



2023

Section: General Surgery

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How to Cite This Article

Saeed, Mohamed Ahmed; Lasheen, Adel Mohammad; Abdelaty, Walid Rafat; and Al-Sisi, Ahmed Hamza (2023) "Reduction Mammoplasty for Non cosmetic Indications," *Al-Azhar International Medical Journal*: Vol. 4: Iss. 10, Article 15.

DOI: <https://doi.org/10.58675/2682-339X.1993>

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Reduction Mammoplasty for Noncosmetic Indications

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Abstract

Background: Although the results of reduction mammoplasty are equivalent to those of other unquestionably effective surgical treatments like hip and knee total joint replacement, reduction mammoplasty is shown to be effective in symptom reduction and in improving the quality of life for individuals with symptomatic macromastia.

Purpose: Examining the results and impact of reduction mammoplasty for therapeutic rather than aesthetic purposes.

Patients and methods: There are 50 participants with breast enlargement in this prospective trial. Breast enlargement causes body imbalance in all of them, which results in physical dysfunctions, psychological illnesses, and feelings of social inadequacy. So, they submitted to breast reduction surgery through the inferior pedicle flap technique at the Department of General Surgery in Al-Azhar University Hospitals, Cairo, Egypt. The follow-up was obtained during the first 3–6 months postoperatively. All patients were evaluated preoperatively and postoperatively.

Results: This study shows significant improvement in the patient's overall health in all three areas: physical, psychological, and sexual, after they were submitted to reduction mammoplasty. The mean of the preoperative physical well-being scores was 35.98 ± 5.020 , which increased after operation to be 82.46 ± 6.041 . The mean of the preoperative psychosocial well-being scores was 34.62 ± 5.806 , which increased after operation to be 78.68 ± 6.186 . The mean of the preoperative sexual well-being scores was 38.33 ± 4.950 , which increased after operation to be 71.09 ± 7.516 . The mean of the patient's postoperative satisfaction with the nipples score was 69.70 ± 12.593 . The mean of the patient's postoperative satisfaction with the outcome score was 93.12 ± 8.630 .

Conclusion: Breast hypertrophy is a painful condition that can lead to physical dysfunctions, psychological disorders, and a sense of social inadequacy. This condition can be effectively treated by breast reduction surgery. This study highlights and shows that there is significant postoperative improvement in patient's quality of life making it better, more easier by decreasing the physical dysfunctions and improving their mental and sexual health. Moreover, after undergoing breast reduction surgery, women who were unsatisfied with their breast size reported greater overall satisfaction with their bodies.

Keywords: Reduction mammoplasty, Symptomatic hypertrophy, Symptomatic macromastia

1. Introduction

Breast hypertrophy manifests itself in a woman having abnormally large breasts for her frame. Physical dysfunctions, psychological illnesses, and feelings of social inadequacy can all result from a body that is out of whack due to hypertrophy.^{1,2}

Postural abnormalities, shoulder and spinal pain, and functional limits are all symptoms of breast hypertrophy, which, as has been proven in multiple studies, can even interfere with activities of daily living at their most severe.^{2,3}

By inducing feelings of uncertainty about their own bodies and leading to avoidance behaviors in intimate circumstances, public places, and social settings, breast hypertrophy can also alter how women feel and interact with others. As a result of this dynamic, poor self-esteem and anxiety are produced, which can eventually result in depression.^{2,4–6}

As a result, excessive breast volume may be linked to morbidity levels that go beyond a simple aesthetic change and necessitate appropriate treatment.^{7,8}

Women with enormous breasts who seek therapy do so because of physical symptoms, mental issues,

Accepted 24 June 2023.
Available online 20 November 2023

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<https://doi.org/10.58675/2682-339X.1993>

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and practical considerations. Before seeking medical attention, many of these women attempted unsuccessfully for a long time to lower the size of their breasts through weight loss, exercise, and physical therapy.^{9,10}

Reduction mammoplasty seeks to reduce breast size and improve the symmetry of a woman's chest measurements with improvements in surgical methods and progressively better outcomes. Therefore, it is thought that reduction mammoplasty might have a considerable positive impact on one's self-esteem and mental well-being.^{11,12}

Despite a number of studies demonstrating the benefits of reduction mammoplasty on the physical, psychological, and social aspects, the general public and many medical experts frequently view breast reduction surgery more as a cosmetic than a functional treatment, despite abundant published data to the contrary.⁹

The current study's objective is to assess the effectiveness of reduction mammoplasty for non-cosmetic reasons.

2. Patients and methods

In all, 50 patients with breast enlargement participated in this prospective trial. Breast enlargement, which affects all of them, causes body imbalances that result in physical dysfunctions, psychological illnesses, and feelings of social inadequacy. So, they will be submitted to breast reduction surgery through inferior or superior pedicle flap techniques.

Patients were recruited from the Department of Surgery at Al-Azhar University Hospitals in Cairo, Egypt for this prospective study. The follow-up was obtained during the first 3–6 months post-operatively. Each patient underwent both preoperative and postoperative assessments.

The study was approved by the Al-Azhar University Medical School's Ethical Review Committee.

A written and informed consent was taken from every patient after explanation of all details of the operation, benefits, possible risks intraoperative and postoperative, realistic expectations and with the possibility of other complications.

2.1. Inclusion criteria

- (1) Age more than 18 years.
- (2) The preoperative ptotic breast mass is more than 1500 g for each breast.
- (3) Patients have at least three of the following symptoms caused by their large breast and lasts in excess of a year with no response to

nonsurgical treatment, these symptoms are the following:

- Thoracic kyphosis or chronic back, neck, and shoulder pain that requires pain medications.
- Headaches due to tense muscles.
- Extreme bra strap grooving or shoulder ulceration.
- Fungal infections and eczema are common under the breasts because of the close proximity of the breast skin to the skin of the upper abdomen.
- Breathing more heavily than usual.
- Nerve pain or loss of sensation in the breasts.
- Restricted activity.
- Sleeping problems or poor posture resulting from large breasts.
- Low self-esteem because of breast size.
- Bras and clothing no longer fit comfortably.

Complete clinical and regular laboratory assessment, as well as abdominal sonography, were performed on all patients with informed written consent.

2.2. Exclusion criteria

Patients younger than 18 years old.

Patients unfit for anesthesia.

Patients having symptoms associated with other diagnoses (multiple sclerosis, cervical spine disease, dermatological disease, etc).

- (1) Patients with morbid obesity.
- (2) Patients planning for childbirth or weight loss.
- (3) Patients wanting to avoid scars on their breasts.
- (4) Patients with preoperative ptotic breast mass of less than 1500 g for each breast.
- (5) Patients during lactation or pregnancy period.

Patients were subjected to the following:

- (1) Taking a full medical history.
- (2) Extensive clinical evaluation:
 - (a) General examination
 - (b) Local examination
 - (c) Preoperative breast examination
- (3) Investigations:
 - (a) Laboratory
 - (b) Radiological
- (4) Preoperative care for the patient's overall health:
- (5) Optimum skin hygiene:
- (6) Marking:
- (7) Antibiotic prophylaxis:

- (8) Reduction mammoplasty through the inferior pedicle flap technique.

2.2.1. Follow up parameters

- (1) At 3–6 months after surgery, all patients voluntarily returned to the general surgery outpatient clinic for a checkup.
- (2) Patients self-report data were collected by asking all of them to complete the BREAST-Q Version 2.0, Reduction/Mastopexy Module, Preoperative and Postoperative Scales (163).
- (3) The BREAST-Q, authored by Drs. Andrea Pusic, Anne Klassen and Stefan Cano, is the copyright of Memorial Sloan Kettering Cancer Center and The University of British Columbia (163).
- (4) In this module, patients were assessed according to the following scales:
 - (a) Physical well-being (pre- and postoperative).
 - (b) Psychosocial well-being (pre- and postoperative).
 - (c) Sexual well-being (pre- and postoperative).
 - (d) Satisfaction with breasts (preoperative).
 - (e) Satisfaction with breasts (postoperative).
 - (f) Satisfaction with nipples (postoperative).
 - (g) Satisfaction with outcome.
- (5) Patients answer the questions in each scale by giving an optional score and then the sum of these scores transformed to equivalent Rasch score (0–100) using a conversion table as 0 (worst) and 100 (best). The better the result, the higher the score. Mean and standard deviation (M and SD) calculations were used for statistical analysis.

2.3. Statistical analysis

Key results were tabulated and analyzed by suitable statistical methods utilizing SPSS V.22, a Statistical Package for the Social Sciences.

Numbers and percentages were used to represent categorical data, whereas mean, standard deviation (SD), range, and percentages were used to represent quantitative data.

The difference in pre- and postoperative scores was compared using a paired *t*-test for each scale.

3. Results

Fifty female patients with macromastia who also appeared to Al-Azhar University Hospitals in Cairo, Egypt between March 2021 and September 2022 were included in this clinical study. These patients also experienced body dysfunctions, psychological

illnesses, and feelings of social inadequacy as a result of their condition.

Patients in this study had a mean age of 45.88 ± 5.351 years (Table 1).

Patients' average body mass index was 28.9 ± 1.8 kg/m² (range, 25.00–32.75 kg/m²).

Notable problems such as bleeding, infection, or the loss of the entire nipple–areola complex were not seen. Two patients, one with wound dehiscence and another with partial necrosis of the nipple–areola complex, both of whom responded well to conservative treatment (4%) (Chart 1).

3.1. Physical well-being

This study shows significant improvement in the patient's physical activity and overall physical well-being after they were submitted to reduction mammoplasty (Chart 2).

The mean of the preoperative physical well-being scores was 35.98 ± 5.020 , which increased after operation to be 82.46 ± 6.041 with *P*.value < 0.001 (Table 2).

3.2. Psychosocial well-being

In addition to the improvement in the patient's physical activity, our study also shows noticeable

Table 1. Descriptive Statistics for the age of patients.

| | |
|----------------|-------|
| N | |
| Valid | 50 |
| Missing | 0 |
| Mean | 45.88 |
| Median | 46.00 |
| Std. Deviation | 5.351 |
| Range | 19 |
| Minimum | 36 |
| Maximum | 55 |

Within the 50 patients included in this study, 45 were married, 3 were divorced, 1 was single, and 1 was a widow.

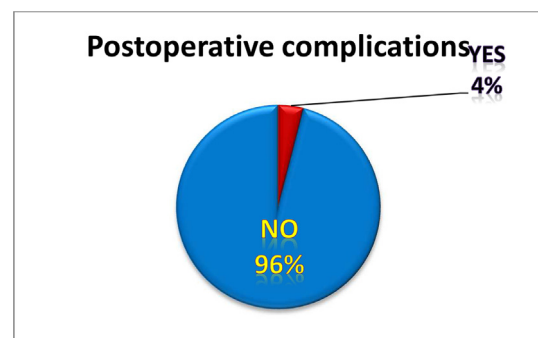


Chart 1. Percentage of postoperative complications.

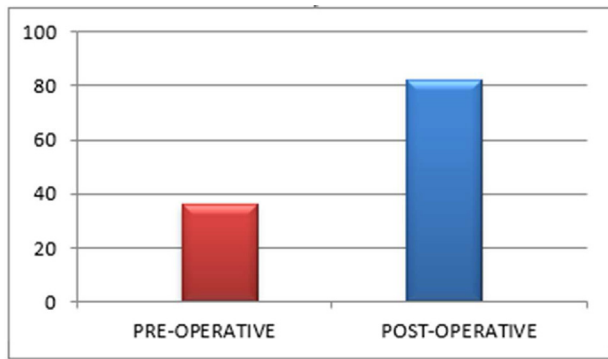


Chart 2. Mean of the preoperative and postoperative physical well-being scores.

increase in self-assurance and psychosocial well-being of the patients after operation (Chart 3).

The mean of the preoperative psychosocial well-being scores was 34.62 ± 5.806 , which increased after operation to be 78.68 ± 6.186 with P .value < 0.001 (Table 3).

3.3. Sexual well-being

Regarding sexual well-being, Table 5 shows that the mean of the preoperative sexual well-being scores was 38.33 ± 4.950 , which increased after operation to 71.09 ± 7.516 with P .value < 0.001 (Chart 4).

Table 4 also shows that the number of patients in this scale was 43 patient as 7 patients were excluded (3 divorced, 1 single, and 1 widow and 2 did not complete the sexual well-being scale questionnaire).

3.4. Satisfaction with breast

The BREAST-Q questionnaire (reduction/mastopexy module) also evaluates the degree of patient satisfaction with their breasts preoperative and postoperative. So as expected in the follow-up visits and after completing the questionnaire our study shows an increase in the degree of patient satisfaction with their breasts postoperatively (Chart 5).

The mean of the preoperative satisfaction with the breasts scores was 29.40 ± 3.817 , which increased after operation to be 90.30 ± 6.665 with P .value < 0.001 (Table 5).

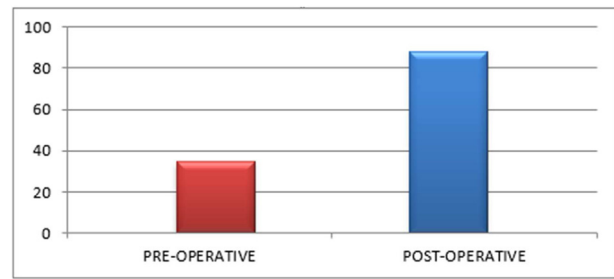


Chart 3. Mean of the preoperative and postoperative psychosocial well-being scores.

3.5. Postoperative satisfaction with nipples

This scale not only assesses the postoperative cosmosis of nipples, their position, and relation to each other but also evaluates the impact of the operation on the blood supply of the nipples and innervation (sensation) of them.

The mean of the patient's postoperative satisfaction with the nipples score was 69.70 ± 12.593 (Chart 6).

3.6. Satisfaction with the outcome

The degree of overall satisfaction with the postoperative outcome was estimated in this questionnaire scale by asking the patients. When asked whether or not they felt that surgery was the best option for them, respondents most commonly said things like, 'Yes', 'Absolutely,' 'Definitely', 'Definitely not', 'Yes', 'Maybe', 'Maybe not', 'Maybe,' and 'Maybe.'

The mean of the patient's postoperative satisfaction with the outcome score was 93.12 ± 8.630 (Chart 7).

4. Discussion

This study's results corroborate previous research showing a negative association between breast hypertrophy and a variety of factors that may have broader implications for women's health and mental well-being. Our findings suggest that greater breast sizes are connected with lower levels of body and breast satisfaction, as well as detrimental effects on physical and sexual health.

Table 2. Descriptive Measures of the preoperative and postoperative physical well-being scores.

| | Test | N | Mean | Std. Deviation | T value | P value |
|---------------------------|---------------|----|-------|----------------|---------|---------|
| Physical well-being score | Preoperative | 50 | 35.98 | 5.020 | 36.885 | <0.001 |
| | Postoperative | 50 | 82.46 | 6.041 | | |

Table 3. Descriptive Measures of the preoperative and postoperative Psychosocial well-being scores.

| | Test | N | Mean | Std. Deviation | T value | P value |
|-------------------------------|---------------|----|-------|----------------|---------|---------|
| Psychosocial well-being score | Preoperative | 50 | 34.62 | 5.806 | 3 1.223 | <0.001 |
| | Postoperative | 50 | 78.68 | 6.186 | | |

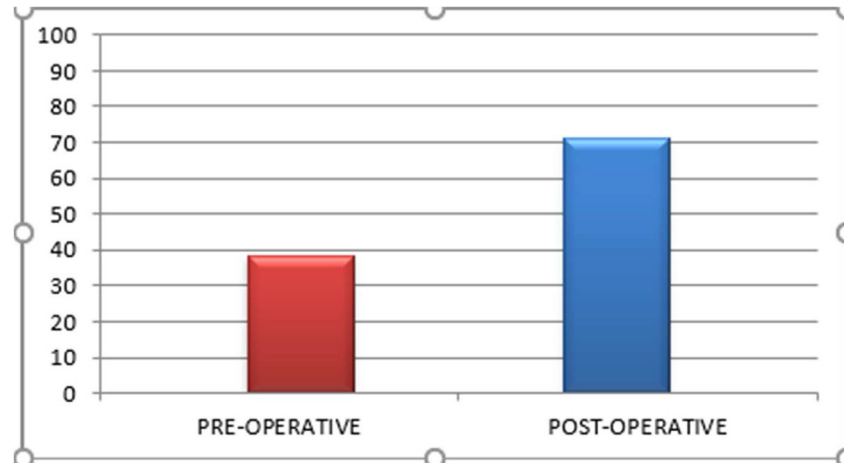


Chart 4. Mean of the preoperative and postoperative sexual well-being scores.

Table 4. Descriptive Measures of the preoperative and postoperative sexual well-being scores.

| | Test | N | Mean | Std. Deviation | T value | P value |
|------------------------|---------------|----|-------|----------------|---------|---------|
| Sexual well-beingscore | Preoperative | 43 | 38.33 | 4.950 | 20.497 | <0.001 |
| | Postoperative | 43 | 71.09 | 7.516 | | |

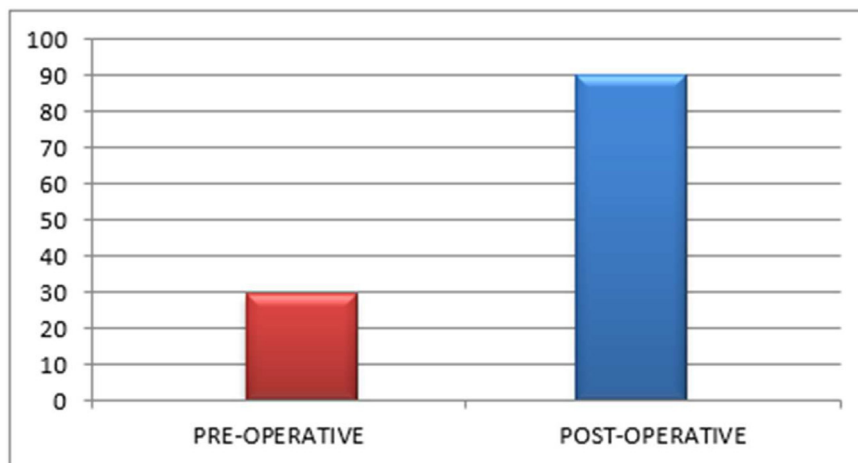


Chart 5. Mean of the preoperative and postoperative satisfaction with breasts scores.

Table 5. Descriptive Measures of the preoperative and postoperative satisfaction with breast scores.

| | Test | N | Mean | Std. Deviation | T value | P value |
|---------------------------------|---------------|----|-------|----------------|---------|---------|
| Satisfaction with breasts score | Preoperative | 50 | 29.40 | 3.817 | 47.040 | <0.001 |
| | Postoperative | 50 | 90.30 | 6.665 | | |

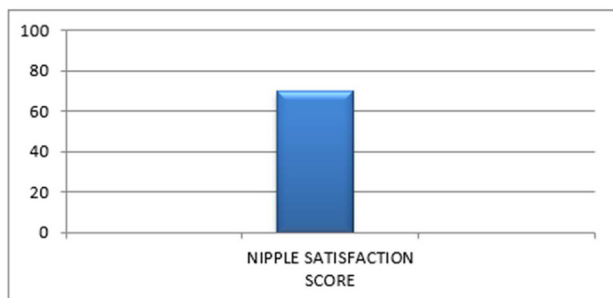


Chart 6. Mean of the postoperative satisfaction with nipple scores.

At 3 months after surgery, the patient's health problems had completely resolved, and her quality of life had improved in every measurable way, suggesting that the breast reduction had been successful.

Fifty women were recruited in our study because they had macromastia and related somatic dysfunctions, psychiatric illnesses, and feelings of social inadequacy. Patients in our study, on average, were 45.88 ± 5.351 years as we exclude patients under 18 years or those planning for childbirth and patients during lactation or pregnancy periods. Within the 50 patients included in this study, 45 of them were married, 3 were divorced, 1 was single, and 1 was a widow.

Inferior pedicle technique for reduction mammoplasty is the technique we used for all the 50 patients included in our study. The reason for that was that all patients met the criteria of having huge, sagging, and ptotic breast and in cases of extreme ptosis, where the nipple really points downward, the inferior pedicle is the best option for reconstruction of the breasts. One or more of the pedicles, including the inferior one, may be shorter in length than the others. Why the pedicle has been used for

so long is because it has a good blood supply and results that are easy to replicate.¹³

However, a study done by Tenna S. et al. (2012) confirmed that in asymmetric breast reduction, a self-tailored adjustment may be necessary regardless of the reduction mammoplasty technique used in order to avoid insufficient removal of the tissue, which could subsequently result in disappointing outcomes.¹⁴

An unexpected result of the study by Aleixo Pedro Brunetti. et al. (2016) was that breastfeeding, contraceptive use and having multiple children were not found to be significantly associated with hypermastia. In contrast to previous research, this shows that elevated estrogen and progesterone levels, or hypersensitivity of these hormone receptors, can lead to abnormally large breasts.¹⁵

Results of our study were found to be similar to the results of the study by Aleixo Pedro Brunetti. et al. (2016) that overall SF-36 and BREAST-Q scores show that patients' physical and emotional health were directly related to the severity of their breast enlargement. Evidence of this can be apparent in how patients have more trouble going about their daily lives and interacting with others. Therefore, after breast reduction, patients with reduced functional capacity due to breast hypertrophy will not only experience greater symptom relief, but also improvements in other aspects of life.¹⁵

Breast hypertrophy has been shown to have a detrimental effect on patients' psychological health as was also found in the aforementioned study (Araujo et al., 2014). Perceived mental health issues, such as anxiety or depression, might interfere with one's ability to do everyday or career tasks. Therefore, the fact that there is a lower score in group B (not submitted to surgery) indicates that patients are



Chart 7. Mean of the postoperative satisfaction with outcome score.

Table 6. Mean improvement in SF-36 PCS and MCS scores between surgical interventions.

| Reference | Surgical intervention | Preop PCS | Postop PCS | ΔPCS | Preop MCS | Postop MCS | ΔMCS | N |
|-----------------------|---------------------------------|-----------|------------|------|-----------|------------|------|------|
| This study | Bilateral breast reduction | 39.7 | 49.9 | 10.2 | 37.0 | 46.2 | 9.2 | 191 |
| Pivec et al | Total knee replacement | 33.0 | 47.8 | 14.8 | 52.9 | 55.9 | 3.0 | 281 |
| Stickles et al | Total hip replacement | 28.0 | 41.2 | 13.2 | 51.2 | 53.9 | 2.7 | 551 |
| Muller-Nordhorn et al | Coronary artery bypass grafting | 36.0 | 43.0 | 7.3 | 45.0 | 50.0 | 4.3 | 412 |
| Polly et al | Lumbar fusion (spine) | 26.6 | 40.0 | 13.4 | n/a | n/a | n/a | 1826 |
| Rogmark et al | Incisional hernia repair | 41.6 | 49.5 | 8.1 | 50.2 | 52.3 | 1.7 | 124 |
| Faulconbridge et al | Bariatric surgery | 37.7 | 46.4 | 8.7 | 43.1 | 45.5 | 2.4 | 36 |

Δ, mean change in SF-36 score from preoperative to 12 months postoperative; MCS, Mental Component Summary; N, number of participants; n/a, not applicable; PCS, Physical Component Summary; SF-36, Short Form-36.

aware that their anxiety can lead to significant difficulties in their daily lives. Sexual dysfunctions caused by such depressive symptoms can harm relationships and contribute to other issues, such as anxiety.¹⁶

In a survey by Coriddi (2013), Group B's sexual well-being scores on the BREAST-Q were higher than those of group A (that did not submitted to breast reduction surgery), which was less satisfied than group A (that submitted to the surgery) in the aspect of their quality of life. One possible explanation is that patients loathe their appearance more when they have hypertrophic breasts. The extra weight of enormous breasts might cause the top pole to drop and cause ptosis of varied degrees.¹⁷

Our findings were consistent with those of previous research that used different measures of body image, as well as those that used the BDDE (body dysmorphic disorder) to evaluate the psychological impact of breast hypertrophy and reduction mammoplasty. They all agreed that women with hypertrophic breasts had poor self-perception, were unhappy with their physical appearance, lacked confidence, avoided public displays of affection, and struggled socially because of their condition. Women reported increased happiness with their breast size, shape, and symmetry after reduction mammoplasty.^{18,19}

Summary SF-36 scores for women who had surgery in Crittenden showed significant improvement in both physical and mental health. The results of this study were compared with those of other surgical operations after 12 months after treatment (Table 8). The improvement in SF-36 and PCS scores after breast reduction surgery was comparable to that after total knee replacement surgery and was larger than that after a coronary artery bypass graft and hernia repair. Breast reduction surgery had the

greatest effect on patients' SF-36 MCS than any other operation.²⁰

In addition to that, there are other studies that discussed the impact of reduction mammoplasty on women with breast hypertrophy using SF-36 PCS and MCS scores, which have been advocated for a 3-point modification by the developers.^{21,22}

These studies showed that at 1 year, the SF-36 PCS score improvements were on pace with those seen after other common surgeries including hip and knee replacement,²³ spinal fusion,²⁴ bariatric surgery,²⁵ and coronary artery bypass graft surgery.²⁶ Table 6.

However, Both Kerrigan et al. and Collins et al. compared the self-perception of women who had undergone mammoplasty to that of women whose breasts were of a more natural size. Female participants in both research reported higher levels of satisfaction with their physical appearance when their breasts were of a typical size. However, not one of these research followed up with participants later on to assess how their body dysmorphic disorder symptoms had changed.^{27,28}

4.1. Conclusion

Breast hypertrophy is a painful condition that can lead to physical dysfunctions, psychological disorders, and a sense of social inadequacy. This condition can be effectively treated by breast reduction surgery. This study highlights and shows that there is postoperative great improvement in patient's quality of life making it better, more easier by decreasing the physical dysfunctions, and improving their mental and sexual health. Moreover, after undergoing reduction mammoplasty, women who were unsatisfied with their breast size reported increased satisfaction with their bodies and breasts.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article.

Funding

The study is self-funded, no grants or external funders.

Conflicts of interest

The authors declared that there were no conflicts of interest.

References

- Cabral IV, Garcia ED, Sobrinho RN, et al. Increased capacity for work and productivity after breast reduction. *Aesthetic Surg J.* 2017;37:57–62.
- Sabino Neto M, Demattê MF, Freire M, Garcia EB, Quaresma M, Ferreira LM. Self-esteem and functional capacity outcomes following reduction mammoplasty. *Aesthetic Surg J.* 2008;28:417–420.
- Mello AA, Domingos NA, Miyazaki MC. Improvement in quality of life and self-esteem after breast reduction surgery. *Aesthetic Plast Surg.* 2010;34:59–64.
- Beraldo FN, Veiga DF, Veiga-Filho J. Sexual function and depression outcomes among breast hypertrophy patients undergoing reduction mammoplasty: a randomized controlled trial. *Ann Plast Surg.* 2016;76:379–382.
- Garcia ES, Veiga DF, Sabino-Neto M, et al. Sensitivity of the nipple-areola complex and sexual function following reduction mammoplasty. *Aesthetic Surg J.* 2015;35:NP193–NP202.
- Singh KA, Losken A. Additional benefits of reduction mammoplasty: a systematic review of the literature. *Plast Reconstr Surg.* 2012;129:562–570.
- Benditte-Klepetchko H, Leisser V, Paternostro-Sluga T. Hypertrophy of the breast: a problem of beauty or health? *J Womens Health (Larchmt).* 2007;16:1062–1069.
- Sarwer DB, Crerand CE, Magee L. Body dysmorphic disorder in patients who seek appearance-enhancing medical treatments. *Oral Maxillofac Surg Clin.* 2010;22:445–453.
- Neto MS, Abla LE, Lemos AL, et al. The impact of surgical treatment on the self-esteem of patients with breast hypertrophy, hypomastia, or breast asymmetry. *Aesthetic Plast Surg.* 2012;36:223–225.
- Chadbourne EB, Zhang S, Gordon MJ. Clinical outcomes in reduction mammoplasty: a systematic review and meta-analysis of published studies. *Mayo Clin Proc.* 2001;76:503–510.
- Panzano EP, Catalán AG, Domínguez RS, Lasfuentes PC, Campayo JG, Sánchez AG. Reduction mammoplasty improves levels of anxiety, depression and body image satisfaction in patients with symptomatic macromastia in the short and long term. *J Psychosom Obstet Gynaecol.* 2017;11:1–11.
- Neligan PC, Nahabedian MY. *Plastic Surgery (Breast), fourth ed., Volume Five* Chapter 9 – Reduction mammoplasty with inverted-T techniques. 2018:135–159.
- Hammond DC. Short scar periareolar inferior pedicle reduction (SPAIR) mammoplasty. *Plast Reconstr Surg.* 1999;103:890–901. discussion 902.
- Tenna S, Cogliandro A, Cagli B, et al. Breast hypertrophy and asymmetry: a retrospective study on a sample of 344 consecutive patients. *November Acta Chirurgiae Plasticae.* 2012;54:9–12.
- Brunetti AP, de Paiva Macedo LGR, Cangussu LDR, da Silva Carvalho G. The influence of breast hypertrophy on quality of life in women: a comparison between two study groups. *Aust. J. Basic & Appl. Sci.* 2016;10:207–213.
- Araújo CDM, Veiga DF, Hochman BS, et al. Cost-utility of reduction mammoplasty assessed for the Brazilian public health system. *Aesthetic Surg J.* 2014. <https://doi.org/10.1177/1090820X14539972>.
- Coriddi M, Nadeau M, Taghizadeh M, Taylor A. Analysis of satisfaction and well-being following breast reduction using validated survey instrument: the BREAST-Q. *PRS J.* 2013;132:2.
- Panzano EP, Catalán AG, Domínguez RS, Lasfuentes PC, Campayo JG, Sánchez AG. Reduction mammoplasty improves levels of anxiety, depression and body image satisfaction in patients with symptomatic macromastia in the short and long term. *J Psychosom Obstet Gynaecol.* 2017;11:1–11.
- Thoma A, Sprague S, Veltri K, Duku E, Furlong W. A prospective study of patients undergoing breast reduction surgery: health-related quality of life and clinical outcomes. *Plast Reconstr Surg.* 2007;120:13–26.
- Crittenden T, Watson DI, Ratcliffe J, et al. Does breast reduction surgery improve health-related quality of life? A prospective cohort study in Australian women. *BMJ Open.* 2020;10:e031804. <https://doi.org/10.1136/bmjopen-2019-031804>.
- Frendl DM, Ware JE. Patient-Reported functional health and well-being outcomes with drug therapy: a systematic review of randomized trials using the SF-36 health survey. *Med Care.* 2014;52:439–445.
- Ware JE, Kosinski M, Bayliss MS, et al. Comparison of methods for the scoring and statistical analysis of SF-36 health profile and summary measures: summary of results from the medical outcomes study. *Med Care.* 2015;33:AS264–AS279.
- Pivec R, Issa K, Given K, et al. A prospective, longitudinal study of patient satisfaction following total knee arthroplasty using the short-form 36 (SF-36) survey stratified by various demographic and comorbid factors. *J Arthroplasty.* 2015;30:374–378.
- Polly DW, Glassman SD, Schwender JD, et al. Sf-36 PCS benefit-cost ratio of lumbar fusion comparison to other surgical interventions: a thought experiment. *Spine.* 2007;32:S20–S26.
- Faulconbridge LF, Wadden TA, Thomas JG, et al. Changes in depression and quality of life in obese individuals with binge eating disorder: bariatric surgery versus lifestyle modification. *Surg Obes Relat Dis.* 2013;9:790–796.
- Müller-Nordhorn J, Roll S, Willich SN, et al. Comparison of the short form (SF)-12 health status instrument with the SF-36 in patients with coronary heart disease. *Heart.* 2004;90:523–527.
- Kerrigan CL, Collins ED, Striplin D, et al. The health burden of breast Hypertrophy. *Plast Reconstr Surg.* 2001;18:1591–1599.
- Collins ED, Kerrigan CL, Kim M, et al. The effectiveness of surgical and nonsurgical interventions in relieving the symptoms of macromastia. *Plast Reconstr Surg.* 2002;109:1556–1566.