

Reduction Mammoplasty: The Factors that Influence Outcomes and Patients' Satisfaction in Calabar, Nigeria

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Abstract

Background: Breast reduction surgery, also called reduction mammoplasty, is a common breast aesthetic surgery.

Objective: We aim to investigate factors that influence reduction mammoplasty outcomes and patient satisfaction at our institution.

Patients and Methods: This 10-year retrospective study included 39 patients who underwent reduction mammoplasty from January 2014 to December 2023. We reviewed patients' records, including sociodemographic parameters, complication types, and patient satisfaction levels. Exclusion criteria included incomplete records and other breast surgeries performed for reasons unrelated to the study's purpose. We analyzed the results using the Statistical Package for the Social Sciences (SPSS) version 20.0, along with questionnaires (5-point Likert scale) and postoperative BREAST-Q outcomes to assess patient satisfaction.

Results: Table 1 shows the socio-demographic parameters, including age range, educational level, and surgeon cadre; all patients were female. The Table showed an age range of 25-50 years, with a mean value of 38 ± 5 years. The 41-50 age group had the most patients. All surgeons were plastic surgeons. Table 2 shows the various complications and their corresponding frequencies. Predictors such as obesity and surgical technique constituted major outcome parameters. Patient satisfaction with the decision, assessed using a 5-point Likert scale, was high (90-98%), and the BREAST-Q outcome was also high ($p = 0.03$).

Conclusion: Reduction mammoplasty is a common breast aesthetic surgery. The factors that influence outcomes were age, educational level, breast asymmetry, obesity, surgical technique, and impact on sexuality. We identified factors that influence patient outcomes. Overall patient outcomes showed a high level of patient satisfaction.

Keywords: Reduction mammoplasty, Breast reduction, Patients' satisfaction, Breast surgery complications, Mammoplasty outcome

INTRODUCTION

Breast Reduction surgery, also known as Reduction Mammoplasty, is a surgical procedure that reduces the size of overly large breasts or removes excess breast tissue, fat, and skin, making the breasts more proportional to the rest of the body.¹ It is commonly done for aesthetic reasons. Large breasts, called macromastia, especially in adult or juvenile mammary hypertrophy in teenagers and young adults, are a

frequent presentation to plastic surgeons. Although macromastia is common, it is rare in men and carries an ominous prognosis.²

Aetiologically, breast enlargement could be due to hormonal imbalance, mammary hypertrophy, or hyperplasia.³ The aetiology of breast enlargement could be grouped into three main headings: (1) Hormonal imbalance, which could be due to menstrual cycle, puberty, pregnancy, use of oral contraceptives,

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or hormone replacement therapy, menopause, gynecological disease (polycystic ovarian disease); (2) Breast Injury could be result from blow to the breast, rough handling, tight brassiere, surgery to the breast and (3) Breast diseases such as fibrocystic breast diseases, benign breast tumours, breast cancers, mastitis, breast cyst and galactorrhea. Differential diagnosis of unilateral breast enlargement should be ruled out, such as giant fibroadenoma, cystosarcoma phyllodes, virginal hamartoma, virginal hypertrophy, hematoma, and breast cancer in adolescence.

In screening patients for breast reduction surgery, a detailed history should be taken to rule out malignant breast disease, and a good breast examination should be done. The patient's history is aimed at evaluating symptoms of hypertrophy, reviewing breast cancer risk factors (both personal and familial), discussing scarring tendencies, reviewing the history of any bleeding disorders, diabetes mellitus, or collagen vascular diseases, and discussing the smoking history, as well as the general medical background.⁴ Indications for reduction mammoplasty include very large breasts, shoulder pain, Cervical and upper thoracic backache, severe embarrassment, which may be physical or sexual, recurrent intertrigo, inability to exercise due to breast discomfort, heaviness, and brassiere sleeve cutting injury could be the presentation of patients with breast hypertrophy.⁵

The presence of benign disease should be diagnosed prior to aesthetic breast surgery. Although a history should be taken, a thorough breast examination should be done to evaluate breast architecture. The use of preoperative and postoperative mammograms in cosmetic surgery of the breast is very important to rule out malignancies and other breast conditions.⁶

Different surgical techniques have been used, including the traditional inverted T (anchor) technique, Vertical (Lollipop), superomedial, and inferior pedicle techniques. A good understanding of each procedure is required by the surgeon.

Why should we reduce the breast size? Does reduction mammoplasty convey any physical, psychological, or aesthetic benefits? Benefits of breast reduction include reduced shoulder pain, improved sleep, easier exercise, better clothing fit, improved self-confidence, better posture, a more proportionate breast size to the body's physique, and reduced chafing. It is a cosmetic surgical procedure aimed at reducing large ptotic or sagging breasts to a more comfortable size or shape.⁷

There are known factors that affect the outcome of reduction mammoplasty such as patients' factors (age, Body Mass Index, smoking habit), obesity with increased BMI, surgical techniques which is dependent on surgeon prefer-

ence and the nature of the breast, inpatients setting, breast asymmetry after surgery, postoperative infection, swelling, scarring, Advanced American Society of Anaesthesiologists, and the association of conditions that makes the patient high-risk patient.⁸

Studies have shown that several factors influence breast reduction outcomes; however, no study has been conducted in our local setting. We aimed to study the factors that influence the outcome of reduction mammoplasty and the level of patient satisfaction in the institution.

PATIENTS AND METHODS

This 10-year retrospective study spans January 2014 to December 2023 and includes 39 patients who underwent reduction mammoplasty at the Teaching Hospital. We reviewed patients' records, including socio-demographic parameters, complication types, and patient satisfaction using questionnaires (5-point Likert scale) and the BREAST-Q Questionnaire. Exclusion criteria were incomplete records and breast surgeries, such as malignancies and cysts. We analyzed the results using the Statistical Package for the Social Sciences (SPSS) version 20.0. We assessed patients' satisfaction with the decision using a 5-point Likert scale and the BREAST-Q outcome.

RESULTS

Table 1 shows the socio-demographic parameters, including age range, educational level, and surgeon cadre; all patients were female. The age range was 20-50 years, with a mean of 38 ± 5 years. The 41-50 age group had the most patients. All surgeons were plastic surgeons, and all patients were female.

Table 1 Socio-demographic parameters of the study

S/N	Parameters	Frequency (N = 39)	Percentage (%)
1	Age		
	20-30 years	10	25.6
	31-40 years	13	33.3
	41-50 years	16	41.1
2	Educational level		
	Primary school	3	7.7
	Secondary school	13	33.3
	Tertiary education	23	59.0
3	Sex		
	Females	39	100.0
4	Cadre of Surgeons		
	Plastic surgeons	4	100.0

Table 2 shows the different complications, frequencies, and percentages of occurrence in 39 Patients

S/N	Complications	Frequency (N=39)	Percentage (%)
1	Breast asymmetry	2	5.2
2	Surgical site infection	6	15.4
3	Scarring	5	12.8
4	Nipple insensitivity	2	5.1
5	Partial nipple necrosis	1	2.6
6	Surgical techniques		
	Lollipop (Vertical)	4	10.3
	Inverted T	2	5.2
	Superomedial pedicle	12	30.7
	Inferior pedicle	11	28.2
	Inferior pedicle	10	25.6
7	Obesity		
	Not obese BMI (25.0-29.9 kg/m ²)	1	2.6
	Low obese BMI (30.0-34.9 kg/m ²)	8	20.5
	Moderately obese BMI (35-39.9 kg/m ²)	16	41.0
	High Risk obese BMI (≥ 40.0 kg/m ²)	14	35.9

Table 2 shows the different complications and their frequency of occurrence. Obesity and the type of surgical technique were among the main challenges. The results were breast asymmetry 1 (5.1%) scarring 5 (12.8 %), postoperative infection 6 (15.4%), Nipple insensitivity 2 (5.1%), surgical techniques - Invert T-2 (5.1%) and vertical method 4 (10.3%), partial nipple necrosis 1 (2.6 %) and obesity related complications, with overall complication rate of 18 (46.2 %).

Upon assessing patients' satisfaction with the decision using a 5-point Likert scale, it was revealed that despite complications, patients still expressed satisfaction, with a score of 90-98%, and a positive BREAST-Q outcome ($p < 0.03$). Patients with partial nipple necrosis and hypertrophic scars expressed their displeasure with the procedures.

DISCUSSION

Reduction mammoplasty is a common aesthetic surgery in developed countries. However, it is gaining much acceptance and beauty value in Sub-Saharan Africa.⁹ It is not completely free from complications. The study population was made up of females who presented themselves for breast reduction. The socio-demographic variables were evaluated as shown in **Table 1**.

Age: The age range was 20 to 50 years, with a mean of 38 ± 5 years. It showed that the age ranges of 31-40 years and 41-50 years had higher numbers of patients coming for breast reduction. The majority of the patients had completed their childbearing before embarking on breast reduction. Studies have shown that Caucasians age peak for reduction breast surgeries was 31-40 years. No significant complications were associated with age-related differences across age ranges. Apha et al con-

ducted a study among different age groups and concluded that there was no significant difference among the groups.¹⁰ Also, in a population-level analysis of reduction mammoplasty, it was indicated that with proper patient selection, the procedure can be performed safely in all ages.¹¹

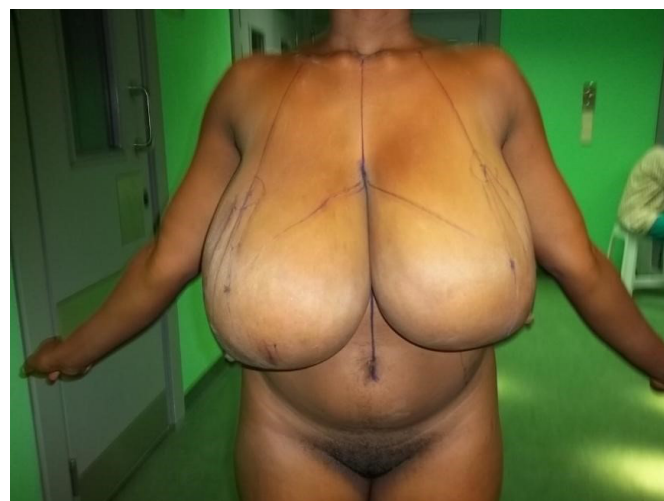


Figure 1 Showing a 42 -year -old female with breast hypertrophy ready to undergo reduction mammoplasty

Educational levels: The study revealed reflections on interest in and acceptance of breast reduction surgery based on participants' educational levels. The study groups consisted of 3 (7.7%) primary school students, 13 (33.3%) secondary school students, and 23 (59.0%) tertiary-level students, representing the percentages of the study groups by highest educational level. One can conclude that education level may influence awareness and acceptance of the procedure. No literature supports a relationship between breast reduction and educational level. However, studies have shown that higher educational standards generally support aesthetic surgeries, but they do not influence the complication rate.¹²

Cadre of surgeons: In this study, all the surgeons were plastic surgeons with an overall complication rate of 2.5%. Masound et al.¹³ evaluated the impact of resident involvement on outcomes in body-contouring procedures using a large National Database. Resident involvement in body-contouring procedures was associated with significantly higher complication rates (7.8% vs. 4.4%; $p = 0.003$) and longer operation times (180.7 minutes vs. 171.9 minutes; $p = 0.005$). For each year increase in resident postgraduate year, there was a significant decrease in the odds of complications (odds ratio = 0.906; $p = 0.013$) and operation time (127 minutes; $p = 0.001$). Therefore, resident involvement in Body-contouring procedures was associated with an increased rate of overall complications in a National Database. However, increased postgraduate year experience as a surgical resident was inversely proportional to the overall complications.¹⁴

Breast asymmetry: Breast asymmetry occurred in 2 (5.1%) of the study population. This occurs when the plastic surgeon removes more or less breast tissue from one of the breasts, inadvertently creating a lopsided appearance. It can also occur when a nipple-areola complex is created and located in the wrong site. Additionally, bottoming out occurs when the lifted and reshaped breast tissue begins to sag over time, resulting in hollowness in the upper breast and a nipple that points too high.¹⁵ Lee and Ock used an acellular dermal matrix disk and fragments to correct breast asymmetry¹⁶, while others prefer a redo surgery.¹⁷

Nipple insensitivity: It is seen as a postoperative complication 2 (5.1%) in the study, which was fully restored in 3-6 months. Inferior pedicle reduction provides the nipple with a generous blood and nerve supply, thereby protecting the breast during surgery. Jairo et al.¹⁸ evaluated the viability and sensibility of the nipple-areola complex (NAC) after peri-areolar dermis section following de-epithelialization in patients who underwent reduction mammoplasty. The study concluded that peri-areolar dermis does not affect NAC viability or pressure sensitivity. Another study measured nipple sensitivity in post-reduction mammoplasty patients and compared it with the general population. It concluded that the peri-areolar dermis release did not compromise the pressure sensitivity at the points evaluated in the nipple-areolar complex.¹⁹



Figure 2 Showing the immediate postoperative condition of a patient after reduction mammoplasty

Surgical techniques: Surgical techniques may influence the outcome of the procedure. Inverted T-2 (5.1%) and vertical incision 8 (20.5%) were the complication rates of the two methods. Other techniques included Strombeck 16 (41%) and inverted T14 (35.9%). This suggests that the technique influences complications and outcomes. The anchor procedure's enriched blood and nerve supply led to fewer complications. In a study by Radosa et al.²⁰ patients' assessments of postoperative symptom relief were comparable across all three surgical techniques. However, the overall outcome rating for both bi-pedicled

approaches (Strombeck and Ribeiro) was higher than for the mono-pedicled Bostwick technique. The type of pedicle used can impact the location of tissue resection, blood supply, and the risk of complications. For example, a study found that patients who received a superomedial pedicle had better scarring and shorter procedure time, while patients who received an inferior pedicle had a higher risk of complications. The incision type can affect complication risk. A meta-analysis found that the vertical incision had a lower overall incidence of complications than the T-inverted incision.²¹ The surgeon's understanding of available techniques and ability to tailor the procedure to the individual patient can positively affect complications. Cuning et al.²² studied how technique affects clinical aesthetics and patient-reported outcomes. Overall, 101 patients underwent reduction surgeries; 60.3% had a superomedial pedicle and 39.7% had an inferior pedicle. Superomedial pedicle patients were more likely to have grade 3 ptosis ($p = 0.01$) and had a significantly shorter time ($p < 0.01$). Only the inferior pedicle technique resulted in wound dehiscence ($p < 0.03$) and reoperations due to complications ($p < 0.01$). Those who underwent inferior pedicle reduction were 4.3 times more likely to experience postoperative complications ($p = 0.03$). They concluded that the superomedial pedicle reduction technique provided clinical and aesthetic benefits compared with the inferior pedicle technique.

Obesity: Obesity is a risk factor for the development of complications in any major surgery. The study showed a gradual increase in the cohort from non-obese to low-obese, moderate-obese, and high-obese patients. The morbidity rate varied from 2.6% in non-obese patients to 23.1% in highly obese patients. Many studies have proven the high complication rate associated with obesity in reduction mammoplasty.²³ However, Nuzzi et al.'s study results did not vary with Body Mass Index category or age concerning postoperative morbidity rate.²¹

Impact on female sexuality: The study showed an increase in sexuality in the post-reduction mammoplasty patients (23.2%). Janik et al. analyzed the impact of breast reduction on female sexual dysfunction and on sexual well-being. The study concluded that the breast reduction procedure has a positive impact on female sexual function, quality of life, and sexual well-being.²⁴ Emani and Sobhan's study showed a significant improvement in the mean Index of Female Sexual Function (IFSF) and the International Index of Erectile Function (IIEF) Scores after surgery in both patients and their partners. Additionally, patients reported high satisfaction with the surgical outcome, as measured by both physical and psychological scores. It concluded that reduction breast surgery has a positive impact on the health status and psychological function, as well as on the sexual activity of patients and their partners.^{25,26}

Assessment of patients' satisfaction: The index study

assessed overall satisfaction using a 5-point Likert scale (90-98%) and the BREAST-Q OUTCOME score ($p = 0.003$). The study population demonstrated a high level of patient satisfaction. Reported satisfaction ranged from 75% to 98%.²⁷ Reported rates of improved physical quality of life ranged from 76.2% to 98.8%²⁸ and absolute rates of improved psychological quality of Life ranged from 73.6% to 82.5%.²⁹ There was a high level of satisfaction among patients after reduction mammoplasty, with significant improvements in health-related quality of life and relief of breast-related symptoms. Measurable improvements in physical and psychosocial well-being were evident within 6 months postoperatively.

CONCLUSION

Many factors influence patient satisfaction and outcomes of breast reduction mammoplasty. Middle age, high educational level, breast asymmetry, obesity with high Body Mass Index, and impact on sexuality have been noted to influence patients' satisfaction and outcome measures. Although the study reported minor complications, it also noted high patient satisfaction (90-98%) and breast Q-scores (92-96%). Despite minor complications, overall patient outcomes remained highly satisfactory. Proper patient selection, screening out comorbid conditions, and appropriate surgical techniques will help avoid untoward complications and increase postoperative patient satisfaction. Reduction mammoplasty not only relieves physical symptoms but also improves patients' psychosocial, sexual, and mental well-being.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

The University of Calabar Teaching Hospital Ethical Committee approved the study, and the study team read and explained the consent form to the patients.

CONFLICT OF INTEREST

There was no conflict of interest among the co-authors, nor from any funding organization or institution.

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AUTHOR'S CONTRIBUTION

M.O.O. contributed to the conceptualization, wrote the manuscript, and is the corresponding author. **O.O.O.** contributed to the acquisition of data and analysis. **R.G.E.** contributed to data interpretation. **E.I.** contributed to revising the critical

points for the intellectual content. All co-authors contributed to the final approval of the submitted version.

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