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Quality of Life Evaluation Using Questionnaires in Breast Cancer Patients after Surgery: A Systematic Review

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Abbreviations:
QoL: Quality of life;
PROMS: Patient-reported outcome measures;
DIEP: Deep inferior epigastric perforator;
BCT: Breast- conserving therapy;
MST: Mastectomy;
IBR: Immediate breast reconstruction;
MIBR: Minimally invasive breast reconstruction.

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Rezumat

Evaluarea calității vieții utilizând chestionare la pacientele cu neoplasm mamar după intervenție chirurgicală: un review sistematic

Introducere: cancerul mamar este cea mai frecvent diagnosticată malignitate la nivel mondial în rândul femeilor, iar intervenția chirurgicală jucând un rol important în cadrul tratamentului multimodal. În ciuda progreselor realizate în managementul bolii şi a creşterii ratei de supraviețuire, impactul asupra calității vieții pacientelor rămâne o problemă importantă. Acest review îşi propune să sintetizeze metodele de evaluare a calității vieții prin chestionare, concentrându-se pe rezultatele raportate de paciente după diferite tipuri de intervenții chirurgicale.
Metode: căutări sistematice au fost efectuate în PubMed, Scopus şi Web of Science între ianuarie 2022 şi mai 2025 pentru identificarea studiilor în limba engleză despre calitatea vieții în cancerul de sân utilizând chestionare validate. Şaptesprezece studii au întrunit criteriile de includere şi au fost analizate independent de către doi autori.
Rezultate: EORTC QLQ-C30 şi BR23 a arătat o imagine corporală şi o funcție emoțională superioară după intervenția conservatoare a sânului, însă 40 până la 60% dintre pacientele supuse mastectomiei fără reconstrucție au prezentat disfuncții sexuale persistente. SF-36 şi FACT-B au indicat o îmbunătățire a stării fizice şi mentale după reconstrucție, deşi 31% dintre pacientele cu mastectomie s-au situat sub pragurile funcționale. BREAST-Q a evidențiat o satisfacție mai ridicată şi o stare psihosocială mai bună în cazul reconstrucției autologe comparativ cu reconstrucția cu implant. Chirurgia oncoplastică a sânului a fost asociată cu scoruri medii BREAST-Q BCT semnificativ mai mari comparativ cu excizia locală largă convențională, pacientele din grupul oncoplastic au raportat scoruri medii de satisfacție față de aspectul sânilor de aproximativ 90%, comparativ cu 75% în grupul convențional.
Concluzii: Chirurgia conservatoare a sânului sau reconstrucția după mastectomie îmbunătățesc calitatea vieții comparativ cu mastectomia. Chirurgia oncoplastică a sânului sporeşte semnificativ imaginea corporală

față de excizia locală largă convențională (tratamentul conservator). Reconstrucția autologă a sânului este asociată cu o satisfacție mai mare, dar şi cu un risc crescut de complicații comparativ cu reconstrucția cu implant.

Cuvinte cheie: cancer mamar, calitatea vieții, chestionar, chirurgia sânului, rezultatele postoperatorii

Abstract

Introduction: breast cancer continues to dominate as the most frequently diagnosed malignancy among women globally, with surgery playing a key role in treatment. Despite advances in disease management and improved survival, the impact on patients' quality of life (QoL) remains an important issue. This review aims to synthesize evidence on QoL outcomes, focusing on patient-reported outcomes following different types of breast cancer surgery.
Methods: A systematic search was performed in PubMed, Scopus, and Web of Science from January 2022 until May 2025 to identify English-language publications on breast cancer QoL using validated PROMS. Seventeen studies met the inclusion criteria and were reviewed independently by two authors.
Results: The EORTC QLQ-C30 and BR23 instruments demonstrated superior body image and emotional functioning following breast-conserving surgery. However, 40 to 60% of patients undergoing mastectomy without reconstruction reported persistent sexual dysfunction. SF-36 and FACT-B indicated improvements in physical and mental health post-reconstruction, although 31% of mastectomy patients remained below functional thresholds. BREAST-Q revealed higher satisfaction and better psychosocial well-being in autologous reconstruction compared to implant-based reconstruction. Oncoplastic breast surgery was associated with significantly higher mean BREAST-Q breast-conserving treatment (BCT) scores compared to conventional wide local excision, with patients in the oncoplastic group reporting approximately 90% mean satisfaction with breast appearance versus 75% in the conventional group.
Conclusions: Breast-conserving surgery or reconstruction after mastectomy improves quality of life compared to mastectomy alone. Oncoplastic breast surgery significantly enhances body image relative to conventional wide local excision (BCT). Autologous breast reconstruction is associated with greater patient satisfaction but carries a higher risk of complications compared to implant-based reconstruction.

Keywords: breast cancer, quality of life, questionnaire, breast surgery, post-surgical outcomes

Introduction

Breast cancer (BC) represents the most frequently determined malignancy among women worldwide. In 2022, an estimated 8.2 million women were diagnosed within the preceding five years, underscoring the critical importance of comprehensive assessments regarding health-related quality of life in this expanding cohort of survivor population. Alongside survival, quality of life (QoL) has gained prominence in routine healthcare. Discovery of means to improve the level of quality of life in breast cancer patients is strongly encouraged, and the identification and implementation of strategies to enhance QoL in breast cancer patients remain a priority in oncological care (1).

The diagnosis and treatment of BC have significant physical, psychological, and economic impacts on patients and their families, often necessitating significant lifestyle changes and affecting family dynamics. Common QoL concerns include disease symptoms, psychological challenges such as anxiety, stress, fear, and depression, reduced life expectancy, and the side effects and morbidity of treatment, all of which vary across different stages of the disease, from non-invasive BC to advanced stages. QoL is a multidimensional concept, encompassing physical, psychological, and social wellness. The World Health Organization defines QoL as an individual's perception of their life satisfaction and functional well-being (2). As women are often central figures in family structures, their QoL not only influences their own life but also the stability of their families. Studies have shown that psychosocial issues can exacerbate physical symptoms, especially during treatment, when side effects are often perceived as intolerable (3). Therefore, emphasizing the importance of QoL post diagnosis and case management is critical, and improving it should be an important goal in BC treatment (4).

Breast cancer surgery has evolved toward less

invasive techniques, yet its impact on QoL remains a pivotal outcome. Hence, the advancements in multimodal treatment, mastectomy remains a frequent surgery for breast cancer. Over 50% of survivors report persistent issues with body image, pain, or sexual health. Recent literature emphasizes the role of PROMS in evaluating surgical success beyond survival metrics.

Understanding the factors that influence QoL is essential to help patients transition to survivorship and normal life and cope with the stress of the disease, and is a vital consideration in the management of BC (5). Various factors have been identified as affecting the QoL of BC patients, including age, disease stage, financial issues, severe side-effects of the treatment, daily life challenges, impact of body-image, reduced self-esteem and medical or psychosomatic factors such as pain, stress, anxiety, depression, diminished self-efficacy, and weakening social ties (6).

To evaluate the QoL of BC patients, various Patient-Reported Outcome Measures (PROMs) have been utilized (7). PROMs are structured questionnaires designed to capture patients' functional and emotional status, featuring specific items and corresponding response options (8). When developed and validated following international guidelines, PROMs can offer reliable and valid assessments of patients' conditions (9). The use of instruments to measure the quality of life of breast cancer patients is crucial in understanding the impact of the disease on patients' lives, from physical and mental health to social aspects (2).

The BREAST-Q questionnaire was introduced in the late 2000s and has established itself as a robust patient-reported outcome measure specifically designed and validated for breast surgery patients. The instrument is particularly valuable in evaluating patient satisfaction and quality of life after surgical interventions. It excels in capturing specific aspects such as body image and psychosocial well-being. Due to its comprehensive role and clinical relevance, it has become a standard tool in surgical outcome assessment for breast surgery patients (10).

The 36-Item Short Form Health Survey (SF-36) is a globally used generic instrument developed in the early 1990s (11). It offers a comprehensive assessment of a patient's overall well-being, encompassing both physical and mental health domains (12). In breast cancer patients, it is instrumental in assessing baseline quality of life before treatment, monitoring changes in QoL during and after therapy, and comparing outcomes among different patient groups. It also aids in investigating the psychosocial factors that influence overall well-being (13). It is widely used internationally in breast cancer research, likely due to its availability in numerous languages and its well-established psychometric properties. The SF-36 has demonstrated reliability and validity across diverse populations, including breast cancer patients (14).

The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30), first introduced in the 1980s, is a cancer-specific instrument designed to evaluate overall health, symptoms, and functional status. An important extension of this tool, the QLQ-BR23, was developed in the early 1990s following extensive research and collaboration with oncologists, psychologists, and patients. Tailored specifically for patients with breast cancer, the QLQ-BR23 addresses key concerns such as body image, sexual functioning, side effects of systemic therapy, and future perspectives. It remains one of the most widely used and validated instruments in evaluating QoL for breast cancer patients (15).

The EORTC QLQ-BR42, introduced in 2020, serves as an extension of the QLQ-BR23. This updated version enhances the assessment of health-related quality of life specifically for breast cancer patients by incorporating additional items that capture the impact of treatment. It encompasses a wider range of issues, including symptom burden, physical and mental well-being, and the influence of breast cancer on daily life (15).

The Functional Assessment of Cancer Therapy - Breast (FACT-B) is another extensively used instrument specifically developed for breast cancer patients. It provides a comprehensive evaluation of patients' well-being by integrating general health items from the Functional Assessment of Cancer Therapy – General (FACT-G) and breast cancer-specific subscales. This instrument is particularly valued for its ability to capture both emotional and social dimensions of patients' experiences (16).

The World Health Organization Quality of Life - BREF (WHOQOL-BREF), introduced in 1996, is a shortened version of the original WHOQOL-100, which was first released in 1995 by the World Health Organization (WHO). Designed to assess quality of life across different cultures and health conditions, it evaluates four key domains: physical health, psychological well-being, social relationships, and environmental factors. Its brevity and cross-cultural adaptability have made the WHO-

QOL-BREF a valuable tool in both clinical practice and international research (17).

This review aims to compare QoL across different surgical techniques (wide local excision, oncoplastic surgery, mastectomy ± reconstruction) and to evaluate the sensitivity of modern QoL tools.

Materials and Methods

A comprehensive literature search was performed according to the Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The search strategy was conducted for articles published between January 2022 and May 2025 using three databases: PubMed, Scopus, and Web of Science. Original studies evaluating standardized QoL measures (e.g., EORTC QLQ-C30, QLQ–BR42, QLQ-BR45, FACT-B, SF-36, Breast-Q) in female patients after breast cancer interventions were screened. The initial searched terms were “breast cancer," "quality of life," "questionnaire", “breast surgery” and “post-surgical outcomes”.

Eligibility Criteria

Inclusion criteria were studies focusing on breast cancer QoL assessment tools, English-language publications, studies involving adult female patients, and validated patient-reported outcome measures.

Exclusion criteria were non-English publications, studies without full-text availability, case reports and individual patient narratives, and studies without clear methodological protocols.

Titles and abstracts were independently reviewed for eligibility by two authors, and non-relevant or duplicate studies that did not meet the inclusion criteria were excluded. After the initial screening, the full texts were reviewed by another author. In cases of disagreement, the problem was resolved by discussion.

Results

After the initial search, 2,580 records were identified. Following the removal of 1,593 duplicate records, 860 records deemed ineligible by automation tools, and 79 records excluded for other reasons, 48 records remained for screening. After title and abstract screening, 7 records were excluded, resulting in 41 reports sought for full-text retrieval. Of these, 5 reports could not be retrieved. The remaining 36 reports were assessed for eligibility, and 8 were excluded (3 not open access and 5 not published in English). Ultimately, 28 studies, corresponding to 17 individual reports, met the inclusion criteria and were incorporated into the final review (*Fig. 1*).

A total of 17 studies were included.

A summary of the main trends in QoL outcomes across different surgical techniques is represented in *Table 1*.

An overview regarding the characteristics of the included studies is reported in *Table 2*.

BREAST-Q:

Nine studies utilized the BREAST-Q questionnaire. It is a validated tool designed to assess patient-reported outcomes following different types of breast surgery, focusing on satisfaction with breasts, surgeon, and information, as well as quality of life domains, including psychosocial, physical, and sexual well-being. BREAST-Q assesses reconstruction outcomes through satisfaction domains (breasts, surgeon, information) and quality of life domains (psychosocial, physical, sexual well-being). Using Rasch modeling, it generates 0-100 domain scores (higher=better) via proprietary software, without a total composite score (18).

One study found significantly higher satisfaction scores with autologous reconstruction (mean scores between 68 and 82) versus implant-based techniques (mean scores between 54 and 72), and superior psychosocial well-being following DIEP flap procedures ($p<0.01$ in all comparative studies). Physical discomfort was reported by 23-38% of patients receiving implants (19).

Another study proved that patients with delayed reconstruction reported lower satisfaction than those with immediate reconstruction. BREAST-Q scores were lowest for tissue expanders compared to implant, autologous, or combined methods. Satisfaction after simple mastectomy (mean score 66.1) was lower than skin-sparing (mean score 71.1) and nipple-sparing mastectomies (mean score 72.6) (20).

Patients undergoing oncoplastic surgery reported significantly greater satisfaction with their breasts, with a mean score of 82, compared to a score of 65 for those who received traditional breast-conserving surgery. This superior result demonstrates that oncoplastic techniques provide a clinically important enhancement to a patient's quality of life and body image post-surgery (21).

A study regarding patient-reported outcome measurements in post-mastectomy implant-based

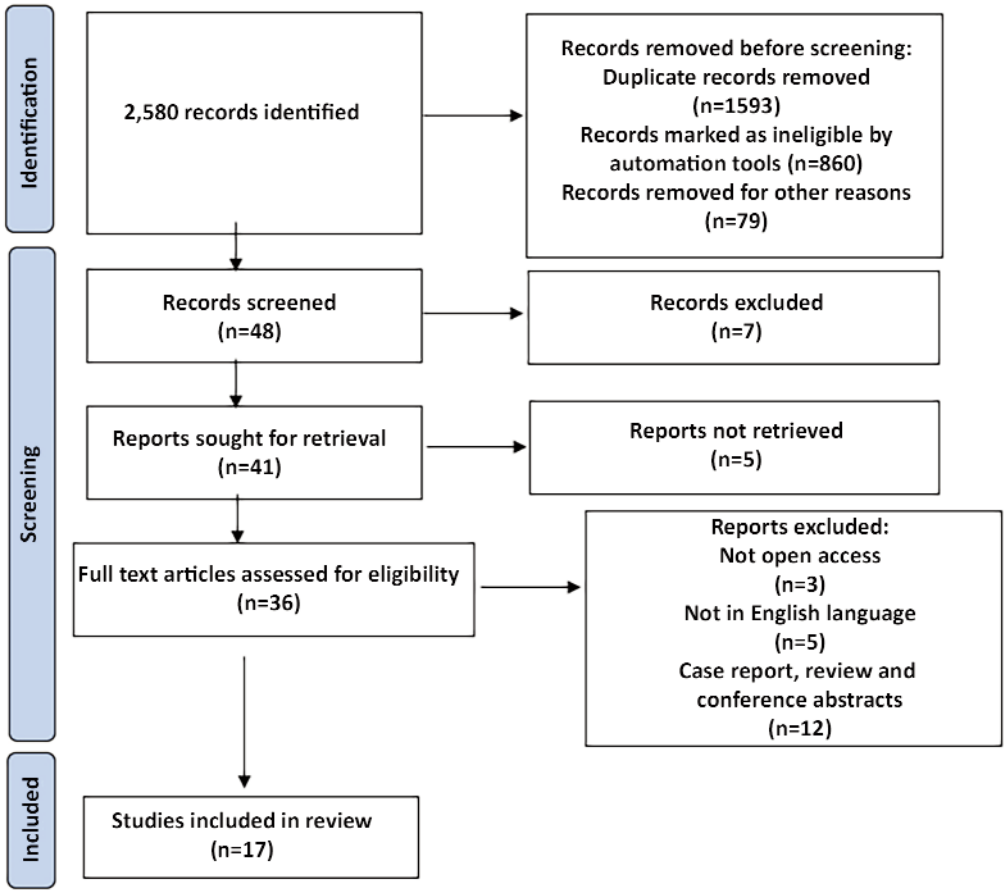

Figure 1. PRISMA 2020 flow diagram

Table 1. Summary of QoL findings by surgical technique (based on included studies)

Surgical approach	QoL instruments used	Main QoL trends reported
Breast-conserving surgery (BCT)	EORTC QLQ-C30/BR23, BREAST-Q	Better body image and emotional functioning vs mastectomy; higher satisfaction with breast appearance in oncoplastic BCT vs standard BCT; persistent but lower rates of sexual dysfunction than mastectomy without reconstruction
Mastectomy without reconstruction	EORTC QLQ-C30/BR23, SF-36, FACT-B	Lowest scores for body image and pain; high rates (40–60%) of persistent sexual dysfunction; a substantial proportion (≈31%) below functional thresholds on FACT-B; reduced physical functioning and role limitations on SF-36.
Mastectomy with implant - based reconstruction	BREAST-Q, SF-36	Improved satisfaction compared to simple mastectomy; some patients report physical discomfort (23–38%); SF-36 shows 12-point improvement in physical component scores and mental health above population norms; capsular contracture associated with decreased satisfaction.
Mastectomy with autologous reconstruction (e.g. DIEP flap)	BREAST-Q	Higher satisfaction scores (68–82 vs 54–72 for implants) and superior psychosocial well-being; better body image; however, associated with more complex surgery and higher complication risk.
Oncoplastic breast-conserving surgery	BREAST-Q (BCT module)	Significantly higher satisfaction with breast appearance (≈82 vs 65) compared to conventional BCT; clinically meaningful improvement in body image and QoL.
Cryoablation vs conventional BCT	BREAST-Q	Cryotherapy associated with higher patient satisfaction vs BCT (71.0 ± 18.6 vs 56.3 ± 16.5).
Immediate vs delayed breast reconstruction	BREAST-Q, SF-36	Immediate reconstruction associated with higher BREAST-Q satisfaction and better SF-36 physical health; delayed reconstruction linked to lower mental-health scores and lower satisfaction in some cohorts.

Table 2. Characteristics of Included Studies

Study	Country	Sample size	Mean Age	Surgery Type	QoL Instruments	Key Findings
Persichetti et al., 2022 (17)	Italy	325	51	Autologous vs Implant-Based Breast Reconstruction	BREAST-Q	DIEP leads to the highest satisfaction in all BREAST-Q scores compared to implant-based reconstruction.
Avino et al., 2022 (28)	Romania	25	44	Mastectomy ± Immediate or delayed breast reconstruction	SF-36	Breast reconstruction following mastectomy has a positive effect on the patient's quality of life.
Pačarić, et al., 2022 (29)	Croatia	79	51	Mastectomy ± Immediate or delayed breast reconstruction	SF-36	Patients without breast reconstruction rated their quality of life worse than patients who underwent immediate and delayed breast reconstruction after mastectomy.
Alghamdi et al., 2022 (18)	Saudi Arabia	100	48	Implant-Based Breast Reconstruction	BREAST-Q	Implant reconstruction associated with good satisfaction but some physical discomfort reported.
Zhou et al., 2022 (9)	France	127	50	BCS vs. Mastectomy	EORTC QLQ-C30, QLQ-BR23	Body image decrease post-surgery more observed after mastectomy.
Alvarez et al., 2022 (27)	Mexico	183	52	BCS vs. Mastectomy	EORTC QLQ-C30, QLQ-BR23	BCS shows better body image and emotional function than mastectomy.
Ghili et al., 2023 (19)	Italy	232	58	Oncoplastic surgery vs. conventional wide local excision	BREAST-Q	BREAST-Q BCT module is useful to evaluate patients' perception in terms of sexual, emotional, and psychosocial well-being following different surgical techniques.
El Haidari et al., 2023 (31)	Lebanon	120	54	BCS	EORTC QLQ-C30 EORTC QLQ-BR23	Surgery leads to significant changes in certain aspects of quality of life, such as physical function, emotional well-being, and body image.
Sala, et al., 2023 (20)	Italy	75	56	Post-mastectomy Implant-Based Breast Reconstruction	BREAST-Q	BREAST-Q is a functional and valid tool to assess the overall patients experience, satisfaction and relation with surgeon and medical staff.
Zhang et al., 2024 (21)	China	150	52	Delayed DIEP flap vs. Implant-Based Breast Reconstruction	BREAST-Q	DIEP flap reconstruction yields better long-term satisfaction and QoL without increased morbidity.
Afshar-Bakshloo et al., 2023 (26)	Germany	325	55	BCS vs. mastectomy ± immediate reconstruction	EORTC QLQ-BR23	Body- image deterioration in the long term after MIBR while improving after BCS.
Rampal et al., 2024 (22)	United Kingdom	78	50	Pre-pectoral- vs. sub-pectoral Implant-Based Breast Reconstruction	BREAST-Q	Equivalent clinical and patient-perceived outcomes between pre- and sub-pectoral immediate breast reconstruction.
Vasioiu et al., 2024 (30)	Romania	40	48	Mastectomy	FACT-B	Majority of patients scored below average in functional ability, indicating challenges in managing daily activities and overall performance.
Shah et al., 2024 (16)	India	120	42	Mastectomy	FACT-B	Individual patient factors, especially age, significantly impact quality of life outcomes.
Anya Romanoff et al., 2024 (23)	Nigeria	108	50	Mastectomy	BREAST-Q	PROMs following mastectomy were unchanged or better in most domains. Significant improvement was seen in patients with early-stage disease.
Matsumoto et al., 2025 (24)	Japan	147	56	BCS vs Cryoablation	BREAST-Q	Cryoablation led to significantly higher patient satisfaction compared to BCT in early-stage breast cancer patients.
Cătană et al., 2025 (32)	Romania	61	49	Prophylactic mastectomy	BREAST-Q	Analysis of quality of life following a prophylactic mastectomy reveals the significant physical and psychological changes that patients go through, underscoring the need for continued assistance, such as psychotherapy and routine follow-up care, to lessen the long-term effects of surgery.

Abbreviations: DIEP: Deep inferior epigastric perforator; BCT: Breast-conserving therapy; BCS:Breast-conserving surgery; BCT: Breast-conserving therapy; MST: Mastectomy; IBR:Immediate breast reconstruction; MIBR:Minimally invasive breast reconstruction

breast reconstruction and radiotherapy, analyzing BREAST-Q data showed that high proportions of patients reported maximum satisfaction levels with both the surgical outcome (72%) and the overall care received (73%) after breast reconstruction and satisfaction with the appearance of the breast and psychosocial well-being outcomes showed significant improvement in scores compared to pre-operative data, before reconstruction (22).

A study analyzing direct-to-implant (DTI) and tissue expander (TE)-based immediate breast reconstruction and comparing patient-reported outcomes concluded that multivariate regression analysis revealed no significant impact of DTI or TE on patient satisfaction or quality of life. Higher clinical staging was linked to lower psychosocial well-being scores (p=0.03). Patients receiving adjuvant chemotherapy showed increased psychosocial well-being (p=0.009) and greater satisfaction with their breasts (p=0.014). Among TE patients, longer follow-up correlated with improved physical well-being related to the chest (p=0.017). In the DTI group, capsular contracture was associated with a significant decline in breast satisfaction scores (23).

A three and twelve-month analysis of a PROM-Q study regarding comparison of patient-reported outcome measures in pre- vs. sub-pectoral implant-based immediate breast reconstruction, median BREAST-Q scores for pre- and sub-pectoral IBR showed that breast satisfaction has a score of 58 versus 48 (p=0.01), psychosocial well-being 60 versus 57 (p=0.9), and physical well-being 68 versus 76 (p=0.53). At 12 months, scores reflected a breast satisfaction score of 58 versus 53 (p=0.3), psychosocial well-being 59 versus 60 (p=0.9), and physical well-being 68 versus 78 (p=0.18). This study shows similar clinical and patient-reported outcomes between pre- and sub-pectoral IBR (24).

A study proved that early-stage breast cancer patients had significant increases in BREAST-Q scores at 6 months post mastectomy: psychosocial well-being rose from 60 to 67 (p=0.024), physical chest well-being from 13 to 27 (p<0.001), and breast satisfaction from 55 to 65 (p=0.031), while sexual well-being showed no significant change (29 to 24, p=0.3) However, late-stage patients showed no significant changes in psychosocial (66 to 67, p=0.6), physical (22 to 20, p=0.5), or breast satisfaction (58 to 52, p=0.13), but sexual well-being shifted from 42 to 25 (p<0.001), demonstrating an important decline (25).

A specific study regarding the comparison between cryoablation versus breast conservation therapy patient satisfaction in early-stage breast cancer proved that cryotherapy led to significantly higher patient satisfaction compared to breast-conserving treatment (BCT) in early-stage breast cancer patients (71.0±18.6 versus 56.3±16.5) in the primary outcome (26).

EORTC QLQ-C30 and QLQ-BR23:

Four studies utilized the EORTC system. It includes 23 items and is used alongside the QLQ-C30 to provide a comprehensive assessment of breast cancer patients' quality of life. Scores are calculated by averaging item responses within each scale and then transforming these averages to a 0–100 scale. For functioning scales and global health, higher scores indicate better quality of life, while for symptom scales, higher scores reflect greater symptom severity. The QLQ-BR23 complements the QLQ-C30 with breast cancer-specific items, providing a detailed and sensitive measure of patient well-being (27).

One study found 15-22% better body image scores with breast-conserving surgery versus mastectomy. Significant emotional function differences favoring breast conservation approaches, as well as persistent sexual dysfunction in 40-60% of mastectomy patients without reconstruction (28).

Another similar study showed that at baseline, 64% of women had the highest body image score, with a drop by 15 points after surgery (p<0.001). Meanwhile, the future perspective score increased by 5 points (p<0.01), and emotional functioning also improved significantly (p<0.05) after surgery (9).

A third study shows that body image was statistically higher in the BCT group with respect to MST as well as the scores on the item sexual enjoyment, although without significant differences; and the BCT group was higher than the EORTC reference values 82.98 ± 22.87 (29).

SF-36:

Two studies used the SF-36 questionnaire. This instrument measures eight critical dimensions: physical functioning, bodily pain, role limitations due to physical health or emotional problems, general health perceptions, and energy. It contains 36 questions measuring eight health domains. Each domain is scored 0-100 (higher=better health). It calculates Physical and Mental Component Summary scores (mean=50, SD=10) but no overall score (11).

A study found and reported a 12-point improvement in physical component scores with reconstruc-

tion, and mental health scores 9 points above national norms in reconstructed patients, and that reconstruction following mastectomy has a positive effect on the patient's quality of life (30).

A second study showed that patients who underwent a mastectomy had the lowest scores in the domain of pain 18.8 (6.3–31.3) in physical functioning and limitation due to emotional difficulties 16.7 (8.3–33.3) in mental health. In immediate breast reconstruction, patients rated better physical health ($p<0.001$), while patients who underwent delayed breast reconstruction rated their mental health worse ($p<0.001$) (31).

FACT-B:

Two studies used the FACT-B questionnaire. It includes core domains relevant to cancer, with additional items addressing breast cancer-specific concerns, providing a holistic view of the patient's well-being. It measures physical, social, emotional, functional, and breast-specific concerns through a simple summation of Likert items (0-4), yielding subscale and total scores (0-144) where higher values reflect better quality of life. Subscale scores are summed from item responses, and the total score is the sum of all subscales. Higher scores correspond to a better quality of life. Missing items are handled by prorating subscale scores based on the average of completed items, ensuring consistency in scoring (27).

One study regarding factors affecting QoL in BC patients following mastectomy showed that physical well-being had the lowest mean score (2.71±1.29), whereas emotional well-being had the highest (1.92±1.24) post-surgery. Among sociodemographic factors, age showed a significant association with QoL (p-0.045) while there was no significant association with marital status, educational status, or socioeconomic status (16).

Another study using the FACT-B questionnaire reported that 31% of patients who underwent mastectomy fell below established functional ability thresholds, with a significant correlation ($r=0.42$) observed between physical and social well-being domains (32).

Study Limitations

This systematic review has several limitations that must be acknowledged.

First, the heterogeneity of study designs, populations, and QoL instruments prevented the conduct of a quantitative meta-analysis, limiting the ability to directly compare effect sizes between surgical techniques.

Second, most of the included studies were observational and differed in terms of adjustment for confounders such as age, stage of disease, adjuvant therapies, and comorbidities, which may introduce selection and information bias.

Third, publication bias cannot be excluded, as studies with statistically significant or favorable QoL outcomes are more likely to be published and indexed in major databases.

Fourth, although the present review covers the period 2022-2025, the geographical distribution of studies is skewed, with overrepresentation of high-resource countries and underrepresentation of low- and middle-income settings.

Finally, the timing of postoperative QoL assessment varied widely between studies (from a few months to several years after surgery), which may influence comparability of results and the interpretation of longitudinal changes.

Despite these limitations, this review provides an up-to-date and comprehensive synthesis of QoL outcomes after breast cancer surgery, integrating evidence from multiple validated PROMs and highlighting areas for future research and clinical implementation.

Discussion

Quality of life assessment constitutes a fundamental component of breast cancer management, aiding personalized therapeutic strategies and survivorship care. Surgical interventions, particularly breast reconstruction, have been demonstrated to enhance QoL by preserving body image and psychological well-being; nevertheless, complex reconstructive procedures are associated with increased complication rates, necessitating rigorous patient selection and preoperative counseling (33).

Among the most validated and widely employed instruments for QoL evaluation in breast cancer populations are the BREAST-Q and the European Organization for Research and Treatment of Cancer questionnaires – namely, the EORTC QLQ-C30 and its breast cancer-specific modules QLQ-BR23 and the recently updated QLQ-BR45, as well as SF-36. These instruments collectively provide a multidimensional appraisal of symptom burden, functional capacities, psychosocial status, and overall quality of life (34).

A comparison of QoL instruments used in BC surgery studies is detailed in *Table 3*.

Internationally, the BREAST-Q questionnaire has emerged as an essential patient-reported

Table 3. Comparison of QoL instruments used in breast cancer surgery studies in this review

Instrument	Number of studies	Main domains covered	Strengths in this review	Limitations in this review
BREAST-Q	9	Satisfaction with breasts, surgeon, information; psychosocial, physical, sexual well-being	Highly sensitive to differences between surgical techniques (autologous vs implant, oncoplastic vs standard BCT); captures body image and satisfaction with reconstruction	Limited cross-study comparability due to different modules and scoring contexts; proprietary scoring software
EORTC QLQ-C30 / BR23	4	Global QoL, functional scales, symptom scales; body image, sexual functioning, treatment side-effects	Well-validated, widely used; allows comparison with reference values; useful for symptom burden and body image	Less specific for esthetic outcomes; sexual functioning frequently impaired after mastectomy without reconstruction
SF-36	2	Physical functioning, pain, role limitations, mental health	Captures general physical and mental health; useful for comparing with population norms; detects impact of reconstruction on physical and mental summary scores	Generic tool; may miss breast cancer-specific concerns such as body image or fear of recurrence
FACT-B	2	Physical, social/family, emotional, functional well-being; breast-specific concerns	Provides a holistic view of QoL; sensitive to functional impairment and association between physical and social well-being	Limited number of recent surgical studies; some redundancy between subscales

outcome measure for assessing satisfaction and QoL following breast surgery, including reconstructive procedures (35). The formal translation and cultural adaptation of the instrument into Romanian have recently been accomplished, thereby facilitating its valid application within Romanian clinical settings and enabling accurate evaluation of surgical outcomes and patient experiences in this population.

Romanian investigations employing the BREAST-Q have substantiated its utility. A cohort study involving 620 breast cancer patients treated between 2022 and 2024 within private healthcare networks in Bucharest utilized the Romanian version of the BREAST-Q to elucidate significant correlations between surgical approaches and QoL outcomes, underscoring the necessity of individualized patient-centered care (36).

The EORTC QLQ-C30 and its breast cancer-specific modules have been extensively applied in Romania to assess QoL among patients with metastatic disease and those undergoing chemotherapy. For instance, a prospective study conducted in Bucharest documented substantial symptom burden and impairments in functional domains, highlighting the imperative for comprehensive supportive care interventions (37).

Complementary cross-sectional research utilizing the QLQ-BR45 module during chemotherapy further corroborated the significant physical and emotional challenges faced by this patient population (34).

The SF-36 questionnaire has also been employed in Romanian breast cancer research to evaluate general health-related QoL. A study conducted between 2014 and 2015 with mastectomy patients revealed marked limitations in physical functioning and the detrimental impact of bodily pain on daily activities. Moreover, a significant association was identified between antecedent psycho-emotional trauma and current health status, emphasizing the importance of integrating psychological support into post-mastectomy care (38). A subsequent prospective study in 2021 demonstrated that breast reconstruction confers improvements in QoL, particularly among younger patients, although some subjects reported only moderate perceptions of health postoperatively, indicating a potential need for enhanced rehabilitative care (39).

The WHOQOL-BREF instrument has been validated for use within Romanian breast cancer populations and has been instrumental in capturing broad QoL domains, including psychosocial well-being. Studies conducted in 2018 and 2020 identified demographic variables such as age and disease stage as significant determinants of QoL scores, while highlighting the protective effect of social support. Persistent psychological distress documented in these cohorts underscores the critical need for psycho-oncological services integration within oncology care pathways. Further observational research in 2021 confirmed substantial challenges in emotional and social well-being, advocating for the implementation of tailored psychosocial interventions for breast cancer survivors in Romania (40).

In conclusion, Romanian breast cancer QoL research aligns with international evidence, affirming the relevance of culturally adapted, validated instruments such as the Romanian-

translated BREAST-Q. Future initiatives should focus on broadening the implementation of electronic patient-reported outcome measures, expanding multicenter collaborations, and developing integrated survivorship care models to optimize patient outcomes.

While established instruments such as the EORTC QLQ-C30 and BR23 and the FACT-B continue to demonstrate robust validity, the field is moving towards the development of more specialized and electronically administered tools. Future advancements should prioritize improving accessibility, ensuring cultural adaptation, and enhancing integration with electronic health records for more effective QoL assessments in breast cancer care (34).

Combining quantitative and qualitative methods, as well as incorporating digital health tools, can provide a comprehensive assessment of QoL. Mixed-methods approaches can enhance understanding by cross-validating findings, identifying discrepancies between self-reported data and clinical assessments, and tailoring interventions to meet individual patient needs (10).

It is important to highlight several major validated instruments that have been extensively used in assessing QoL among breast cancer patients. One of the most prominent tools is the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-C30, alongside its breast cancer-specific module, QLQ-BR23. These instruments, together with BREAST-Q, remain widely utilized, showing strong validity and reliability across diverse populations. The QLQ-BR23, which consists of 23 items, directly addresses concerns related to breast cancer and has been validated in multiple languages and cultural settings.

The Breast-Q has proven useful in capturing the impact of surgical interventions on patients' quality of life and is supported by extensive psychometric testing. Moreover, it allows for nuanced insights into patients' perceptions and experiences related to body image and femininity, making it a critical tool in breast cancer care (41).

A retrospective study performed in New York which started in 2011 and ended in 2021, included 5673 patients completing either the preoperative or the one-year postoperative BREAST-Q, results highlighted the effectiveness in capturing patient experiences, particularly in relation to body image and femininity (41).

A longitudinal study performed in a hospital in Turkey explored the long-term quality of life in patients who underwent breast conservation versus mastectomy and reconstruction. The BREAST-Q was used to measure physical, psychosocial, and sexual well-being over time, providing a comprehensive view of patient outcomes years after surgery (42).

In Romania, QoL assessment in patients undergoing mastectomy and breast reconstruction for moderate penetrance gene-related BC was carried out. A cohort of 620 breast cancer patients treated at a private health network, in Bucharest, between January 2022 and July 2024 was identified. The study highlighted the relationship between surgical choices and quality-of-life factors, advancing personalized prevention strategies and emphasizing patient-centered care (36).

Another study made in Australia demonstrated the BREAST-Q's ability to reliably measure satisfaction and well-being in breast cancer patients post-surgery. Its rigorous development and psychometric testing ensure that it provides nuanced insights into patients' psychosocial and physical well-being (18).

The instrument demonstrates particular strength in several key areas. Regarding comprehensive assessment, it provides detailed evaluation of satisfaction and quality of life outcomes, particularly in breast reconstruction settings.

In the context of electronic implementation, recent studies have shown successful integration of BREAST-Q as an electronic PROM (ePROM), enhancing data collection efficiency. The tool includes specific modules for different types of breast surgery, allowing targeted assessment based on procedure type.

SF-36 is a widely used tool, and recent studies highlight its utility in capturing general health status but note limitations in addressing breast cancer-specific concerns. It is frequently used in international studies due to its availability in numerous languages (12).

Studies have shown that breast cancer and its treatments can significantly affect patients' quality of life, leading to declines in physical functioning, increased pain, fatigue, and emotional distress. This instrument allows researchers to quantify these changes and assess the effectiveness of interventions aimed at mitigating these negative effects. Specific studies have highlighted the ability of SF-36 to detect low levels of unwellness in breast cancer patients, even in those who have scored relatively well on other health measures such as the Nottingham Health Profile (43).

SF-36 was first used in China, to evaluate the QoL in BC patients, where its use demonstrated that the Chinese version of the SF-36 v2 had acceptable psychometric properties and suitability for use in women with breast cancer (14).

In Romania, the utilization of the SF-36 questionnaire, facilitating the measurement of quality of life of breast cancer patients, is an area of interest. Several studies report the use of SF-36 as a reliable instrument in evaluating the QoL of BC patients. A study was carried out between October 2014 - January 2015, on a sample of 23 patients with mastectomy, using the SF-36 Questionnaire in a single visit, with direct questioning of patients. A secondary instrument was a general anamnestic questionnaire referring to age group, area of residence, type of surgery, associated diseases, family history, and psycho-emotional traumas (38). The findings from the study indicated that nearly half of the participants experienced limitations in engaging in vigorous and moderate activities after surgery. Additionally, bodily pain was reported to affect their work and normal activities. The study also found that both physical and emotional health significantly influenced the social activities of the patients, with more than half reporting that these factors impacted them most of the time or some of the time. Furthermore, a positive correlation was observed between the existence of psycho-emotional traumas in the patients' histories and their current physical health or emotional issues (38). A recent prospective study, performed in 2021, involving 25 female patients who underwent breast reconstruction after mastectomy had been documented. The research evaluated patients who received either immediate or delayed reconstruction 3 months following the intervention, using the SF-36 questionnaire as one of the primary assessment tools (30). The distribution of health ratings among the patients indicated varying perceptions of their health and quality of life post-surgery. The findings suggest that breast reconstruction significantly enhances the quality of life, especially for younger women. This implies that not only does reconstruction provide physical restoration, but it may also contribute positively to emotional and psychological well-being. Although a majority of the patients rated their general health as good or very good, the small number who rated it as excellent (only two participants) may indicate that there is room for improvement in post-operative care and support. There is a particular significance in the use of SF-36, as it has been recognized as one of the most common questionnaire instruments, being used in 32.3% of breast reconstruction studies (44).

The SF-36 is valued for its comprehensive approach and ability to compare health outcomes across different conditions. While this generic tool has proven useful, recent research suggests that it may not capture the nuanced experiences faced by breast cancer patients (13). The non-specific nature of the questionnaire means it might miss crucial aspects of the breast cancer experience, such as body-image concerns, fear of recurrence, treatment-specific side effects, and the unique psychological impact of this diagnosis. This limitation has driven the development of specialized questionnaires designed specifically for breast cancer assessment. The development of these tailored questionnaires represents an important evolution in patient assessment. While the SF-36 continues to serve as a valuable baseline measure, complementing it with breast cancer-specific tools provides a more complete picture of BC patient health and well-being. This combined approach ensures that healthcare providers can better understand and address the full spectrum of challenges faced by breast cancer patients.

The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire remains a center of interest in breast cancer QoL assessment. Recent validation studies have confirmed its continued reliability across diverse populations. The breast cancer-specific module, QLQ-BR23, has shown particular strength in capturing treatment-related symptoms and concerns.

A study conducted in Germany in 2021 investigated how curative breast cancer surgery affects patient satisfaction regarding cosmetic results and overall quality of life. This research utilized the QLQ-BR23 to capture the nuanced changes in patients' perceptions post-surgery. Patient satisfaction was initially at its lowest immediately after surgery, but showed improvement in the months that followed, even though breast asymmetry persisted. Among mastectomy patients, those with a lower volume of tissue removed reported greater satisfaction with their cosmetic outcomes (35).

These questionnaires are well-validated and sensitive to changes in status, making them effective for both clinical and research purposes.

The integration of electronic patient-reported outcome measures in breast cancer care has emerged as a vital trend, highlighting the importance of technological advancement in the field. Recent studies demonstrate that the use of electronic QoL assessment tools has not only

improved the efficiency of patient monitoring but has also enhanced the accuracy of QoL data collection, particularly in metastatic breast cancer scenarios (20).

Moreover, emerging trends signal the development of the EORTC QLQ-BR45, an updated version of the QLQ-BR23. This improved instrument has been designed to address the evolving needs of breast cancer care, incorporating additional items that capture contemporary treatment-related issues and survivorship concerns more effectively.

A focus on special populations has also emerged from the review, particularly concerning geriatric assessment. Recent findings underscore the necessity for specialized QoL evaluations in elderly breast cancer patients, suggesting that traditional QoL instruments may require adaptations to suit this demographic.

Furthermore, the importance of cultural adaptation and validation of QoL instruments was highlighted, with multiple studies showcasing efforts to validate translated versions in various cultural contexts, ensuring that assessments are appropriate and relevant for different populations.

A cross-sectional study was conducted from August 1, 2022, to July 31, 2024, at a tertiary care center in India. The study included 120 women who were above 18 years of age with breast carcinoma and undergoing chemotherapy post-mastectomy. Participants were assessed using the Functional Assessment of Cancer Therapy - Breast questionnaire to evaluate their quality of life. Factors like sociodemographic variables, physical, emotional, social, and functional well-being were analyzed for the assessment of quality of life (16). The study highlighted that individual patient characteristics, particularly age, may play a more prominent role in influencing QoL outcomes in BC patients.

An updated version, QLQ-BR45, has been developed to address contemporary treatment-related issues. It is worth mentioning that the EORTC QLQ-BR42 introduction coincided with the COVID-19 pandemic (45), this timing presented unique challenges and considerations for its deployment and validation, as healthcare systems worldwide were under significant strain. Despite these challenges, the updated module aimed to provide a more comprehensive tool for assessing quality of life in breast cancer patients, reflecting both advancements in treatment and the evolving needs of patients. The pandemic context underscored the importance of understanding and supporting patients' quality of life, especially as healthcare resources were stretched and access to care could be impacted. However, the recent use of this instrument provides a more comprehensive view, enabling clinicians and researchers to better understand the specific challenges faced by breast cancer patients.

WHOQOL-BREF is effective in capturing quality of life across multiple domains, including physical health and psychological well-being, and has been validated in diverse cultural contexts. Research emphasizes its strength in providing a broad QoL assessment but does not search deeply into breast cancer-specific issues (46).

Research has shown that physical activity can have a positive impact on the quality of life of women with breast cancer, both during and after treatment. According to a study performed in 2016 in Brazil including 215 BC patients between the ages of 40 and 65, evaluating the relationship regarding levels of physical activity, fatigue and QoL with the use of WHOQOL-BREF as a mean for measuring QoL, concluding that there is a significant association between physical activity levels and overall QoL across all WHOQOL-BREF domains ($p<0.001$) (17). This relationship has been further supported by clinical research showing that exercise programs can significantly improve the quality of life in breast cancer survivors.

A study performed in Romania in 2018 using this questionnaire, including 150 patients diagnosed with breast cancer, found that demographic factors like age and stage of disease significantly impacted their quality of life, as measured by WHOQOL-BREF. Patients with better social support reported a higher quality of life (47). In 2020, another assessment was made through evaluating 120 breast cancer patients. In this study, researchers noted lower quality of life scores, particularly in physical and psychological domains. The study highlighted the need for integrated care that includes mental health support to address treatment-related side effects. In 2021, an observational study assessed 200 oncology patients, including 80 breast cancer patients, and found significant challenges in psychological wellness and social support. The findings stressed the importance of tailored interventions to improve both physical and emotional well-being.

This instrument helps measure the overall quality of life in breast cancer patients. It can be used to track changes in quality of life over time, especially before, during, and after treatment (like

surgery, chemotherapy, or radiotherapy). It helps in understanding the impact of treatment on patients' daily lives.

The international landscape of breast cancer quality of life research reveals a nuanced and complex application of the WHOQOL-BREF instrument across diverse cultural contexts. The World Health Organization's extensive review spanning 25 years has consistently emphasized the applicability of the instrument in cancer research. This strength of the instrument lies in its generic yet comprehensive approach.

Conclusions

Quality of life represents a crucial parameter in patients with breast cancer, particularly in the context of the increased life expectancy observed as a result of advancements in therapeutic strategies.

The assessment of quality of life through standardized questionnaires constitutes a validated and reliable method, providing essential data for understanding the physical, psychological, and social impact of the disease and its treatment. This approach facilitates the identification of specific needs, supports the optimization of therapeutic management, and contributes to the development of patient-centered care strategies. Most validation studies focus on developed healthcare systems. There is limited long-term follow-up data in some newer implementation strategies, and potential selection bias in electronic PROM studies can occur. There is a need for more research in underserved populations.

To enhance the effectiveness of QoL assessment tools, regular validation of existing instruments across diverse populations is recommended. Additionally, developing more specialized modules tailored to specific patient subgroups will be crucial. Integrating QoL assessment tools with electronic health records and establishing standardized protocols for routine QoL assessments in clinical practice will further optimize the care provided to breast cancer patients.

Development of more integrated electronic assessment systems and the creation of culturally adapted versions for underserved populations, along the standardization of implementation protocols across different healthcare settings.

Among the instruments used for assessing QoL, the BREAST-Q has proven particularly valuable for its strong focus on surgical outcomes and patient satisfaction, especially in breast reconstruction cases. The EORTC QLQ-BR23 offers a comprehensive approach to capturing treatment-related symptoms and functional limitations. Additionally, the FACT-B provides a robust measure of overall quality of life, with particular emphasis on psychosocial well-being. These instruments offer complementary perspectives and their combined application supports a multi-dimensional understanding of quality of life in breast cancer patients and directions for future guidelines for improving QoL.

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