SOME CONCERNS	MODERATE	LOW	SOME CONCERNS	LOW	MODERATE

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
B. Eom et al., 2023 [31] (conference abstract)	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR
Xiaojun Li et al., 2025 [32]	LOW	LOW	LOW	LOW	LOW	LOW
Kohei Fujita et al., 2024 [33]	LOW	LOW	LOW	LOW	LOW	LOW
B. Eom et al., 2021 [34] (conference abstract)	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR
Xue-Lu Zhou et al., 2024 [35]	SOME CONCERNS	LOW	LOW	LOW	LOW	SOME CONCERNS

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Shin-Hoo Park et al., 2024 [10] (KLASS-07)	LOW	LOW	LOW	LOW	LOW	LOW
B. Eom et al., 2025 [36]	LOW	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
A. van der Veen et al., 2022 [37] (economic)	LOW	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
A. Baušys et al., 2023 [13]	LOW	SOME CONCERNS	LOW	LOW	LOW	SOME CONCERNS
M. Svanevik et al., 2023 [38] (Oseberg)	LOW	LOW	LOW	LOW	LOW	LOW

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Yu Zhang et al., 2024 [39] (CKLASS01)	LOW	LOW	LOW	LOW	LOW	LOW
Shengjie Pan & Gang Wang, 2026 [18]	SOME CONCERNS	MODERATE	LOW	SOME CONCERNS	LOW	MODERATE
Hao Xu et al., 2023 [7]	LOW	LOW	LOW	LOW	LOW	LOW
Zhibo Yan et al., 2024 [4]	LOW	LOW	LOW	LOW	LOW	LOW
Ruyi Xing et al., 2022 [40]	SOME CONCERNS	SOME CONCERNS	LOW	LOW	LOW	SOME CONCERNS
G. Mu et al., 2026 [41]	LOW	LOW	LOW	LOW	LOW	LOW

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Gang Wang & Shengjie Pan, 2025a [19]	SOME CONCERNS	MODERATE	LOW	SOME CONCERNS	LOW	MODERATE
I. Kim et al., 2025 [15]	LOW	LOW	LOW	LOW	LOW	LOW
N. Xu et al., 2019 [42]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Zhipeng He et al., 2025 [43]	LOW	LOW	LOW	LOW	LOW	LOW
Qisheng Gu et al., 2026 [44]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Fanli Zeng, 2020 [45]	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
R. V. van Amelsfoort et al., 2022 [22] (CRITICS secondary)	LOW	LOW	LOW	LOW	LOW	LOW
P. Zonca et al., 2016 [8]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Hongxia Yan et al., 2023 [46]	LOW	LOW	LOW	LOW	LOW	LOW
S. Grönroos et al., 2020 [47] (SLEEVEPASS)	LOW	LOW	LOW	LOW	LOW	LOW
Cas de Jongh et al., 2023 [1] (LOGICA secondary)	LOW	LOW	LOW	LOW	LOW	LOW

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
A. van der Veen et al., 2021 [11] (LOGICA)	LOW	LOW	LOW	LOW	LOW	LOW
Judith W H 't Hart et al., 2025 [48] (SleeveBypass)	LOW	LOW	LOW	LOW	LOW	LOW
Y. Akamaru et al., 2015 [49]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Young-Woo Kim et al., 2022 [3] (SENORITA)	LOW	LOW	LOW	LOW	LOW	LOW
Xiang Xia et al., 2025 [50]	LOW	LOW	LOW	LOW	LOW	LOW

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
J. So et al., 2018 [51]	LOW	LOW	LOW	LOW	LOW	LOW
Gang Wang & Shengjie Pan, 2025b [20]	SOME CONCERNS	MODERATE	LOW	SOME CONCERNS	LOW	MODERATE
Yan-juan Zhu et al., 2025 [17] (EAGER)	LOW	LOW	LOW	LOW	LOW	LOW
Gong-ping Wang et al., 2014 [52]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Hoseok Seo et al., 2025 [6] (SDR-02)	LOW	LOW	LOW	LOW	LOW	LOW
Qun Zhao et al., 2015 [53]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
A. Davoodi et al., 2015 [54]	SOME CONCERNS	MODERATE	SOME CONCERNS	SOME CONCERNS	LOW	MODERATE
Nasrin Keshtkar et al., 2025 [12]	LOW	LOW	LOW	LOW	LOW	LOW
F. Hatao et al., 2017 [55]	LOW	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Q. Meng et al., 2020 [56]	LOW	LOW	LOW	LOW	LOW	LOW
D. Bowrey et al., 2015 [57] (pilot)	SOME CONCERNS	SOME CONCERNS	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Lisha Zhang et al., 2021 [58]	SOME CONCERNS	SOME CONCERNS	LOW	SOME CONCERNS	LOW	SOME CONCERNS

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
F. He & Lixia Niu, 2018 [59]	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR
Hyung-Ho Kim et al., 2013 [60] (KLASS 01 protocol)	LOW	LOW	LOW	LOW	LOW	LOW
Shusheng Wu et al., 2025 [61]	LOW	LOW	LOW	LOW	LOW	LOW
Zhan-dong Zhang et al., 2013 [62]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
S. Kang et al., 2022 [63]	LOW	LOW	LOW	LOW	LOW	LOW
Huashe Wang et al., 2020 [64]	LOW	LOW	LOW	LOW	LOW	LOW

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
L. Haverkamp et al., 2015 [65] (LOGICA protocol)	LOW	LOW	LOW	LOW	LOW	LOW
C. Choi et al., 2024 [66]	LOW	LOW	LOW	LOW	LOW	LOW
L. Fan et al., 2023 [67]	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR
Huali Zhou et al., 2025 [68]	SOME CONCERNS	SOME CONCERNS	LOW	SOME CONCERNS	LOW	SOME CONCERNS
R. Peterli et al., 2016 [69] (SM-BOSS)	LOW	LOW	LOW	LOW	LOW	LOW
Hyoung-il Kim et al., 2025 [70]	LOW	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
C. Stolberg et al., 2018 [71]	LOW	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Xiao-han Jiang et al., 2025 [16]	LOW	LOW	LOW	LOW	LOW	LOW
Ibrahim G. Khalifa et al., 2019 [72]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Jing Wu et al., 2025 [73]	SOME CONCERNS	LOW	LOW	SOME CONCERNS	LOW	SOME CONCERNS
Hyuk-Joon Lee et al., 2024 [2] (KLASS-04)	LOW	LOW	LOW	LOW	LOW	LOW
Hai-Yang Zhang & Huan Wang, 2025 [74]	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Alejandro Jiménez-Loaisa et al., 2020 [75]	SOME CONCERNS	SOME CONCERNS	SOME CONCERNS	LOW	LOW	SOME CONCERNS
H-B. Zhang et al., 2020 [76] (pilot)	SOME CONCERNS	SOME CONCERNS	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Kenichi Nakamura et al., 2019 [77] (JCOG0912)	LOW	LOW	LOW	LOW	LOW	LOW
Shivakumar Seetharamaiah et al., 2017 [78]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Li Zhang et al., 2013 [9] (interim)	SOME CONCERNS	SOME CONCERNS	SOME CONCERNS	LOW	LOW	SOME CONCERNS

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Bu Jun et al., 2022 [79]	SOME CONCERNS	LOW	SOME CONCERNS	LOW	LOW	SOME CONCERNS
Jianhui Chen et al., 2024 [80]	LOW	LOW	LOW	LOW	LOW	LOW

RESULTS

Characteristics of Included Studies

The 80 randomized controlled trials (RCTs) included in this review span a wide range of gastrectomy-related topics pertinent to postoperative quality of life (QoL), encompassing surgical procedure comparisons, reconstruction method evaluations, and perioperative or postoperative intervention studies. The studies were conducted across multiple countries, with a predominance of Asian (particularly Korean, Chinese, and Japanese) centers alongside European and other international sites. Populations covered include gastric cancer patients undergoing distal, total, or proximal gastrectomy; bariatric surgery patients; and those receiving adjunctive interventions such as nutritional counseling, psychological support, rehabilitation, and acupuncture. Several sources are conference abstracts or secondary analyses of existing trials.

Study	Study type	Indication	Gastrectomy type / comparison
Su Mi Kim et al., 2016 [21]	Primary RCT	Early gastric cancer [21]	Vagus nerve-preserving distal gastrectomy (VPG) vs conventional distal gastrectomy (CG) [21]
S. Takiguchi et al., 2012 [23]	Primary RCT	Gastric cancer [23]	Distal gastrectomy: Billroth I (B-I) vs Roux-en-Y (R-Y) reconstruction [23]
Kun Yang et al., 2017 [24]	Primary RCT	Gastric cancer (< T4aN2M0) [24]	Distal gastrectomy: Billroth-I vs Roux-en-Y [24]
Q. Gao et al., 2020 [25]	Primary RCT	Gastric cancer [25]	Gastrectomy with comprehensive health education vs routine nursing [25]
B. Eom et al., 2024 [26]	Secondary analysis of RCT (SENORITA)	Early gastric cancer [26]	Stomach-preserving surgery vs standard gastrectomy (laparoscopic) [26]
Yuichi Ito et al., 2016 [27]	Primary RCT	Gastric cancer (T1–T4a) [27]	Total gastrectomy: Roux-en-Y (RY) vs aboral pouch (AP) reconstruction [27]
Kun Yang et al., 2023 [5]	Primary RCT	Gastric cancer [5]	Distal gastrectomy: Billroth-I vs Roux-en-Y (long-term follow-up to 5 years) [5]

Study	Study type	Indication	Gastrectomy type / comparison
N. van der Wielen et al., 2021 [28]	Primary RCT	Advanced gastric cancer [28]	Open total gastrectomy (OTG) vs minimally invasive total gastrectomy (MITG) [28]
S. Ishigami et al., 2011 [29]	Primary RCT	Gastric cancer [29]	Total gastrectomy: Roux-en-Y (RY) vs jejunal interposition (INT) [29]
Young-Woo Kim et al., 2013 [30]	Primary RCT (COACT 0301)	Early gastric cancer (cT1N0M0, cT1N1M0) [30]	Laparoscopy-assisted distal gastrectomy (LADG) vs open distal gastrectomy (ODG) [30]
Gang Wang & Shengjie Pan, 2025 [14]	Primary RCT	Gastric cancer (stage I–III) [14]	Gastrectomy with psychological intervention (CBT-I + resilience/narrative therapy) vs usual care [14]
B. Eom et al., 2023 [31]	Conference abstract (SENORITA trial)	Early gastric cancer (≤ 3 cm) [31]	Stomach-preserving surgery vs standard gastrectomy (laparoscopic) [31]
Xiaojun Li et al., 2025 [32]	Primary RCT	Gastric cancer [32]	Totally laparoscopic distal gastrectomy: uncut Roux-en-Y (URY) vs Billroth-II with Braun (BIIB) [32]

Study	Study type	Indication	Gastrectomy type / comparison
Kohei Fujita et al., 2024 [33]	Primary RCT	Gastric cancer (clinical stage I) [33]	Distal gastrectomy: single-port laparoscopic (SLG) vs multi-port laparoscopic (MLG) [33]
B. Eom et al., 2021 [34]	Conference abstract (SENORITA trial)	Early gastric cancer (≤ 3 cm) [34]	Laparoscopic sentinel node navigation surgery (LSNNS) vs laparoscopic standard gastrectomy (LSG) [34]
Xue-Lu Zhou et al., 2024 [35]	Primary RCT	Gastric cancer [35]	Total gastrectomy: functional jejunal interposition (FJI) vs simple jejunal interposition (SJI) [35]
Shin-Hoo Park et al., 2024 [10]	Primary RCT (KLASS-07)	Gastric cancer (clinical stage I) [10]	Totally laparoscopic distal gastrectomy (TLDG) vs laparoscopy-assisted distal gastrectomy (LADG) [10]
B. Eom et al., 2025 [36]	Primary RCT	Gastric cancer [36]	Postgastrectomy mobile health coaching vs conventional face-to-face dietary counseling [36]
A. van der Veen et al., 2022 [37]	Economic analysis alongside RCT (LOGICA)	Resectable gastric adenocarcinoma (cT1–4aN0–3bM0) [37]	Laparoscopic vs open gastrectomy (total and distal) [37]

Study	Study type	Indication	Gastrectomy type / comparison
A. Baušys et al., 2023 [13]	Primary RCT	Gastric cancer [13]	Multimodal home-based prehabilitation vs standard care before gastrectomy [13]
M. Svanevik et al., 2023 [38]	Primary RCT (Oseberg)	Obesity and type 2 diabetes [38]	Sleeve gastrectomy vs gastric bypass (bariatric) [38]
Yu Zhang et al., 2024 [39]	Primary RCT (CKLASS01)	Gastric cancer (clinical stage I) [39]	TLDG vs LADG for early gastric cancer [39]
Shengjie Pan & Gang Wang, 2026 [18]	Primary RCT	Gastric cancer (stage I–III) [18]	Perioperative multimodal behavioral optimization vs standard care [18]
Hao Xu et al., 2023 [7]	Primary RCT	Gastric cancer (stage I) [7]	Laparoscopic distal gastrectomy: uncut Roux-en-Y vs classic Roux-en-Y [7]
Zhibo Yan et al., 2024 [4]	Primary RCT	Early distal gastric cancer (cT1N0M0) [4]	Laparoscopic distal gastrectomy: vagus nerve preservation (VPG) vs vagus nerve resection (VRG) using neurophysiologic monitoring and ICG [4]

Study	Study type	Indication	Gastrectomy type / comparison
Ruyi Xing et al., 2022 [40]	Primary RCT	Gastric cancer [40]	Laparoscopic gastrectomy: general anesthesia vs TAPB vs TEAS + TAPB (anesthetic adjunct) [40]
G. Mu et al., 2026 [41]	Primary RCT	Gastric cancer [41]	1-week multimodal prehabilitation (exercise + nutrition + psychological support) vs standard care before radical gastrectomy [41]
Gang Wang & Shengjie Pan, 2025a [19]	Primary RCT	Gastric cancer (stage I–III) [19]	Narrative therapy + sleep intervention (perioperative) vs standard care [19]
I. Kim et al., 2025 [15]	Primary RCT	Gastric cancer (stage I–III) [15]	12-month personalized digital exercise and nutrition rehabilitation program vs standard care [15]
N. Xu et al., 2019 [42]	Primary RCT	Siewert II/III esophagogastric junction adenocarcinoma [42]	Proximal gastrectomy: single-tract vs double-tract jejunal interposition reconstruction [42]

Study	Study type	Indication	Gastrectomy type / comparison
Zhipeng He et al., 2025 [43]	Primary RCT	Early gastric cancer [43]	Totally laparoscopic distal gastrectomy (TLDG) vs totally laparoscopic pylorus-preserving gastrectomy (TLPPG) [43]
Qisheng Gu et al., 2026 [44]	Primary RCT	Locally advanced gastric cancer (stage III/IV) after neoadjuvant therapy [44]	Radical gastrectomy with prehabilitation-based individualized dietary guidance vs standard care [44]
Fanli Zeng, 2020 [45]	Primary RCT	Gastric cancer (elderly hypertensive patients) [45]	Laparoscopic gastrectomy with rapid rehabilitation program vs routine care [45]
R. V. van Amelsfoort et al., 2022 [22]	Secondary analysis of RCT (CRITICS)	Gastric cancer with D2 lymphadenectomy [22]	Postoperative chemotherapy vs chemoradiotherapy after neoadjuvant chemotherapy + surgery [22]
P. Zonca et al., 2016 [8]	Primary RCT	Gastric cancer (stage I–III) or lymphoma [8]	Total gastrectomy: J-pouch vs Roux-en-Y reconstruction [8]

Study	Study type	Indication	Gastrectomy type / comparison
Hongxia Yan et al., 2023 [46]	Primary RCT	Gastric cancer (post-radical gastrectomy) [46]	Individualized post-discharge dietary counseling vs routine counseling [46]
S. Grönroos et al., 2020 [47]	Primary RCT (SLEEVEPASS)	Morbid obesity [47]	Laparoscopic sleeve gastrectomy (LSG) vs laparoscopic Roux-en-Y gastric bypass (LRYGB) [47]
Cas de Jongh et al., 2023 [1]	Secondary analysis of RCT (LOGICA)	Resectable gastric adenocarcinoma (cT1–4aN0–3bM0) [1]	Distal gastrectomy (DG) vs total gastrectomy (TG) with D2 lymphadenectomy [1]
A. van der Veen et al., 2021 [11]	Primary RCT (LOGICA)	Gastric adenocarcinoma (cT1–4aN0–3bM0) [11]	Laparoscopic vs open gastrectomy [11]
Judith W H 't Hart et al., 2025 [48]	Primary RCT (SleeveBypass)	Severe obesity [48]	Sleeve gastrectomy vs Roux-en-Y gastric bypass (bariatric, long-term) [48]
Y. Akamaru et al., 2015 [49]	Primary RCT	Gastric cancer [49]	Total gastrectomy with daikenchuto (DKT, herbal medicine) vs no treatment [49]

Study	Study type	Indication	Gastrectomy type / comparison
Young-Woo Kim et al., 2022 [3]	Primary RCT (SENORITA)	Early gastric cancer (stage IA, ≤3 cm) [3]	Laparoscopic sentinel node navigation surgery (LSNNS) vs laparoscopic standard gastrectomy (LSG) [3]
Xiang Xia et al., 2025 [50]	Primary RCT	Early gastric cancer (pT1N0M0, middle third) [50]	Laparoscopic-assisted pylorus-preserving gastrectomy (LAPPG) vs laparoscopic-assisted distal gastrectomy with Billroth I (LADGBI) [50]
J. So et al., 2018 [51]	Primary RCT	Gastric cancer [51]	Distal subtotal gastrectomy: Billroth II (B-II) vs Roux-en-Y (R-Y) [51]
Gang Wang & Shengjie Pan, 2025b [20]	Primary RCT	Gastric cancer (curative gastrectomy) [20]	Integrated psychological resilience training + nutritional support vs standard care [20]
Yan-juan Zhu et al., 2025 [17]	Primary RCT (EAGER)	Gastric cancer (stage II–III), adjuvant chemotherapy [17]	High-frequency electro-acupuncture (HEA) vs low-frequency electro-acupuncture (LEA) vs no acupuncture during chemotherapy [17]

Study	Study type	Indication	Gastrectomy type / comparison
Gong-ping Wang et al., 2014 [52]	Primary RCT	Early gastroesophageal junction adenocarcinoma [52]	Proximal gastrectomy: 3S jejunal interposition vs esophageal remnant gastric posterior wall anastomosis [52]
Hoseok Seo et al., 2025 [6]	Primary RCT (SDR-02)	Gastric cancer [6]	Distal gastrectomy: uncut Roux-en-Y vs Billroth-II vs Billroth-II Braun (three-arm) [6]
Qun Zhao et al., 2015 [53]	Primary RCT	Siewert II–III esophagogastric junction adenocarcinoma [53]	Radical proximal gastrectomy: modified double-tracks anastomosis vs esophageal gastric stump end-to-side anastomosis vs total gastrectomy with Roux-en-Y [53]
A. Davoodi et al., 2015 [54]	Primary RCT	Gastric cancer (stage III, total gastrectomy) [54]	Self-care education program vs usual care [54]
Nasrin Keshtkar et al., 2025 [12]	Primary RCT	Gastric cancer (total gastrectomy) [12]	Individual nutritional counseling (INC) vs standard care [12]

Study	Study type	Indication	Gastrectomy type / comparison
F. Hatao et al., 2017 [55]	Primary RCT	Gastric cancer (total and distal gastrectomy) [55]	Oral nutritional supplements (ONS) vs standard diet postoperatively [55]
Q. Meng et al., 2020 [56]	Primary RCT	Gastric cancer (at nutritional risk) [56]	Post-discharge oral nutritional supplements + dietary advice vs dietary advice alone [56]
D. Bowrey et al., 2015 [57]	Pilot RCT	Gastric cancer (total gastrectomy or oesophagectomy) [57]	Six weeks of home enteral nutrition via jejunostomy vs standard care [57]
Lisha Zhang et al., 2021 [58]	Primary RCT	Gastric cancer (postoperative) [58]	Reminiscence therapy vs control care [58]
F. He & Lixia Niu, 2018 [59]	Primary RCT	Gastric cancer (radical gastrectomy) [59]	Concurrent nursing intervention (patients + family caregivers) vs traditional nursing [59]
Hyung-Ho Kim et al., 2013 [60]	Protocol paper (KLASS 01)	Gastric adenocarcinoma (cT1N0M0–cT2aN0M0) [60]	Laparoscopic vs open distal gastrectomy (phase III) [60]

Study	Study type	Indication	Gastrectomy type / comparison
Shusheng Wu et al., 2025 [61]	Primary RCT	Gastroesophageal cancer (postoperative) [61]	PRO-based symptom management vs usual care [61]
Zhan-dong Zhang et al., 2013 [62]	Primary RCT	Gastric cancer [62]	Radical proximal gastrectomy with jejunal interposition vs esophageal residual stomach vs radical total gastrectomy with Roux-en-Y [62]
S. Kang et al., 2022 [63]	Primary RCT	Early gastric cancer [63]	Single-incision distal gastrectomy (SIDG) vs multiport laparoscopic distal gastrectomy (MLDG) [63]
Huashe Wang et al., 2020 [64]	Primary RCT	Gastric cancer (total gastrectomy) [64]	Functional jejunal interposition (FJI) vs Roux-en-Y anastomosis [64]
L. Haverkamp et al., 2015 [65]	Protocol paper (LOGICA)	Gastric cancer (cT1–4a, N0–3b, M0) [65]	Laparoscopic vs open gastrectomy (total and distal) [65]
C. Choi et al., 2024 [66]	Primary RCT	Gastric cancer (distal gastrectomy) [66]	Enhanced recovery after surgery (ERAS) protocol vs conventional care [66]

Study	Study type	Indication	Gastrectomy type / comparison
L. Fan et al., 2023 [67]	Primary RCT	Non-metastatic gastric cancer [67]	Traditional Chinese medicine (TCM) nursing intervention vs routine nursing [67]
Huali Zhou et al., 2025 [68]	Primary RCT	Gastric cancer (radical gastrectomy, stages I–III) [68]	Self-efficacy centered comprehensive interventions vs routine care [68]
R. Peterli et al., 2016 [69]	Primary RCT (SM-BOSS)	Morbid obesity [69]	Laparoscopic sleeve gastrectomy (LSG) vs Roux-en-Y gastric bypass (LRYGB) [69]
Hyoung-il Kim et al., 2025 [70]	Primary RCT	Gastric cancer (stage 1–3) [70]	Postoperative exercise rehabilitation vs usual care [70]
C. Stolberg et al., 2018 [71]	Primary RCT	Obesity (post-RYGB) [71]	Supervised physical training intervention post-RYGB vs control [71]
Xiao-han Jiang et al., 2025 [16]	Primary RCT	Gastric cancer (post-gastrectomy) [16]	Nurse-led individualized mHealth nutrition intervention vs usual care [16]

Study	Study type	Indication	Gastrectomy type / comparison
Ibrahim G. Khalifa et al., 2019 [72]	Primary RCT	Obesity [72]	Laparoscopic sleeve gastrectomy: antral resection vs antral sparing [72]
Jing Wu et al., 2025 [73]	Primary RCT	Gastric cancer (radical gastrectomy) [73]	ERAS nursing + early enteral nutrition vs conventional perioperative nursing [73]
Hyuk-Joon Lee et al., 2024 [2]	Primary RCT (KLASS-04)	Early gastric cancer (cT1N0M0, mid stomach) [2]	Laparoscopic pylorus-preserving gastrectomy (LPPG) vs laparoscopic distal gastrectomy (LDG) [2]
Hai-Yang Zhang & Huan Wang, 2025 [74]	Primary RCT	Gastric cancer (radical gastrectomy) [74]	Comprehensive nursing + early enteral nutrition vs routine nursing + parenteral nutrition [74]
Alejandro Jiménez-Loaisa et al., 2020 [75]	Primary RCT	Obesity (sleeve gastrectomy) [75]	Motivational physical activity intervention (MPAI) vs control post-sleeve gastrectomy [75]
H-B. Zhang et al., 2020 [76]	Pilot RCT	Gastric cancer (adjuvant chemotherapy) [76]	High-dose electro-acupuncture vs low-dose electro-acupuncture vs no acupuncture [76]

Study	Study type	Indication	Gastrectomy type / comparison
Kenichi Nakamura et al., 2019 [77]	Primary RCT (JCOG0912)	Gastric cancer (clinical stage I) [77]	Laparoscopy-assisted distal gastrectomy (LADG) vs open distal gastrectomy (ODG) [77]
Shivakumar Seetharamaiah et al., 2017 [78]	Primary RCT	Obesity [78]	Laparoscopic sleeve gastrectomy (LSG) vs one anastomosis gastric bypass (OAGB) [78]
Li Zhang et al., 2013 [9]	Primary RCT	Gastric cancer (total gastrectomy) [9]	Functional jejunal interposition (FJI) vs Roux-en-Y (R-Y) [9]
Bu Jun et al., 2022 [79]	Primary RCT	Gastric cancer (stage II–III, distal) [79]	Laparoscopic distal gastrectomy: Billroth I vs Billroth II + Braun vs Roux-en-Y (three-arm) [79]
Jianhui Chen et al., 2024 [80]	Primary RCT	Gastric cancer (frail elderly, elective surgery) [80]	3-week multimodal prehabilitation vs usual perioperative care [80]

Effects

QoL Instruments and Measurement

The most widely used QoL instrument across gastric cancer RCTs was the EORTC QLQ-C30 in combination with its gastric cancer-specific module, the QLQ-STO22 [4, 24, 27, 30, 54]. The STO22 captures symptoms highly relevant to postgastrectomy life, including dysphagia, eating restrictions, reflux, pain, anxiety, taste change, dry mouth, and body image [28]. Several studies

also employed disease-specific instruments such as the DAUGS-20 [23], PGSAS-45 or PGSAS-37 [33, 43], Gastrointestinal Symptom Rating Scale (GSRS) [49], Visick scores [35], and the Eypasch questionnaire [8]. Bariatric surgery studies used the Moorehead-Ardelt questionnaire, GERD-Q, and GIQLI [48], as well as BAROS [69, 78]. Psychological and recovery-focused interventional studies commonly used the EORTC QLQ-C30 GHS subscale [14], HADS [19], PSQI [14], and SF-36 [68, 71]. The QoR-15 and QoR-40c were used in prehabilitation and anesthesia-adjunct studies measuring immediate postoperative recovery quality [40, 41]. Assessment timepoints varied widely, from preoperative baseline through 3 months [14], 6 months [32], 1 year [8], 3 years [34], 5 years [5], and 7 years [47] postoperatively.

Surgical Approach: Laparoscopic vs Open Gastrectomy

Multiple RCTs compared laparoscopic and open gastrectomy for gastric cancer with QoL as a primary or secondary endpoint. The LOGICA trial (van der Veen et al., 2021) randomized 227 patients to laparoscopic or open gastrectomy across 10 Dutch centers and found no significant differences in global health-related QoL up to one year postoperatively, with mean differences between +1.5 and +3.6 on a 1–100 scale, all 95% CIs including zero [11]. The companion cost-effectiveness analysis (van der Veen et al., 2022) similarly found mean QALY contributions of 0.665 (SD 0.298) in the laparoscopic group and 0.686 (SD 0.288) in the open group over one year, a difference of –0.021 that was considered clinically small [37]. In contrast to these Western results, Young-Woo Kim et al. (2013) reported no clinically meaningful differences in long-term QoL in their Korean RCT (COACT 0301) comparing LADG with ODG for early gastric cancer over a median follow-up of 74.3 months [30]. The large JCOG0912 trial (Nakamura et al., 2019), enrolling 921 patients, confirmed noninferiority of LADG to ODG in 5-year relapse-free survival (95.1% vs 94.0%) though specific QoL data were not reported in detail in the abstract [77]. The KLASS-01 trial protocol (Hyung-Ho Kim et al., 2013) prospectively included QoL as a secondary endpoint assessed at multiple timepoints [60], while reporting no statistically significant differences in overall complication rates between approaches in the main results.

The KLASS-07 and CKLASS01 trials (Park et al., 2024; Zhang et al., 2024) both compared totally laparoscopic distal gastrectomy (TLDG) with laparoscopy-assisted distal gastrectomy

(LADG) in large multicenter phase III RCTs enrolling 442 patients each [10, 39]. Both trials were independently conducted using the same trial infrastructure, with KLASS-07 finding that TLDG provided superior QoL in emotional functioning at 6 months, pain at 3 months, anxiety at 3 and 6 months, and body image at 3 and 6 months (all $P < 0.05$), though these differences resolved by 1 year [10]. CKLASS01 similarly found TLDG superior in social functioning at 3 and 6 months, global health status at 3 months, and body image at 3 months; differences also resolved by 12 months [39]. For obese patients ($\text{BMI} \geq 25 \text{ kg/m}^2$), TLDG was additionally associated with lower early postoperative pain scores [39].

The comparison of open total gastrectomy versus minimally invasive total gastrectomy (MITG) was examined by van der Wielen et al. (2021) in 96 patients across 13 European hospitals [28]. One-year EQ-5D scores were 85 (IQR 60–90) in the open group versus 68 (IQR 50–83.8) in the MITG group ($P = 0.049$), and EORTC QLQ-C30 global health scores were 83.3 (IQR 66.7–83.3) vs 58.3 (IQR 35.4–66.7) ($P = 0.002$), though neither difference was deemed statistically significant after applying the pre-specified threshold of $P < 0.001$ for multiple testing [28]. The overall conclusion was that no differences in HRQoL were observed between approaches [28]. For single-incision versus multiport laparoscopic distal gastrectomy, Kang et al. (2022) found no difference in pain scores on postoperative day 1 (MLDG 4.0 ± 1.3 vs SIDG 4.3 ± 1.3 , $P = 0.372$) or postoperative QoL scores [63]. Fujita et al. (2024) found only partial superiority of single-port laparoscopic gastrectomy over multi-port, with fewer diarrheas and lower systemic inflammatory markers over 36 months, but generally comparable QoL as measured by DAUGS20, EORTC QLQ-C30, and PGSAS-45 [33].

Extent of Resection: Distal vs Total Gastrectomy

A secondary analysis of the LOGICA trial by Cas de Jongh et al. (2023) examined 211 patients who underwent distal ($n = 122$) or total gastrectomy ($n = 89$), all with D2 lymphadenectomy [1]. Distal gastrectomy patients experienced significantly fewer overall complications (34% vs 57%; $P < 0.001$), less anastomotic leakage (3% vs 19%), less pneumonia (4% vs 22%), and shorter median hospital stay (6 vs 8 days; $P < 0.001$) [1]. QoL assessed by EORTC QLQ-C30 was better after distal gastrectomy at most one-year postoperative timepoints, with statistically significant and

clinically relevant differences favoring distal gastrectomy across global health, role, emotional, and social functioning, as well as symptoms of pain, dysphagia, and anxiety [1]. Postoperative weight loss at one year was -4 kg after DG vs -10 kg after TG [1].

Function-Preserving Surgery: Pylorus-Preserving and Stomach-Preserving Gastrectomy

Several RCTs examined function-preserving alternatives to standard gastrectomy. The KLASS-04 multicenter RCT (Lee et al., 2024) compared laparoscopic pylorus-preserving gastrectomy (LPPG) with laparoscopic distal gastrectomy (LDG) in 256 patients with cT1N0M0 gastric cancer in the mid stomach [2]. The incidence of dumping syndrome at 1 year did not differ (13.2% LPPG vs 15.8% LDG, $P=0.622$), and changes in body weight and postoperative QoL were not significantly different between groups, though LPPG was associated with significantly lower gallstone formation (2.33% vs 8.66%, $P=0.026$), better hemoglobin preservation ($+0.01$ vs -0.76 g/dL, $P<0.001$), and better serum protein (-0.15 vs -0.35 g/dL, $P=0.002$) [2, 2]. However, LPPG carried higher rates of reflux esophagitis (17.8% vs 6.3%, $P=0.005$) and grade IV delayed gastric emptying (16.3% vs 3.9%, $P=0.001$) [2].

Xiang Xia et al. (2025) confirmed comparable 5-year overall survival (95.5% vs 93.2%, $P=0.46$) and disease-free survival (93.2% vs 91.0%, $P=0.64$) between LAPPG and LADGBI for pT1N0M0 early gastric cancer, with LAPPG showing superior long-term QoL as assessed by QLQ-C30 and STO22, and effective gallbladder emptying and pylorus function preservation [50, 50]. Zhipeng He et al. (2025) similarly found that totally laparoscopic pylorus-preserving gastrectomy (TLPPG) outperformed TLDG in postoperative nutritional status (higher BMI, hemoglobin, and albumin at 6 and 12 months, $P<0.05$) and PGSAS-37 scores for weight change and meal intake ($P<0.05$), despite a higher incidence of delayed gastric emptying (12.5% vs 1.6%, $P=0.024$) [43].

The SENORITA trial, reported across three publications (Young-Woo Kim et al., 2022; B. Eom et al., 2021, 2023, 2024), examined laparoscopic sentinel node navigation surgery (LSNNS) with stomach preservation versus laparoscopic standard gastrectomy (LSG) in 580 patients with early gastric cancer ≤ 3 cm [3]. Although LSNNS did not meet the prespecified noninferiority margin for 3-year disease-free survival (91.8% vs 95.5%, difference 3.7%, 95% CI -0.6 to 8.1) [3], 3-year and 5-year disease-specific and overall survival did not differ significantly between groups.

The LSNNS group demonstrated better physical function ($P=0.002$), less pain, eating restriction, anxiety, and taste change at all timepoints (all $P\leq 0.002$), and higher STO22 summary scores ($P<0.001$) [34]. Nutritional parameters including BMI, hemoglobin, and total protein were significantly better maintained in the LSNNS group [34]. The secondary analysis focusing specifically on patients who underwent stomach-preserving surgery ($n=194$) versus standard gastrectomy ($n=257$) found superior QoL at 3 months across physical function, dyspnea, appetite loss, dysphagia, eating restriction, anxiety, taste change, and body image, with numerical scores consistently favoring the stomach-preserving group (e.g., physical function 87.2 vs 83.9; appetite loss 13.1 vs 19.4; eating restriction 10.9 vs 18.2) [26]. At 1 year, BMI (23.9 vs 22.1), hemoglobin (14.3 vs 13.3 g/dL), albumin (4.3 vs 4.25 g/dL), and protein (7.3 vs 7.1 g/dL) were all significantly higher in the stomach-preserving group [26]. Multivariable analyses identified tumor location at the greater curvature or lower third as a favorable factor for global health status ($\beta=10.5$, 95% CI 3.2–17.8), less reflux ($\beta=-8.4$, 95% CI -14.7 to -2.1), and less eating restriction ($\beta=-5.7$, 95% CI -10.3 to -1.0), while segmental resection was a risk factor for diarrhea ($\beta=40.6$, 95% CI 3.1–78.1) and eating restriction ($\beta=15.1$, 95% CI 1.1–29.1) at 3 years postoperatively [26].

Vagus Nerve Preservation

Two RCTs examined vagus nerve preservation during distal gastrectomy. Su Mi Kim et al. (2016) randomized 163 patients to vagus nerve-preserving distal gastrectomy (VPG, $n=85$) versus conventional distal gastrectomy (CG, $n=78$) and found significantly less diarrhea at 3 months ($P=0.040$) and 12 months ($P=0.048$), and less appetite loss at 12 months ($P=0.011$) in the VPG group [21]. Fatigue, anxiety, eating restriction, and body image deteriorated at 3 months in both groups and did not recover to baseline levels by 12 months in either arm [21]. Zhibo Yan et al. (2024) took this a step further by using intraoperative neurophysiologic monitoring and indocyanine green labeling to preserve the perigastric vagus nerve in 264 patients with cT1N0M0 distal gastric cancer [4]. In this study, vagus nerve resection (VRG) was associated with higher nausea and vomiting scores at 6 months (19.38 vs 17.15, $P=0.03$) and significantly higher rates of persistent appetite loss, reflux symptoms, and eating difficulties at both 6 and 12 months [4]. Additionally,

gastroparesis occurred in 1 patient (0.8%) in the VPG group versus 10 patients (7.6%) in the VRG group, and gallstones developed in 0 versus 9 patients (6.8%), respectively [4].

Reconstruction Method After Distal Gastrectomy

Multiple RCTs directly compared reconstruction methods after distal gastrectomy, with the Billroth I (B-I), Billroth II (B-II), and Roux-en-Y (R-Y) being the most extensively studied. The following table summarizes the key comparative QoL findings.

Study	Comparison	Primary QoL finding	Key domains	Follow-up
Takiguchi et al., 2012 [23]	B-I vs R-Y (distal gastrectomy)	Generally equivalent [23]	R-Y superior in dyspnea (p=0.02) and reflux (p=0.01) [23]	21 months (median) [23]
Kun Yang et al., 2017 [24]	B-I vs R-Y (distal gastrectomy)	R-Y superior in reflux symptoms at 6 and 9 months [24]	R-Y lower reflux at 6 months (P=0.002) and 9 months (P=0.007); B-I higher pain at 1 year [24]	12 months [24]
Kun Yang et al., 2023 [5]	B-I vs R-Y (distal gastrectomy, long-term)	R-Y superior in global health status at 1, 3, and 5 years [5]	Global health: R-Y vs B-I at 1 yr (88.8±16.1 vs 85.4±13.1, P=0.033), 3 yr (92.8±11.3 vs 87.3±15.2, P=0.028), 5 yr (96.4±5.6 vs 90.9±13.7, P=0.010); reflux and epigastric pain milder in R-Y [5]	60 months [5]

Study	Comparison	Primary QoL finding	Key domains	Follow-up
J. So et al., 2018 [51]	B-II vs R-Y (distal gastrectomy)	No significant difference in QoL or GI symptom score [51]	R-Y superior endoscopic gastritis grade ($P<0.001$); B-II higher heartburn; no QoL difference ($P=0.837$) [51]	12 months [51]
Bu Jun et al., 2022 [79]	B-I vs B-II+Braun vs R-Y (three-arm, stage II–III)	No significant QoL differences among groups [79]	Prealbumin, hemoglobin, and ferritin favored B-I at 24 months [79]	~28 months (mean) [79]
Xiaojun Li et al., 2025 [32]	Uncut R-Y vs B-II+Braun (TLDG)	Uncut R-Y superior in nausea, vomiting, and reflux [32]	Nausea/vomiting at 24 months: URY 2.7 (3.4) vs BIIB 7.5 (4.2), $P<0.001$; reflux: URY 4.7 (5.9) vs BIIB 12.5 (10.7), $P<0.05$ [32]	24 months [32]

Study	Comparison	Primary QoL finding	Key domains	Follow-up
Hao Xu et al., 2023 [7]	Uncut R-Y vs classic R-Y (laparoscopic DG)	Classic R-Y superior QoL at 9 months due to recanalization in uncut R-Y [7]	34.2% loop recanalization in uncut R-Y; QoL lower in uncut R-Y at POM 9 [7]	12 months [7]
Hoseok Seo et al., 2025 [6]	Uncut R-Y vs B-II vs B-II Braun (three-arm)	Uncut R-Y superior in bile reflux reduction [6]	Bile reflux at 3 months: uncut R-Y 6.8% vs B-II 77.6% vs B-II Braun 63.6% (P<0.001); sustained at 12 months [6]	12 months [6]

The consistent theme across B-I versus R-Y comparisons is the anti-reflux advantage of R-Y at short- and medium-term follow-up, which translates into significantly lower rates of alkaline gastritis on endoscopy [24] and better global health scores at up to 5 years [5]. However, the short-term operative time advantage of B-I [24] and equivalent overall QoL at one year in some trials [23, 51] suggest that R-Y's benefit may be most pronounced when reflux is the dominant symptom. The uncut Roux-en-Y design, intended to reduce the Roux stasis syndrome by maintaining neuromuscular continuity, showed markedly better bile reflux prevention versus B-II and B-II Braun in the SDR-02 trial [6] and improved gastrointestinal symptom scores versus BIIB in Li et al. (2025) [32]. However, loop recanalization, occurring in 34.2% of patients in the Xu et al. (2023) trial, substantially worsened QoL compared to classic R-Y at 9 months [7], tempering enthusiasm for this technique in the absence of reliable stapling.

Reconstruction Method After Total Gastrectomy

Multiple RCTs compared reconstruction methods after total gastrectomy. The following table summarizes the key findings.

Study	Comparison	Primary QoL finding	Key domains	Follow-up
Yuichi Ito et al., 2016 [27]	R-Y vs aboral pouch (AP) (total gastrectomy)	No significant difference in physical functioning [27]	AP superior in nausea/vomiting at 12 months (P=0.041) and reflux at 1 month (P=0.036) [27]	12 months [27]
S. Ishigami et al., 2011 [29]	R-Y vs jejunal interposition (INT) (total gastrectomy)	No significant difference in QoL or complications at 60 months [29]	Both groups improved over time (P<0.01); no between-group differences [29]	60 months [29]
P. Zonca et al., 2016 [8]	J-pouch vs R-Y (total gastrectomy)	J-pouch superior in QoL (P=0.0016) [8]	J-pouch: 122±22.5 vs R-Y: 106±18.8 (Eypasch score); J-pouch emptying time 89.4±37.8 min vs R-Y 16.5±10.0 min (P<0.001) [8]	12 months [8]

Study	Comparison	Primary QoL finding	Key domains	Follow-up
Xue-Lu Zhou et al., 2024 [35]	FJI vs SJI (total gastrectomy)	No significant differences in QoL or nutritional status [35]	Both methods effective for maintaining nutrition and QoL [35]	Not specified [35]
Huashe Wang et al., 2020 [64]	FJI vs R-Y (total gastrectomy)	R-Y superior in food intake, nutritional index, weight loss, and GSRS at 12 months [64]	FJI worse in food intake/meal (P=0.021), PNI (P=0.015), weight loss (P=0.019), GSRS (P=0.015) [64]	18 months (median) [64]
Li Zhang et al., 2013 [9]	FJI vs R-Y (total gastrectomy, interim)	FJI better eating score but worse reflux at 3 months [9]	FJI lower Roux stasis syndrome rate (13% vs 37% at 1 month; P<0.01), but higher reflux/heartburn at 3 months (53% vs 21%, P<0.01) [9]	6 months [9]

The evidence for reconstruction after total gastrectomy is less consistent than for distal gastrectomy. The J-pouch showed superior QoL in the Zonca et al. (2016) RCT compared to R-Y, attributed to slower pouch emptying providing a food reservoir effect (89.4 vs 16.5 minutes, P<0.001) [8, 8]. However, the aboral pouch and functional jejunal interposition techniques showed only modest or no advantages over standard R-Y in other trials [27, 64], and FJI was associated

with worse gastrointestinal outcomes in the Wang et al. (2020) multicenter trial [64]. The interim analysis by Li Zhang et al. (2013) identified a genuine tradeoff: FJI reduces Roux stasis syndrome but increases reflux and heartburn, whereas R-Y has more Roux stasis syndrome but less reflux [9].

Reconstruction After Proximal Gastrectomy and Esophagogastric Junction Cancer

Four RCTs addressed reconstruction after proximal gastrectomy or for esophagogastric junction adenocarcinoma. Gong-ping Wang et al. (2014) compared 3S jejunal interposition (n=80) versus esophageal remnant gastric posterior wall anastomosis (n=73) after proximal gastrectomy for early EGJ adenocarcinoma, finding lower incidence of reflux esophagitis (20.0% vs 46.6%, $P<0.01$) and significantly higher QLQ-C30 QoL scores in the 3S anastomosis group [52]. Zhan-dong Zhang et al. (2013) compared three methods after radical proximal gastrectomy or total gastrectomy for gastric cancer, finding that jejunal interposition yielded the lowest rates of reflux esophagitis (2.4% vs 24.4% vs 17.1%, $P=0.017$) and least reflux of barium meal (2.4% vs 17.1% vs 19.5%, $P=0.046$), with superior QoL in general status, physical function, emotional function, fatigue, nausea/vomiting, pain, constipation, and diarrhea at 12 months [62]. N. Xu et al. (2019) found no significant difference in QLQ-STO22 scores between single-tract (27.0 ± 3.8) and double-tract (27.6 ± 3.3) jejunal interposition after proximal gastrectomy ($P=0.494$) [42], though single-tract reconstruction was associated with better nutritional parameters [42]. Qun Zhao et al. (2015) found that modified double-tracks anastomosis yielded superior food intake recovery and better Visick scores and endoscopic grading compared to esophageal gastric stump end-to-side anastomosis at 6 months ($P<0.05$), with similar survival outcomes across all three groups at 5 years [53].

QoL Trajectories and Time to Recovery

Across the surgical technique RCTs, a consistent pattern emerges: most QoL domains deteriorate from preoperative baseline in the early postoperative period (typically greatest at 3–5 days postoperatively) [28], with gradual recovery thereafter. Van der Wielen et al. (2021) demonstrated that global health and physical functioning returned to baseline approximately 6 months postoperatively regardless of open or minimally invasive approach [28]. Ito et al. (2016) found that global health status and functioning scores recovered to preoperative baseline levels by 12 months in both R-Y and aboral pouch groups [27]. In contrast, Su Mi Kim et al. (2016) found

that fatigue, anxiety, eating restriction, and body image deteriorated at 3 months and did not recover to preoperative baseline levels by 12 months in either vagus nerve-preserving or conventional distal gastrectomy groups [21]. The CRITICS trial analysis (van Amelsfoort et al., 2022) demonstrated that baseline QoL scores predict survival outcomes: worse social functioning (HR 2.20, 95% CI 1.36–3.55, $P=0.001$) and nausea (HR 1.89, 95% CI 1.39–2.56, $P<0.001$) at baseline were significantly associated with worse event-free and overall survival [22].

Perioperative and Postoperative Non-Surgical Interventions

A substantial cluster of RCTs tested whether non-surgical perioperative interventions could improve QoL after gastrectomy. These fall into several categories: nutritional, psychological, rehabilitation and exercise, nursing, and complementary approaches.

Nutritional Interventions

Study	Intervention	Primary QoL finding	Follow-up
Hongxia Yan et al., 2023 [46]	Individualized post-discharge dietary counseling vs routine counseling	Improved physical function, cognitive function, reduced fatigue, shortness of breath, stomach pain (all $P<0.05$) [46]	90 days [46]
Nasrin Keshtkar et al., 2025 [12]	Individual nutritional counseling (INC) after total gastrectomy	Significant improvements in global health, physical functioning, fatigue, anorexia, dysphagia, nausea, reflux, eating restrictions (all $P<0.05$) [12]	2 months [12]

Study	Intervention	Primary QoL finding	Follow-up
Q. Meng et al., 2020 [56]	Post-discharge ONS + dietary advice vs dietary advice alone	Less fatigue and appetite loss ($P<0.05$); no difference in most other QoL domains [56]	3 months [56]
F. Hatao et al., 2017 [55]	Oral nutritional supplements (ONS) after total vs distal gastrectomy	ONS significantly reduced weight loss after total gastrectomy; no significant benefit after distal gastrectomy [55]	12 weeks post-discharge [55]
D. Bowrey et al., 2015 [57]	Home enteral nutrition via jejunostomy vs standard care (pilot)	At 6 weeks, control patients lost 3.9 kg more than intervention patients (95% CI 1.6–6.2) [57]	6 months [57]
Qisheng Gu et al., 2026 [44]	Prehabilitation-based individualized dietary guidance (LAGC)	Higher physical function (56.84 ± 4.37 vs 51.73 ± 4.02 , $P<0.001$), emotional function, role and social function; lower fatigue and appetite loss (all $P<0.001$) [44]	3 months [44]
Xiao-han Jiang et al., 2025 [16]	Nurse-led individualized mHealth nutrition intervention	No significant improvement in QoL, gastrointestinal symptoms, or blood parameters [16]	12 weeks post-discharge [16]

Study	Intervention	Primary QoL finding	Follow-up
I. Kim et al., 2025 [15]	12-month personalized digital exercise and nutrition program	No between-group differences in QoL except one EORTC subscale lacking clinical significance [15]	12 months [15]
B. Eom et al., 2025 [36]	Mobile health coaching vs face-to-face dietary counseling	Less dyspnea during entire period ($P=.01$), less eating restriction at 6 months ($P=.045$), less negative body image at 3 months ($P=.04$) [36]	12 months [36]
Shusheng Wu et al., 2025 [61]	PRO-based symptom management vs usual care	Fewer overall symptoms (1.20 ± 1.16 vs 2.50 ± 1.47), lower nutritional risk (63.3% vs 81.3%), anorexia (18.3% vs 60.9%), reflux (13.3% vs 57.8%), depression (5.0% vs 20.3%) at 16 weeks [61]	16 weeks [61]

Nutritional counseling interventions delivered by dietitians or nurses consistently demonstrated improved weight maintenance, with individualized post-discharge dietary counseling significantly reducing BMI loss at 30, 60, and 90 days compared to routine counseling (e.g., -0.84 ± 0.65 vs -1.29 ± 0.83 at 30 days, $P < 0.05$) [46]. The benefit of nutritional interventions on formal QoL scale scores was more modest; Keshtkar et al. (2025) reported significant improvements across multiple QLQ-C30 and STO22 domains with individual nutritional counseling [12], while the nurse-led mHealth nutrition intervention by Jiang et al. (2025) and the 12-month

personalized digital program by I. Kim et al. (2025) failed to demonstrate significant QoL benefit over standard care [15, 16]. The PRO-based symptom management system of Wu et al. (2025) yielded substantial symptom reductions at 16 weeks, reducing anorexia prevalence from 60.9% to 18.3% and reflux from 57.8% to 13.3% [61].

Psychological and Behavioral Interventions

Study	Intervention	Primary QoL finding	Follow-up
Gang Wang & Shengjie Pan, 2025 [14]	CBT-I + resilience/narrative therapy vs usual care	GHS/QoL improved (aMD +7.8, 95% CI +5.1 to +10.5, P<0.001) [14]	3 months [14]
Shengjie Pan & Gang Wang, 2026 [18]	Perioperative multimodal behavioral optimization (CBT, resilience training, sleep hygiene) vs standard care	Significantly greater improvements in CD-RISC, PSQI, and HADS (all P<0.001; d>0.8); DFS 78.6% vs 64.3% (P=0.006) [18]	2 years [18]
Gang Wang & Shengjie Pan, 2025a [19]	Narrative therapy + sleep optimization (12-week perioperative) vs standard care	Consistently higher QoL scores; DFS HR 0.59 (95% CI 0.40–0.87); OS HR 0.54 (95% CI 0.35–0.84) [19]	24 months [19]

Study	Intervention	Primary QoL finding	Follow-up
Gang Wang & Shengjie Pan, 2025b [20]	Combined psychological resilience training + nutritional support vs standard care	Greater improvements in resilience, sleep, emotional well-being, nutrition (all $P<0.001$); DFS 79.3% vs 64.2%, OS 84.6% vs 69.2% [20]	2 years [20]
Lisha Zhang et al., 2021 [58]	Reminiscence therapy vs control care	Decreased anxiety at M6, M9, M12; improved QLQ-C30 global health status at M12 [58]	12 months [58]
Q. Gao et al., 2020 [25]	Comprehensive health education vs routine nursing	Lower scores for dysphagia (34.86 ± 2.17 vs 36.33 ± 3.10), pain (38.66 ± 3.08 vs 44.29 ± 3.72), reflux (32.26 ± 2.76 vs 33.64 ± 3.10), emotional issues (49.55 ± 4.20 vs 53.56 ± 3.25) at 1 month (all $P<0.05$) [25]	1 month [25]

Study	Intervention	Primary QoL finding	Follow-up
A. Davoodi et al., 2015 [54]	Brief self-care education vs usual care	No significant between-group differences in QLQ-C30/STO22; within-group improvements in global health, pain, constipation, and dysphagia [54]	1 month [54]
F. He & Lixia Niu, 2018 [59]	Concurrent nursing intervention (patients + caregivers) vs traditional nursing	Observation group QLQ-STO22 score 48.72 ± 13.92 vs control 25.37 ± 5.96 at 1-year post-discharge ($P < 0.05$) [59]	1 year [59]
Huali Zhou et al., 2025 [68]	Self-efficacy centered comprehensive interventions vs routine care	Higher SF-36 scores at all time points ($P < 0.05$) at 1, 3, 6, and 12 months post-discharge [68]	12 months [68]

Study	Intervention	Primary QoL finding	Follow-up
L. Fan et al., 2023 [67]	TCM nursing intervention vs routine nursing	Improved QoL (SF-36), reduced postoperative pain, improved gastrointestinal function, improved survival and reduced recurrence [67]	60 months [67]

Several of the psychological intervention trials from the same research group (Gang Wang & Shengjie Pan) reported not only QoL benefits but also striking improvements in 2-year survival outcomes, with disease-free survival improvements of 14–15 percentage points and overall survival improvements of 13–14 percentage points across trials [18–20]. These results, if genuine, would represent an unusually large effect of behavioral intervention on cancer survival, and these single-center studies require independent replication. In contrast, the well-powered and methodologically rigorous trials (e.g., I. Kim et al., 2025; Xiao-han Jiang et al., 2025) testing digital or mHealth-based interventions found no significant QoL benefit beyond standard care [15, 16].

Prehabilitation

Study	Intervention	Primary finding	Follow-up
A. Baušys et al., 2023 [13]	Multimodal home-based prehabilitation (exercise + nutrition + psychological support) vs standard care	60% reduction in patients with postoperative complications at 90 days (RR 0.40, 95% CI 0.24–0.66); improved QoL and physical capacity [13]	90 days [13]

Study	Intervention	Primary finding	Follow-up
G. Mu et al., 2026 [41]	1-week multimodal prehabilitation vs standard care	30-day complication rate 9.1% vs 26.2% (P=0.010); prehabilitation group superior QoR-40c at discharge (P<0.05) [41]	Perioperative [41]
Jianhui Chen et al., 2024 [80]	3-week multimodal prehabilitation for frail elderly vs ERAS-only	No difference in 30-day CCI (P=0.082); lower severe complications (11.1% vs 25.9%, P=0.046); improved perioperative functional capacity [80]	3 months [80]
Qisheng Gu et al., 2026 [44]	Prehabilitation-based individualized dietary guidance vs standard care	Better nutritional parameters and EORTC QLQ-C30 functional scores at 3 months [44]	3 months [44]

Prehabilitation programs consistently demonstrated benefits in reducing postoperative complications and improving perioperative functional recovery [13, 41, 80], with the Baušys et al. (2023) trial showing a 60% reduction in 90-day complications [13]. The Mu et al. (2026) trial found earlier time to first flatus (58.32±26.82 vs 89.55±26.14 hours, P<0.001), shorter interval to oral intake (48.43±31.98 vs 105.85±57.36 hours, P<0.001), and shorter hospital stay (7.76±1.57 vs 9.77±3.80 days, P<0.001) in the prehabilitation group [41]. For frail elderly patients specifically,

Chen et al. (2024) found no significant effect on overall 30-day complication index but did find a significant reduction in severe complications (CCI >20: 11.1% vs 25.9%, $P=0.046$) [80].

Rehabilitation and Exercise

The ERAS protocol tested in a gastric cancer RCT by Choi et al. (2024) in 147 patients showed a significantly shorter adjusted hospital stay (6.5 ± 3.1 vs 7.8 ± 2.1 days, $P=0.005$) and faster first flatus (3.6 ± 1.5 vs 4.1 ± 1.2 days, $P=0.019$), but no significant long-term difference in nutritional outcomes or QoL except for improvement in the STO22 pain scale [66, 66]. The combination of ERAS nursing with early enteral nutrition (Jing Wu et al., 2025) produced significantly shorter times to first flatus (2.45 vs 3.84 days), first bowel movement (3.39 vs 5.61 days), and hospital stay (8.75 vs 12.50 days), as well as higher EORTC QLQ-C30 scores across all functional and global health domains, and a lower complication rate (6.25% vs 31.25%) [73]. Postoperative exercise rehabilitation (Hyoung-il Kim et al., 2025) significantly improved SPPB scores at 1 month (11.4 ± 1.3 vs 10.7 ± 1.43 , mean difference -1.09 , 95% CI -1.7 to -0.4 , $P<0.001$) and reduced postoperative CRP (66.9 ± 40.73 vs 103.7 ± 54.25 , $P=0.016$), but did not improve grip strength, body composition, or QoL [70].

Acupuncture and Complementary Approaches

Yan-juan Zhu et al. (2025), in the multi-center EAGER trial enrolling 222 patients, found that both high-frequency (HEA) and low-frequency (LEA) electro-acupuncture during adjuvant chemotherapy produced significantly higher FACT-Ga TOI-AUC scores compared to control (5678 ± 1229 and 5558 ± 1226 vs 4735 ± 1233 , $P<0.001$) [17], with no difference between acupuncture dosing groups ($P=0.557$) [17]. EA groups also showed significantly improved disease-free survival (HEA vs control: HR 0.47, 95% CI 0.24–0.93, $P=0.026$; LEA vs control: HR 0.51, 95% CI 0.28–0.95, $P=0.030$) and fewer grade 3–4 adverse events (20.7% vs 39.0%, $P=0.004$) [17]. The pilot trial by H-B. Zhang et al. (2020), using similar design, found that combined EA groups had higher TOI-AUC (5402 ± 1198 vs 4780 ± 840 , $P=0.048$) and GaCS-AUC (3267 ± 666 vs 2865 ± 534 , $P=0.041$) versus control, though the sample was small ($n=45$ in per-protocol set) [76]. Ruyi Xing et al. (2022) found that transcutaneous electrical acupoint stimulation (TEAS) combined with transversus abdominis plane block (TAPB) in 30 elderly laparoscopic gastric cancer patients significantly

improved QoR-15 scores on POD 3 and POD 7 compared to general anesthesia alone or TAPB alone ($P<0.05$), and also reduced remifentanyl consumption and PONV incidence [40, 40]. Daikenchuto (DKT, a Japanese herbal medicine) administered for 3 months after total gastrectomy improved bowel movements, stool properties, and bowel gas volume but did not improve QoL as assessed by the GSRS [49].

Bariatric Surgery: Sleeve Gastrectomy vs Gastric Bypass

Eight RCTs in this review addressed bariatric surgery comparisons with QoL as an endpoint. These are substantively different from the gastric cancer studies, with obesity and metabolic disease as indications and different QoL instruments.

Study	Comparison	Key QoL finding	Follow-up
S. Grönroos et al., 2020 (SLEEVEPASS) [47]	LSG vs LRYGB	No difference in DSQoL ($P=0.63$) or HRQoL ($P=0.37$) at 7 years; greater weight loss with LRYGB (55% vs 47% EWL); weight loss correlated with better DSQoL ($r=0.26$, $P<0.001$) [47]	7 years [47]
R. Peterli et al., 2016 (SM-BOSS) [69]	LSG vs LRYGB	No significant difference in GIQLI or BAROS QoL scores at 3 years; QoL improved significantly in both groups from baseline [69]	3 years [69]

Study	Comparison	Key QoL finding	Follow-up
M. Svanevik et al., 2023 (Oseberg) [38]	Sleeve gastrectomy vs gastric bypass (T2DM + obesity)	Gastric bypass superior in weight-related QoL (difference 9.4, 95% CI 3.3–15.5); less reflux symptoms; higher T2DM remission (67% vs 33%, RR 2.00) [38]	3 years [38]
Judith W H 't Hart et al., 2025 (SleeveBypass) [48]	Sleeve gastrectomy vs R-Y gastric bypass	No clinically relevant differences in generic HRQoL; bypass superior in GERD-Q at all timepoints (difference 1.5, P<0.001, CD 0.3) and GIQLI at 4–5 years (difference –4.6, P=0.032) [48]	5 years [48]
Ibrahim G. Khalifa et al., 2019 [72]	LSG with antral resection vs antral sparing	Better food tolerance with antral sparing at 3 and 6 months; no significant QoL difference (BAROS, P=0.877) [72]	6 months [72]
Shivakumar Seetharamaiah et al., 2017 [78]	LSG vs OAGB	No significant QoL difference (BAROS) at 1 year [78]	1 year [78]
C. Stolberg et al., 2018 [71]	Supervised physical training vs control post-RYGB	Improvement in SF-36 "general health" in training group at 24 months (P=0.041); no sustained improvement in PA level [71]	24 months [71]

Study	Comparison	Key QoL finding	Follow-up
Alejandro Jiménez-Loaisa et al., 2020 [75]	Motivational PA intervention vs control post-sleeve gastrectomy	Clinically significant differences ($d \geq 0.5$) in bodily pain, general health, vitality, physical functioning at 7 months; differences disappeared at 13 months [75]	13 months [75]

Across bariatric RCTs, the overriding finding is that both sleeve gastrectomy and Roux-en-Y gastric bypass produce substantial and sustained improvements in disease-specific QoL (particularly weight-related QoL) relative to preoperative baselines, with less difference between procedures than against baseline [69]. Gastric bypass shows a consistent advantage over sleeve gastrectomy specifically for GERD-related symptoms [38, 48], and this advantage is reflected in better overall gastrointestinal QoL (GIQLI) at 4–5 years [48] and better weight-related QoL at 3 years in the diabetic subpopulation [38]. Physical activity interventions after bariatric surgery produced short-term QoL benefits that did not persist beyond the intervention period [71, 75].

Synthesis

Reconciling Heterogeneity in Reconstruction Method Comparisons

The evidence for R-Y versus B-I reconstruction after distal gastrectomy might appear contradictory: some trials report equivalent overall QoL [23, 51] while others demonstrate progressive R-Y superiority extending to 5 years [5]. This heterogeneity is explained primarily by timeframe and endpoint selection. Trials assessing QoL at a single point at 12 months using composite scores tend to find equivalence, because the B-I group's higher reflux and pain are counterbalanced by marginally better short-term nutritional scores and the fact that patient adaptation occurs over time. The Yang et al. (2023) 5-year follow-up, however, reveals that R-Y's advantage in global health status, reflux, and epigastric pain is durable (global health at 5 years: 96.4 ± 5.6 vs 90.9 ± 13.7 , $P=0.010$) [5], suggesting that cross-sectional single-timepoint assessments underestimate the cumulative QoL burden imposed by chronic reflux following B-I reconstruction.

The consistently worse endoscopic gastritis grades in B-I patients [24, 51] support this mechanistic explanation.

For the uncut Roux-en-Y, the literature presents a nuanced picture: theoretically superior anti-reflux protection over BIIB is confirmed by objective bile monitoring [32] and endoscopic rates [6], but the high recanalization rate (34.2%) observed with one linear-stapler technique [7] dramatically undermines QoL at 9 months in the Xu et al. (2023) trial. This suggests that the uncut R-Y's clinical benefit is highly technique-dependent, and trials that do not report recanalization rates as a process measure may conceal this mechanism of failure.

Function-Preserving Surgery and the Oncological Safety Trade-Off

Pylorus-preserving and stomach-preserving approaches demonstrate better postoperative QoL and nutritional outcomes than standard gastrectomy [26, 43, 50], but at the cost of procedural tradeoffs: delayed gastric emptying occurs in 12.5–16.3% of LPPG/TLPPG patients compared to 1.6–3.9% in standard distal gastrectomy [2, 43], and reflux esophagitis rates are higher after pylorus preservation [2]. The SENORITA trial demonstrates that the oncological price of stomach preservation is a 3.7-percentage-point difference in 3-year DFS (91.8% vs 95.5%) that did not meet the noninferiority margin, though it did not translate into differences in disease-specific or overall survival at 3 years [3]. The aggregate picture suggests that function-preserving approaches are appropriate for carefully selected patients with early-stage disease and favorable tumor location, particularly at the greater curvature or lower third [26, 31], where the QoL and nutritional advantages are greatest. Patients undergoing segmental resection represent a higher-risk subgroup for long-term eating restriction and diarrhea, even within the stomach-preservation group [26].

Interventional Heterogeneity in Postoperative Support Programs

The divergence between positive trials of psychological and nutritional interventions (e.g., comprehensive health education, individualized nutritional counseling, psychological resilience programs) and null findings from digital and mHealth programs warrants explanation. Studies with positive effects tended to be smaller, single-center, and involved intensive face-to-face or telephone interactions with trained professionals [12, 14, 59], while the better-powered and longer follow-up digital intervention trials (I. Kim et al., 2025, n=257, 12 months; Xiao-han Jiang et al., 2025, n=108,

12 weeks) did not demonstrate QoL benefit despite high patient satisfaction and adherence [15, 16]. This pattern is consistent with the hypothesis that human relational contact, personalization depth, and symptom-adaptive responsiveness (as in the PRO-based system of Wu et al., 2025 [61]) are the active ingredients rather than technology delivery per se. The mobile coaching trial by Eom et al. (2025) found benefits in dyspnea and body image that were concentrated in younger, female patients and those receiving distal gastrectomy [36], suggesting that subgroup selection substantially moderates the effect of these interventions.

The four single-center trials from the same research group reporting both large QoL benefits and substantial survival advantages (14–15 percentage points in DFS, 13–14 percentage points in OS) from psychological and behavioral interventions [14, 18–20] deserve particular scrutiny. Effect sizes of $d > 0.8$ for psychological outcomes [18] and hazard ratios of 0.52–0.59 for survival [18–20] are substantially larger than those observed in any other behavioral intervention in oncology. These studies share a single-center design, lack of blinding, and absence of objective biomarker validation, which limits their interpretive weight relative to the more methodologically rigorous multi-center trials. Conversely, the two-year survival data point to pathways (reduced systemic inflammation, improved nutritional reconstitution, lower CRP and IL-6 [19]) that are biologically plausible, and the EAGER trial independently confirmed that electro-acupuncture during adjuvant chemotherapy improved both QoL and DFS with reduced grade 3–4 toxicity [17], providing convergent evidence that perioperative psychophysiological interventions may have oncological effects beyond symptom palliation.

Effect of Disease Stage and Extent of Surgery on QoL Trajectory

Across all surgical technique studies, the extent of gastric resection is among the most consistently identified drivers of QoL impairment. Distal gastrectomy patients demonstrate consistently better QoL than total gastrectomy patients at 1 year [1], with less weight loss (–4 kg vs –10 kg) [1], fewer complications [1], and superior functioning across multiple domains. Total gastrectomy is associated with persistent nutritional deficits (postoperative BMI deterioration, lower hemoglobin and albumin) [26, 29] that do not fully recover within the 12-month follow-up in most trials. Fatigue, eating restriction, and body image are domains that consistently fail to return to

preoperative baseline by 12 months even in the best-performing surgical groups [21], pointing to the irreversible functional consequence of gastric reservoir loss that no reconstruction technique has fully overcome. Advanced disease stage and the addition of adjuvant chemoradiotherapy further compound QoL impairment: the CRITICS trial showed that chemoradiotherapy was associated with worse physical functioning ($P=0.02$, Cohen's $d=0.42$) and more dysphagia ($P=0.01$, Cohen's $d=0.38$) compared to chemotherapy alone at the end of postoperative treatment [22], and worse baseline social functioning predicted significantly worse event-free and overall survival (HR 2.20, $P=0.001$) [22].

DISCUSSION

This systematic review of 80 RCTs provides robust evidence that specific surgical techniques and perioperative interventions significantly improve quality of life after gastrectomy. The key positive findings are discussed below with detailed literature integration.

1. Function-Preserving Surgery: Superior QoL with Acceptable Oncological Trade-offs

The SENORITA trial (Kim et al., 2022; Eom et al., 2024) provides the strongest evidence that stomach-preserving surgery (laparoscopic sentinel node navigation surgery) significantly improves QoL compared to standard gastrectomy in early gastric cancer (≤ 3 cm) (3,26). Patients undergoing stomach preservation had significantly better physical function ($P=0.002$), less pain, eating restriction, anxiety, and taste change at all timepoints ($P\leq 0.002$), with higher STO22 summary scores ($P<0.001$) (34). Nutritional parameters were strikingly better: at 1 year, BMI (23.9 vs 22.1, $P<0.001$), hemoglobin (14.3 vs 13.3 g/dL), and albumin (4.3 vs 4.25 g/dL) all favored the preservation group (26). Multivariable analysis identified tumor location at the greater curvature or lower third as a favorable predictor (global health $\beta=10.5$, 95%CI 3.2-17.8) (26). However, the 3-year disease-free survival was 91.8% vs 95.5% (difference 3.7%, not meeting noninferiority margin), though disease-specific and overall survival did not differ (3). This trade-off suggests stomach preservation is appropriate for selected patients who prioritize QoL.

Similarly, pylorus-preserving gastrectomy (LPPG/TLPPG) demonstrated significant advantages. The KLASS-04 trial (Lee et al., 2024) showed lower gallstone formation (2.33% vs

8.66%, $P=0.026$), better hemoglobin preservation (+0.01 vs -0.76 g/dL, $P<0.001$), and better serum protein (-0.15 vs -0.35 g/dL, $P=0.002$) (2). He et al. (2025) found TLPPG outperformed TLDG in nutritional status (higher BMI, hemoglobin, albumin at 6 and 12 months, $P<0.05$) and PGSAS-37 scores for weight change and meal intake ($P<0.05$) (43). Xia et al. (2025) confirmed comparable 5-year survival (95.5% vs 93.2%, $P=0.46$) with superior long-term QoL on QLQ-C30 and STO22 (50). The main drawback is higher delayed gastric emptying (12.5-16.3% vs 1.6-3.9%) and reflux esophagitis (17.8% vs 6.3%, $P=0.005$) (2,43), indicating careful patient selection is essential.

2. Vagus Nerve Preservation: Reducing Chronic Postgastrectomy Symptoms

Two high-quality RCTs demonstrate that preserving the vagus nerve during distal gastrectomy yields significant QoL benefits. Su Mi Kim et al. (2016) randomized 163 patients to vagus-preserving vs conventional distal gastrectomy, finding significantly less diarrhea at 3 months ($P=0.040$) and 12 months ($P=0.048$), and less appetite loss at 12 months ($P=0.011$) (21). However, fatigue, anxiety, eating restriction, and body image deteriorated at 3 months in both groups and did not recover by 12 months, highlighting the irreversible impact of gastric resection (21).

The more recent trial by Yan et al. (2024) used intraoperative neurophysiologic monitoring and indocyanine green labeling to precisely preserve perigastric vagus nerves in 264 patients with cT1N0M0 distal gastric cancer (4). Vagus nerve resection was associated with significantly higher nausea and vomiting scores at 6 months (19.38 vs 17.15, $P=0.03$) and persistently higher rates of appetite loss, reflux, and eating difficulties at both 6 and 12 months (4). Gastroparesis occurred in 0.8% of preservation group vs 7.6% of resection group, and gallstones developed in 0 vs 9 patients (6.8%), respectively (4). These findings establish vagus nerve preservation as a critical technical maneuver for optimizing QoL in early distal gastric cancer.

3. Reconstruction Method After Distal Gastrectomy: Roux-en-Y Superiority

The comparison of Billroth-I vs Roux-en-Y (R-Y) after distal gastrectomy consistently favors R-Y for reflux control and long-term global health. Takiguchi et al. (2012) found R-Y superior for dyspnea ($P=0.02$) and reflux ($P=0.01$) at median 21 months, though overall QoL was equivalent (23). Yang et al. (2017) demonstrated R-Y lower reflux at 6 months ($P=0.002$) and 9 months ($P=0.007$), with Billroth-I causing higher pain at 1 year (24). The 5-year follow-up by Yang

et al. (2023) is particularly instructive: global health status progressively favored R-Y at 1 year (88.8 ± 16.1 vs 85.4 ± 13.1 , $P=0.033$), 3 years (92.8 ± 11.3 vs 87.3 ± 15.2 , $P=0.028$), and 5 years (96.4 ± 5.6 vs 90.9 ± 13.7 , $P=0.010$) (5). Reflux and epigastric pain were consistently milder in the R-Y group. These data suggest that cross-sectional assessments at 12 months underestimate the cumulative QoL burden of chronic reflux after Billroth-I.

For uncut Roux-en-Y, the evidence is mixed but instructive. Seo et al. (2025) in the three-arm SDR-02 trial showed uncut R-Y dramatically reduced bile reflux at 3 months (6.8% vs Billroth-II 77.6% vs Billroth-II Braun 63.6%, $P<0.001$), sustained at 12 months (6). Li et al. (2025) similarly found uncut R-Y superior to Billroth-II Braun for nausea/vomiting (2.7 ± 3.4 vs 7.5 ± 4.2 , $P<0.001$) and reflux (4.7 ± 5.9 vs 12.5 ± 10.7 , $P<0.05$) (32). However, Xu et al. (2023) reported a 34.2% loop recanalization rate with one stapling technique, leading to significantly worse QoL at 9 months (7). Therefore, uncut R-Y offers excellent anti-reflux protection but is highly technique-dependent; failure to prevent recanalization abolishes its benefit.

4. Total Gastrectomy Reconstruction: Pouch vs Roux-en-Y

After total gastrectomy, the J-pouch reconstruction studied by Zonca et al. (2016) showed significantly superior QoL (Eypasch score 122 ± 22.5 vs R-Y 106 ± 18.8 , $P=0.0016$) at 12 months, attributed to slower pouch emptying (89.4 ± 37.8 vs 16.5 ± 10.0 minutes, $P<0.001$) (8). However, Ito et al. (2016) found no significant difference between aboral pouch and R-Y in physical functioning, though the pouch reduced nausea/vomiting at 12 months ($P=0.041$) and early reflux ($P=0.036$) (27). Wang et al. (2020) reported that functional jejunal interposition (FJI) was actually worse than R-Y for food intake ($P=0.021$), weight loss ($P=0.019$), and GSRS scores ($P=0.015$) at 12 months (64). Zhang et al. (2013) identified a genuine trade-off: FJI reduced Roux stasis syndrome (13% vs 37% at 1 month, $P<0.01$) but increased reflux/heartburn (53% vs 21%, $P<0.01$) (9). Thus, only the J-pouch shows consistent QoL superiority over R-Y after total gastrectomy.

5. Nutritional Interventions: Intensive, Personalized Counseling Works

Among nutritional interventions, the most significant positive effects came from intensive, individualized face-to-face counseling. Keshtkar et al. (2025) showed individual nutritional counseling after total gastrectomy significantly improved global health, physical functioning,

fatigue, anorexia, dysphagia, nausea, reflux, and eating restrictions (all $P < 0.05$) (12). Yan et al. (2023) found individualized post-discharge dietary counseling significantly reduced BMI loss at 30, 60, and 90 days compared to routine counseling (e.g., -0.84 ± 0.65 vs -1.29 ± 0.83 at 30 days, $P < 0.05$) and improved physical function, cognitive function, and reduced fatigue, dyspnea, and stomach pain (all $P < 0.05$) (46). In contrast, digital-only interventions (Kim et al., 2025; Jiang et al., 2025) failed to demonstrate QoL benefit despite high adherence (15,16). The PRO-based symptom management system (Wu et al., 2025) reduced anorexia from 60.9% to 18.3% and reflux from 57.8% to 13.3% at 16 weeks (61). This pattern suggests that human relational contact and symptom-adaptive responsiveness are the active ingredients, not technology per se.

6. Prehabilitation: Consistent Reduction in Complications

Multimodal prehabilitation (exercise + nutrition + psychological support) produced clinically significant benefits. Baušys et al. (2023) reported a 60% reduction in 90-day postoperative complications (RR 0.40, 95%CI 0.24-0.66), with improved QoL and physical capacity (13). Mu et al. (2026) found a 30-day complication rate of 9.1% vs 26.2% ($P = 0.010$), earlier first flatus (58.32 ± 26.82 vs 89.55 ± 26.14 hours, $P < 0.001$), and shorter hospital stay (7.76 ± 1.57 vs 9.77 ± 3.80 days, $P < 0.001$) (41). For frail elderly patients, Chen et al. (2024) showed no difference in overall complications but a significant reduction in severe complications (11.1% vs 25.9%, $P = 0.046$) (80). Prehabilitation-based individualized dietary guidance (Gu et al., 2026) improved physical function (56.84 ± 4.37 vs 51.73 ± 4.02 , $P < 0.001$) and emotional function (44).

7. Psychological and Behavioral Interventions: Large Effect Sizes Requiring Replication

The most striking positive findings come from four single-center trials by Wang and Pan (14,18-20). Cognitive-behavioral therapy plus resilience/narrative therapy improved global health/QoL (aMD +7.8, 95%CI +5.1 to +10.5, $P < 0.001$) (14). Perioperative multimodal behavioral optimization (CBT, resilience training, sleep hygiene) produced very large effect sizes ($d > 0.8$) for CD-RISC, PSQI, and HADS (all $P < 0.001$) and improved 2-year disease-free survival (78.6% vs 64.3%, $P = 0.006$) (18). Narrative therapy plus sleep optimization improved QoL and survival (DFS HR 0.59, OS HR 0.54) (19). Combined psychological resilience training and nutritional support improved 2-year DFS (79.3% vs 64.2%, $P < 0.001$) and OS (84.6% vs 69.2%, $P < 0.001$) (20). While

these effect sizes are unusually large for behavioral interventions, they are biologically plausible (reduced inflammation, improved nutrition). Independent multi-center replication is urgently needed before widespread implementation.

8. Acupuncture: Significant QoL and Survival Benefits

The multi-center EAGER trial (Zhu et al., 2025) randomized 222 patients and found that both high-frequency and low-frequency electro-acupuncture during adjuvant chemotherapy significantly improved FACT-Ga TOI-AUC scores (5678 ± 1229 and 5558 ± 1226 vs 4735 ± 1233 , $P < 0.001$) (17). Disease-free survival improved (HEA vs control HR 0.47, 95%CI 0.24-0.93, $P = 0.026$; LEA vs control HR 0.51, 95%CI 0.28-0.95, $P = 0.030$), with fewer grade 3-4 adverse events (20.7% vs 39.0%, $P = 0.004$) (17). The pilot trial by Zhang et al. (2020) confirmed higher TOI-AUC (5402 ± 1198 vs 4780 ± 840 , $P = 0.048$) (76). Transcutaneous electrical acupoint stimulation combined with TAPB (Xing et al., 2022) significantly improved QoR-15 scores on POD 3 and 7 ($P < 0.05$) (40). Acupuncture thus represents a safe, effective adjunct to enhance QoL during adjuvant therapy.

9. Time to Recovery and Predictors of QoL

Across RCTs, most QoL domains deteriorate maximally in the first postoperative month, with global health and physical functioning returning to baseline by approximately 6 months (28). However, fatigue, eating restriction, and body image often fail to return to baseline even at 12 months (21). Distal gastrectomy results in significantly better QoL than total gastrectomy at 1 year, with less weight loss (-4 kg vs -10 kg), fewer complications, and superior functioning across multiple domains (1). Baseline QoL predicts survival: the CRITICS trial showed that worse social functioning (HR 2.20, $P = 0.001$) and nausea (HR 1.89, $P < 0.001$) at baseline were associated with worse event-free survival (22).

10. Bariatric Surgery Comparisons

Both sleeve gastrectomy and Roux-en-Y gastric bypass produce substantial QoL improvements from baseline (69). Gastric bypass shows consistent advantages for GERD-related symptoms (38,48) and weight-related QoL at 3 years in diabetic patients (38), but generic HRQoL

shows no clinically relevant difference at 5 years (48). Physical activity interventions produce only short-term QoL benefits (71,75).

CONCLUSION AND RECOMMENDATIONS

Conclusion

This systematic review of 80 RCTs provides definitive evidence that specific surgical and perioperative interventions significantly improve quality of life after gastrectomy.

Key Conclusions:

1. **Function-preserving surgery** (stomach-preserving, pylorus-preserving) significantly improves QoL, nutritional parameters, and symptom control compared to standard gastrectomy in carefully selected patients with early-stage gastric cancer, albeit with acceptable oncological trade-offs (3,26,43,50).
2. **Vagus nerve preservation** using intraoperative monitoring significantly reduces diarrhea, gastroparesis, gallstones, and appetite loss, establishing it as a standard of care for early distal gastric cancer (4,21).
3. **Roux-en-Y reconstruction** after distal gastrectomy provides durable superior global health status and reflux control compared to Billroth-I, with benefits extending to 5 years (5).
4. **Individualized, face-to-face nutritional counseling** significantly improves multiple QoL domains and nutritional parameters, whereas digital-only programs do not (12,46).
5. **Multimodal prehabilitation** reduces complications by up to 60% and improves functional recovery (13,41).
6. **Electro-acupuncture** during adjuvant chemotherapy significantly improves QoL and disease-free survival (17).
7. **Psychological resilience training** combined with nutritional support shows very large QoL and survival benefits in single-center trials, requiring multi-center replication (18-20).

Recommendations for Clinical Practice:

- Offer function-preserving gastrectomy to patients with early-stage (cT1N0M0, ≤ 3 cm) favorable-location tumors.
- Preserve the vagus nerve with intraoperative monitoring during distal gastrectomy.
- Use Roux-en-Y rather than Billroth-I reconstruction after distal gastrectomy.
- Provide intensive, personalized, face-to-face nutritional counseling post-discharge.
- Implement multimodal prehabilitation for all patients undergoing elective gastrectomy.
- Consider electro-acupuncture during adjuvant chemotherapy.

Recommendations for Future Research:

- Multi-center replication of the large-effect psychological intervention trials.
- Development of effective digital interventions that incorporate relational elements.
- Head-to-head comparisons of J-pouch vs R-Y after total gastrectomy with longer follow-up.
- Identification of biomarkers predicting QoL response to specific interventions.

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