Review Article on Patient Reported Outcomes in Breast and Glandular Surgery

A systematic review of patient reported outcome measures for women with macromastia who have undergone breast reduction surgery

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Abstract: Patient satisfaction and outcomes following reduction mammoplasty is important to measure, being a being a reconstructive procedure with physical and cosmetic benefits. This study aimed to evaluate patient satisfaction and the various questionnaires that have been devised for this measurement. A systematic search of literature was performed in PubMed, Cochrane Library, Medline and Scopus databases from 1966 to July 2018 according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. After application of pre-determined inclusion criteria by two authors, 95 articles were included. Data was extracted from included studies relating to demographics, surgical technique, questionnaires used and physical, psychological and aesthetic outcomes. Of the 95 studies included (9,716 patients), 58 studies (5,867 patients) reported on overall satisfaction with a mean rate of 90.26%. Researchers' own non-validated questionnaire was most commonly used in 52.6% of studies. Validated questionnaires used were most commonly the SF-36 (25.3%), Rosenberg self-esteem scale (RSES) (9.5%) and BREAST-Q (8.4%). All showed improvement in physical and mental health. Our findings suggest that women who have undergone reduction mammoplasty for breast hypertrophy report postoperative satisfaction and improvement in quality of life. Of the validated questionnaires used, a combination of those assessing both mental, physical and psychosocial health as well as breast-specific surveys were most commonly used and may provide an accurate assessment of patient outcomes.

Keywords: Breast; plastic surgery; personal satisfaction

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Introduction

Reduction mammoplasty is one of the most common breast operations performed. The cosmetic and psychological impacts of macromastia include being unable to find fitting clothes and low self-esteem. The motivation for surgery is commonly for resolution of physical symptoms caused by the heaviness and size of breasts such as back, neck and shoulder pain, intertrigo and shoulder grooving by bra straps (1).

Patient reported outcome measure (PROM) questionnaires that assess patient perceptions of reduction mammaplasty surgery and satisfy accepted health

Table 1 Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Patient-reported outcome questionnaire	Surgery for oncological or congenital asymmetry
Patients undergoing bilateral reduction mammoplasty	Non-English studies
Measure breast related quality of life and/or satisfaction	

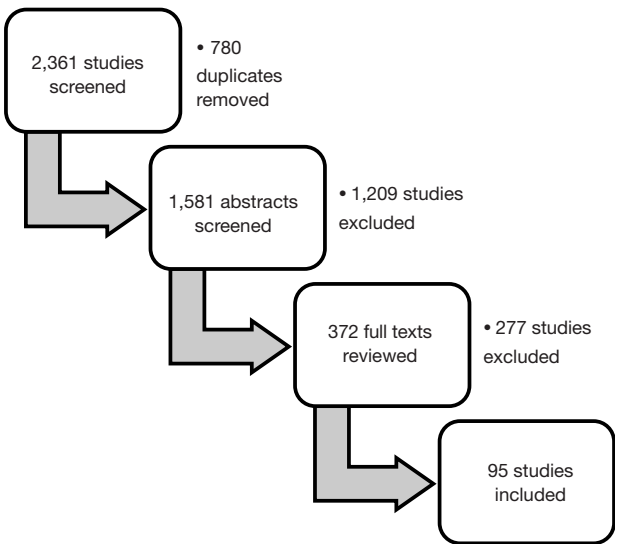

Figure 1 Search strategy.

measurement criteria are needed. They can provide quantitative data to support government funding for reduction mammoplasty, aid surgeons in seeking to improve outcomes in their own practice and evaluate techniques.

The primary aim of this systematic review was to assess whether reduction mammaplasty is associated with measurable patient benefit and the secondary aim was to find which PROM questionnaire best evaluates patient satisfaction.

Methods

This review adheres to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (2).

Search strategy

An electronic literature review was conducted using the PubMed, Cochrane, SCOPUS and Medline databases for publications dated from 1966 to July 2018. Initial searches using the following MeSH terms were used: ("breast reduction" OR "reduction mammaplasty") AND ("treatment outcome" OR "personal satisfaction" OR "outcome assessment" OR "quality of life" OR "quality-of-life" OR "questionnaire" OR "outcome" OR "satisfaction" OR "instrument" OR "survey" OR "assessment").

Once the search results were obtained, duplicate articles were removed. If authors/groups with multiple papers on the same topic existed, we then included the most recent study to avoid duplication of cases being analysed. A review of titles, abstracts and/or full article details were then reviewed by two authors (SL, RS) in order to determine article suitability, according to inclusion criteria. The predetermined inclusion criteria were articles which addressed bilateral reduction mammoplasty (not symmetrising or post-cancer) and reported patient satisfaction or quality of life based on outcome questionnaires (*Table 1*). The search results were further restricted to English language articles only. A graphic representation of the search strategy is summarized below (*Figure 1*).

Statistical analysis

Data was extracted from each study pertaining to demographics, questionnaire used, surgical technique and satisfaction including components of physical, psychological and functional outcomes.

Results

While the search yielded 2,361 studies, only 95 met the inclusion criteria (3-27), representing 9,716 patients (28-52) as summarized in *Table 2* (53-77). Overall, the mean age was 37.8 years, body mass index (BMI) 28.0, and combined tissue resection mass was 1,402.9 g (78-97). Fifty-eight (4,5,9-31) studies listed overall satisfaction (33-39,41,42,44-46,48,50,52-58,60,61) as primary endpoint, including 5,867 patients (65-68,78 80,83,85,91,93). Grouped data found overall satisfaction to be 90.3% (range, 67.6–100%).

Table 2 Study characteristics and overall satisfaction

Category	Total	Overall satisfaction
Studies	95	58
Number of patients	9,716	5,867
Satisfaction	–	90.3% (67.6–100%)
Mean age, years	37.8	–
Mean BMI	28.0	–
Mean resection weight (grams)	1,402.9	–

BMI, body mass index.

Unvalidated PROM questionnaires used most commonly were individually developed by research groups (52.6%). Of validated questionnaires used, most commonly was the Short Form 36 (SF-36) (25.3%) (6-8,20,23,24,31,33,34,42,43,47,49,51,56,62-64,70,74,80,92-94), followed by the Rosenberg self-esteem scale (RSES) (9.5%) (23,42,49,51,56,62,63,77,80), then BREAST-Q (8.4%) (17,22,25,30,39,58,71) (*Table 3*).

Grouped data found the most commonly used pedicle was inferior (1,418 cases) associated with overall satisfaction of 87.4% (*Table 4*). Vertical pedicle, used in 210 cases, was associated with highest satisfaction (97.9%). In terms of skin excision pattern, wise pattern was most commonly used, with mean overall satisfaction of 85.5% (*Table 5*). Horizontal scar [no vertical scar (45)] technique was associated with highest satisfaction (97%).

All studies using BREAST-Q reported satisfaction and improvements in physical and psychological quality of life (17,22,25,30,39,58,71). Reported satisfaction ranged from 76.0% to 95.0%. Reported relative rates of improved physical quality of life ranged from 48.15% to 90.61%. Reported absolute rates of improved psychological quality of life ranged from 76.37% to 84.54%.

Studies using the RSES reported improvements in self-esteem with rates between 12.9% to 17.9% (23,42,49,51,56,62,63,77,80).

All studies using the SF-36 reported improvement in bodily pain with rates between 22.34% to 83.33% (6-8,20,23,24,31,33,34,42,43,47,49,51,56,62-64,70,74,80,92-94). They reported improvement in physical quality of life by 10.38% to 33.24% and psychological quality of life by 3.33% to 33%.

Discussion

Our findings show that the vast majority of patients were happy with their breast reduction procedure, with an overall satisfaction rate of 90.3% amongst patients whose satisfaction was directly measured. While the most common techniques are inferior pedicle and wise-pattern skin resection, highest satisfaction was found with vertical pedicle and horizontal scar; however, these were small sample groups. Regardless of technique, it appears that the cosmetic and physical benefits of reduction mammoplasty are universal.

Despite the plethora of information-seeking methods utilized, the results of our analysis clearly showed that patients felt an overall improvement in their quality of life after breast reduction compared to before. In almost all studies, patients reported improvements in the vast majority of premorbid symptoms, a finding consistent with previous reviews of this subject (98). Other studies have also found that breast reduction had positive effects on depression and sexual function (99), as well as led to a significant improvement in lung function tests with a positive correlation between amount of breast tissue resected and improvement in expiratory capacity (100).

A wide range of questionnaires were captured in the studies investigated in this systematic review. Over half utilized unvalidated surveys, focusing on aspects of patient outcomes specific to their study. In the remaining studies, the SF-36 was used most frequently, followed by the RSES and BREAST-Q. There is significant overlap between these surveys in terms of information sought; both SF-36 and BREAST-Q focus on general physical and psychosocial health, with RSES providing additional questions pertaining to the latter. BREAST-Q also focuses on breast-specific details such as the appearance of their breasts as well as the patients' satisfaction with the procedure and the care they received from their healthcare providers and team (101-103). While it is difficult to say which questionnaire

Table 3 Patient reported outcome measures used

Patient reported outcome measure	Frequency of use by studies, n (%)
Own questionnaire	50 (52.6)
Short Form 36 (SF-36)	24 (25.3)
Rosenberg self-esteem scale (RSES)	9 (9.5)
BREAST-Q	8 (8.4)
Breast-Related Symptoms Questionnaire (BRSQ)	5 (5.3)
15D Quality of Life Questionnaire	5 (5.3)
Kerrigan 13 Symptom Inventory Questionnaire	4 (4.2)
EuroQoL (EQ-5D)	3 (3.2)
Finnish Breast-Associated Symptoms Questionnaire (FBAS)	3 (3.2)
Health Utilities Index Mark 3(HUI3)	3 (3.2)
Body Dysmorphic Disorder Examination Self-Report (BDDE-SR)	2 (2.1)
Finnish Pain Questionnaire (FPQ)	2 (2.1)
Functional assessment of non-life threatening conditions V4 (FANLT)	2 (2.1)
Health Utilities Index Mark 2 (HUI2)	2 (2.1)
Hospital Anxiety and Depression Scale (HADS)	2 (2.1)
Multidimensional Body-Self Rating Questionnaire (MBSRQ)	2 (2.1)
Multidimensional Body-Self Rating Questionnaire Appearance Assessment (MBSRQ-AS)	2 (2.1)
Raitasalo's modification of the Beck's depression inventory (RBDI)	2 (2.1)
Anamnestic Comparative Self Assessment (ACSA)	1 (1.1)
Berliner Stimmungsfragebogen - "Mood Questionnaire" (BSF)	1 (1.1)
Body Satisfaction Scale (BSS)	1 (1.1)
Breast Chest Ratings Scale (BCRS)	1 (1.1)
Body Image Questionnaire (BIQ)	1 (1.1)
Breast Reduction Assessed Severity Scale (BRASS)	1 (1.1)
Colour-a-Person Body Dissatisfaction Test (CAPT)	1 (1.1)
Derriford Appearance Scale (DAS-59)	1 (1.1
Digital-Body-Photo-Test (DBPT)	1 (1.1)
Eating Attitudes Test-26 (EAT-26)	1 (1.1)
Eating Disorders Inventory (EDI-2)	1 (1.1)
Eysenck Personality Questionnaire (EPQ)	1 (1.1)
Eysenck Personality Questionnaire Revised (EPQ-R)	1 (1.1)
General Health Questionnaire (GHQ-28)	1 (1.1)
Gießener Beschwerdebogen - "Gießener Complaint sheet" (GBB)	1 (1.1)
Hamilton Anxiety Rating Scale (Ham-A)	1 (1.1)
Hamilton Rating Scale for Depression (Ham-D)	1 (1.1)

Table 3 (*continued*)

Table 3 (*continued*)

Patient reported outcome measure	Frequency of use by studies, n (%)
Index of Female Sexual Function (IFSF)	1 (1.1)
International Index of Erectile Function (IIEF)	1 (1.1)
Lebenszufriedenheitsinventar - “Life satisfaction inventory” (LZI)	1 (1.1)
Likert Scaling System	1 (1.1)
Mammary Hypertrophy Symptom-Specific Questionnaire	1 (1.1)
NASS Lumbar spine outcome assessment (NASS-LS)	1 (1.1)
Roland-Morris Questionnaire	1 (1.1)
Self-Consciousness Scale (SCS)	1 (1.1)
Stanford Health Assessment Questionnaire (HAQ-20)	1 (1.1)
WHO Quality of Life Assessment (WHOQOL-BREF)	1 (1.1)

Table 4 Pedicle used and satisfaction

Surgical technique (pedicle type)	Total number of patients	Overall mean satisfaction %
Superior pedicle	430	91.7 [80–100]
Superomedial pedicle	321	86.0 [76.03–100]
Medial pedicle	211	85.3 [80–94]
Lateral	104	94.6 [94–95]
Inferior pedicle	1,418	87.4 [72–100]
Central pedicle	56	84.6
Vertical pedicle	210	97.9
Vertical bipedicle	251	95.2 [88.9–100]
Horizontal bipedicle	340	90.3 [87–95]
Free nipple-areola	161	94.8 [88.9–97.9]
Total	3,502	90.8

Table 5 Skin pattern excision and satisfaction

Skin pattern excision	Total number of patients	Overall mean satisfaction %
Wise pattern	899	85.5
Vertical scar	188	81.1
J/L scar	10	86.7
L short-scar	65	92.3
Horizontal	127	97
Short-T scar	30	86.7
Regnault (B-shaped incision)	60	93.3
Total	1,379	88.9

is best suited to a particular research question, it appears that those that cover a wide range of factors involved in determining quality of life were most often used, and can be useful when added to a breast-specific questionnaire to determine factors directly affected by the surgery. Most studies used more than one questionnaire and combinations, such as the use of SF-36 and BREAST-Q offers a broad assessment of patient outcomes in terms of physical, psychological and breast symptoms.

In terms of timing of assessment of patient satisfaction, studies have shown no significant differences in PROM scores at time points of less or greater than 3 months post-operatively (104). It has previously been demonstrated that patients have sharp improvement in quality of life in the immediate post-operative period when experiencing the immediate relief of physical loss of breast weight (25). Patients continue to show satisfaction in the following months as they benefit both physically and psychologically from the surgery once the healing process is completed.

This study has a number of strengths, including a comprehensive search strategy encompassing multiple major medical databases, which increases the likelihood that our systematic review included as many relevant articles as possible. The large number of studies we identified led us to be able to appreciate trends and formulate robust conclusions from the presented data. Duplicate author screening and selection of articles ensured that as many relevant articles as possible were included and a comprehensive data extraction process, performed by two authors, aimed to reduce chance of error and bias.

Limitations to our study included somewhat heterogeneous questionnaire use and variable target outcomes, which made it more difficult to combine and interpret data. A significant portion of patients in some studies was also lost to follow up, possibly introducing bias to the results; for instance, patients who had no issues with their surgery may not have bothered to provide feedback. Nevertheless, we covered a broad range of patient outcomes and almost all studies reported on patient satisfaction with their breast reduction procedure, which was our major focus.

Conclusions

Reduction mammoplasty led to higher PROM scores compared to before the procedure, which is consistent with previous studies. Patients noted improvements in both physical and mental health. PROM questionnaires that address multiple aspects of health appear to be preferred by most authors. When combined with breast-specific questions, validated PROMs may provide a more accurate assessment of pre- and post-operative quality of life.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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