

Preoperative Expectations of Women Undergoing Breast Reconstruction Surgery

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Background: The study investigated the expectations of patients undergoing immediate breast reconstruction after mastectomy, considering factors such as the cause for mastectomy (cancer versus prophylactic due *BRCA1* or *BRCA2* gene mutations), age, marital status, and education.

Methods: The study had a cross-sectional design. Eligible patients at Oslo University Hospital received a link to the BREAST-Q Expectations questionnaire, which they filled out before surgery from 2019 to 2022.

Results: One hundred forty-six patients completed the questionnaire (79.8% response rate). The mean age was 46.6 years, and the majority (95.1%) were undergoing reconstruction with implants. Most patients (86.9%) wanted to be involved in the decision-making. The highest expectation was for breast appearance and the lowest for sensation after surgery. Patients not diagnosed with cancer ($n = 27$) before surgery expected significantly more pain after surgery compared with patients diagnosed with cancer ($P = 0.016$). Patients 40 years or younger had higher expectation of pain after surgery than patients 41 years or older, 73.2 versus 54.2, $P < 0.001$, respectively. After 10 years, 26.7% of the patients expected that further reconstruction procedures might be necessary.

Conclusions: Our study's results regarding patient's expectations with breast reconstruction, as assessed using the BREAST-Q Expectations module, align with previous research in terms of overall trends. However, our study provides a more nuanced understanding by exploring variations within different patient subgroups. These differences emphasize the need for personalized preoperative counseling and support to align patient's expectations with realistic outcomes. (*Plast Reconstr Surg Glob Open* 2024; 12:e5928; doi: 10.1097/GOX.0000000000005928; Published online 20 June 2024.)

INTRODUCTION

For many patients diagnosed with breast cancer, the recommended surgery is mastectomy, which may offer a chance for cure but has a trade-off of scars and disfigurement. However, modern breast reconstruction techniques allow patients undergoing mastectomy not only to avoid disfigurement but also, in many cases, to achieve an outcome that may enhance the beauty of the breast and the overall body shape.

More women are also electing prophylactic mastectomies followed by reconstruction, whether it is for genetic reasons (*BRCA1* and *BRCA2* gene mutations), or their own personal history and the associated desire to reduce the chance of experiencing breast cancer a second time.¹

The reconstruction options involve the use of an implant (with an expander first or not), the patient's own tissue (autologous tissue reconstruction), or both. The reconstruction process can start at the time of mastectomy (immediate reconstruction) or any time afterward (delayed reconstruction). Women often choose reconstruction to restore self-image and self-esteem and minimize negative psychological influence such as depression and anxiety.²

The primary goal of breast reconstruction is to improve a woman's body image and to fulfill her expectations regarding the appearance of her breasts following surgery. Research has demonstrated that unrecognized or unfulfilled expectations regarding surgical results are associated with lower patient satisfaction more so than the technical success of the surgery (in other types of surgery³⁻⁶). Patients choosing to undergo breast surgery

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Received for publication February 5, 2024; accepted May 1, 2024.

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DOI: 10.1097/GOX.0000000000005928

Disclosure statements are at the end of this article, following the correspondence information.

expect to have postoperative outcomes that meet their expectations.⁷ However, it has been found that patients often are surprised by appearance, loss of sensation, and firmness of the reconstructed breast(s),⁸ and some patients have regretted their choice to undergo breast reconstruction.⁹

With breast reconstruction, the patients' expectations are particularly important because surgery is directed toward a restoration or improvement of breast form.¹⁰ Furthermore, it is important for the surgeon to develop a customized approach and achieve a satisfactory result. In addition, understanding patients' expectations allows medical staff to identify those who carry unrealistic expectations preoperatively and help with achieving more realistic ones. In addition to identifying women with inappropriately low expectations who might, for example, decide against reconstructive surgery, expectations are found to be an important predictor of health outcomes and health-related quality of life.⁷ However, meeting women's expectations of breast reconstruction can present challenges for both patients and healthcare professionals. Unrealistic expectations, limited understanding of the procedure, and potential complications can lead to dissatisfaction.⁵ Moreover, there may be variations in surgical outcomes and limitations due to individual anatomical factors, scarring, or implant-related issues. Numerous factors may contribute to women's expectations of breast reconstruction. These include personal preferences, aesthetic concerns, psychological well-being, social support, access to information, and cultural background. Research has shown that individual characteristics, such as age, body image perception, and breast size, can significantly impact expectation.¹¹⁻¹⁴ Furthermore, women without a cancer diagnosis undergoing prophylactic mastectomies followed by reconstruction may have different expectations and different qualities of life than women who are diagnosed with cancer.¹⁵

This study aimed to investigate the expectations of women undergoing immediate breast reconstruction after mastectomy, considering factors such as the cause (cancer versus prophylactic) for mastectomy, age, marital status, and education.

METHODS

Study Design and Patient Recruitment

This cross-sectional study was performed as the first step in a prospective study investigating women's expectations before surgery, the prevalence of complications to the surgical procedure, pain, sexual well-being, and health-related quality of life after surgery. Patients were identified at the first consultation at the breast cancer outpatient department at Oslo University Hospital and recruited after their consultation with the breast surgeon, the plastic surgeon, and the clinical nurse. All patients received a brochure with information regarding reconstructive surgery. Eligible patients received a link to the BREAST-Q Expectations questionnaire, which they filled out before surgery, but after their consultation from 2019 to 2022. Inclusion criteria were all women who were to

Takeaways

Question: What are women's preoperative expectations regarding breast reconstruction?

Findings: Women filled out the BREAST-Q Reconstruction Expectation module before surgery. The highest expectation was for breast appearance, and the lowest, for sensation. Factors such as reason for surgery (cancer versus prophylactic), age, level of education, and marital status influence women's expectations.

Meaning: Our findings emphasize the need for personalized preoperative counseling and support to align women's expectations with realistic outcomes.

have skin-sparing mastectomy (due to invasive or non-invasive cancer or prophylactically) with all types of primary reconstruction and ability to read and understand Norwegian. All patients participating in the study gave their written consent.

The study was conducted in accordance with the Declaration of Helsinki, and the regional ethics committee (2017/1311 REK sør-øst B) had no objections to the study. The study was approved by the hospital data protection officer.

Consultations

In the clinical setting of the authors' institution, each patient undergoes a comprehensive consultation involving both a breast surgeon and a plastic surgeon. Various reconstruction alternatives are systematically presented and discussed. A key emphasis is placed on achieving a level of symmetry such that, when clothed, the reconstructed nature of the breast remains imperceptible to external observers. After the consultation, most women knew whether they should have expanders or permanent implants; however, some women were informed that the surgeons would convert to expander if the skin became too thin or other conditions made permanent implants too risky.

Measurements

Sociodemographic data collected included age, education level, employment, and marital status. Age was categorized as younger than or older than 41 years. Education level was categorized as 12 years or less (representing high school or less education) versus 13 years or more (representing higher level of education, eg, college and university). Relationship status was categorized as living with spouse/cohabitating versus living alone. Employment was dichotomized as working versus not working, in which the former category included being employed with work (full time or part time) or undergoing education, whereas the latter category included housework, being retired, unemployment, and receiving disability benefits.

Medical Data

Medical data, such as type of cancer, neoadjuvant treatment, and gene mutation, were collected from the patient's medical record.

Expectation

The BREAST-Q Reconstruction Expectations module was developed to address the need for a qualitatively grounded assessment tool to measure preoperative expectations among breast reconstruction patients.¹⁶ The questionnaire includes individual questions, in which the option the patient checks is her response. In addition, the questionnaire includes five domains with multiple items: expectation of support from medical team (how much time and emotional support the patient expects to receive from the medical team and surgeon), pain (magnitude of pain the patients expects to face in the first postoperative week), coping (how the patient is anticipating she will cope with the process of breast reconstruction during the first postoperative year), breast appearance (how the patients expects her breast to look 1 year after surgery when clothed), and breast sensation of the reconstructed breast (how the patient expects her breast to feel when she touches them 1 year after surgery, eg, harder than a natural breast, rippling). Each domain comprises four to six items that the patients rate on a Likert scale as unlikely (1), somewhat likely (2), very likely (3), or do not know. The raw scale summed score for each domain is transformed to Rasch scores and log-transformed into a score from 0 to 100. A higher score indicates higher expectations. For missing data and the answer “do not know,” the mean of completed items is inserted, if missing data are less than half of the completed items of the domain. The Breast Reconstruction Expectations module 2.0 has been translated and adapted to the Norwegian context.

Sample Size Calculation

A clinically relevant change in health-related quality-of-life score has been defined as a difference that exceeds half an SD of baseline values.¹⁷ According to Pusic et al,¹⁸ the SD for the BREAST-Q subscale is approximately 20, and the minimum significant difference in score for each subscale is calculated as 10. When power is set at 80% and a standard α of 0.05 and the two-sample *t* test is applied using the minimum difference of 10, a minimum sample size of 64 patients was calculated for this study.

Data Analysis

The data were analyzed using SPSS for Windows version 24.0.0 (IBM SPSS Statistic, Armonk, N.Y.). One hundred forty-six women were included for analyses. Women were excluded from analysis in the case of missing values on relevant variables (case wise deletion). Initial descriptive analyses used frequencies and percentages for categorical variables and means and SDs for continuous variables. The chi-square test was used to compare categorical variables between groups. Differences in continuous variables between the groups were assessed by the independent *t* test. Q-SCORE software version 1.6.3414.40300 was used to construct a series of “expectation domains scores” (maximum 100, minimum 0).¹⁹ Multiple regression was used to evaluate the impact of educational level, age, and marital status on pain expectation while accounting for the influence of prophylactic mastectomy. The level of significance was set at a *P* value of less than 0.05.

RESULTS

A total of 146 women (79.8%) filled out the questionnaire before surgery (Fig. 1). The mean age was 46.6 years (range from 23 to 76 years), and the majority, 67.1%, were married/cohabitant and had higher education 85.1% (Table 1). Most women (95.1%) intended to perform reconstruction using an implant, and all reconstructions were immediate. Forty women had prophylactic mastectomy due to increased lifelong risk to develop breast cancer due to *BRCA1* gene mutation ($n = 21$) or *BRCA2* gene mutation ($n = 15$) or a strong family history of breast cancer or fear of cancer recurrence ($n = 4$). The prophylactic mastectomy patients were significantly younger than the therapeutic mastectomy patients, respectively, 40.4 and 48.9 years ($P < 0.001$). Thirteen (32.5%) of 40 women were diagnosed with cancer before their surgery. Of the 146 women, 119 underwent mastectomy and reconstruction due to a cancer diagnosis, and of these, 56 (38.4%) had received neoadjuvant therapy.

Nearly all women (98.4%) wanted as much information as they needed to be prepared. Most women (56.6%)

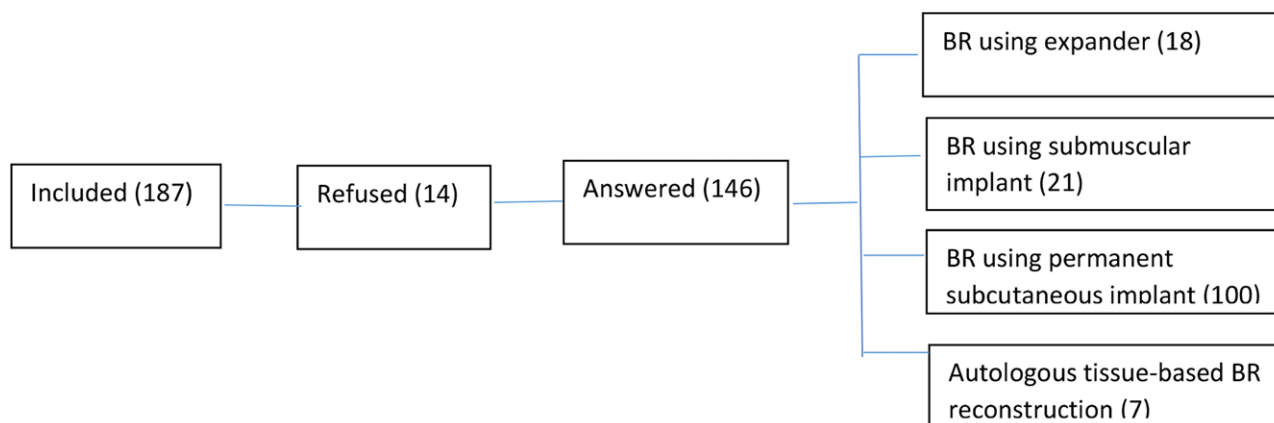


Fig. 1. Flow chart for participants and reconstruction method used. BR, breast reconstruction.

Table 1. Patients Demographics and Medical Data (N = 146)

Demographics	
Age, y mean (SD)	46.6 (10.1)
Range	23–76
BMI, kg/m ² , mean (SD)	24.4 (4.1)
Range	17.7–36.9
Married/cohabitant (% yes)	67.1
Higher education level (13 y or more) (% yes)	85.1
Employed (full or part time) or under education (% yes)	83.6
Medical (% with)	
Invasive cancer	65.1 (95)
Noninvasive cancer (DCIS/LCIS)	14.4 (21)
BRCA1	14.4 (21)
BRCA2	10.3 (15)
Neoadjuvant therapy	38.4 (56)
Earlier invasive breast cancer	3.4 (5)
Earlier noninvasive cancer	6.8 (10)

BMI, body mass index; DCIS, ductal carcinoma in situ; LCIS, lobular carcinoma in situ.

wanted to be somewhat involved, and 30.3%, very much involved in decision-making, whereas 13.1% did not want to be involved at all.

Only a few women (4.8%) expected to experience complication after surgery. Women who expected reconstruction using an implant were asked what they expected their chest to look like immediately after the tissue expander or the permanent implant have been placed, how much pain they expected the tissue expander or the permanent implant to cause, and what each expansion would feel like. The answers are presented in Table 2.

Many women (40.1%) answered that they did not know what to expect regarding their chest appearance immediately after surgery; 51.1% answered that they did not know what to expect regarding what each expansion will feel like (Table 2).

The highest expectations 1 year after breast reconstruction were for appearance, and the lowest, for breast sensation after implant surgery. The scores for the five expectations domains are presented in Table 3. Women who were not diagnosed with cancer (n = 27) before surgery expected significantly more pain after surgery compared with women diagnosed with cancer (n = 119; 71.6 versus 57.1; *P* = 0.005), respectively. In addition, women without cancer expected to experience more breast sensation after surgery compared with women diagnosed with cancer (64.1 versus 50.0; *P* = 0.024), respectively. No other significant difference was found between the groups shown in Table 2.

Women 40 years or younger had higher expectations of pain after surgery than women 41 years or older (73.2 versus 54.7; *P* < 0.001), respectively. Younger women also expected more breast sensation than older women (59.8 versus 49.2; *P* = 0.002).

Women with a higher level of education (≥13 years) expected more pain compared with those with a low level of education (<13 years; 62.5 versus 51.6; *P* = 0.029), respectively. Single women also expected more pain compared with women who were married/cohabitant (67.8 versus 56.5; *P* = 0.009), respectively.

The multiple regression analysis revealed that the model explained a significant portion of the total variance in pain expectation, accounting for 22.3% [F change (4119) = 8.5428; *P* < 0.001]. After controlling for the influence of prophylactic mastectomy, younger age (beta = 0.35; *P* < 0.001), higher education level (beta = 0.26; *P* = 0.002), and being single (beta = 0.28; *P* = 0.001) demonstrated significant associations with pain expectation. Expectations with regard to the characteristics of the reconstructed breast 1 year after surgery are shown in Table 4.

For the expectation after 10 years, 41.8% of the women expected that their breast will nearly be as symmetrical as they were right after the reconstruction, and 26.7%

Table 2. Patient’s Expectations before the Reconstruction Surgery Regarding the Appearance of Their Chest and Experience of Pain

The Chest Will Look	%	Pain	%	The Expansion Will	%
Flat	4.4	Constant pain	8.0	Be painful	9.5
There will be a small mound	35.8	Will feel tight and uncomfortable	46.7	Be uncomfortable	32.8
Will have fully formed breast	19.7	Feel no discomfort	9.5	Feel no discomfort	6.6
I do not know	40.1	I do not know	35.8	I do not know	51.1

Table 3. Results of the Expectation Scores Preoperatively Regarding the Medical Team during the Breast Reconstruction Process, Pain during the First Week after Surgery, Coping during the First Year after Surgery, and Breast Appearance and Sensation 1 Year after Breast Reconstruction Surgery

Expectation	All N = 146	Prophylactically without Cancer n = 27	Prophylactically with Cancer n = 13	Neoadjuvant Therapy, Yes n = 56	Neoadjuvant Therapy, No n = 60
Support from medical staff	62.91	62.67	57.36	60.15	65.46
Pain	59.78	71.57	51.58	54.49	59.97
Coping	79.49	80.96	77.09	81.88	76.09
Breast appearance when clothed	80.77	86.92	77.90	79.77	78.91
Breast sensation	52.25	64.06	54.80	49.98	50.10

Higher scores indicate higher expectations. Scale is from 0 to 100.

Table 4. Patients' Expectations of the Appearance and Sensation of the Reconstructed Breast 1 Year after Surgery

Expectations	%
New breast will look okay	55.6
New breast will be fairly similar to a natural breast	68.8
New breast will be slightly different size	68.8
New breast will be slightly different shape	75.7
New breast will have less movement than a natural breast	73.6
I will have almost no sensation in new breast	50.7
The scars will be somewhat noticeable	70.8
The side of chest will be slightly different than before surgery	55.6
The side of chest will feel slightly numb	42.0
Will sometimes be aware of the new breast	60.8

expected that further reconstruction procedures might be necessary.

DISCUSSION

In this study, we investigated the preoperative expectation of patients undergoing immediate breast reconstruction after mastectomy, considering factors such as cause (cancer versus prophylactic) for mastectomy, age, marital status, and education level. Most patients participating in this study seem to have realistic expectations regarding the outcome. However, patients who expected reconstruction using an implant had varied expectations regarding postoperative appearance and pain. Furthermore, women without cancer expected more pain postoperatively than women with cancer. Our study shows that factors such as age, educational attainment, and marital status do seem to influence patients' expectations of the outcome.

Most of the women who participated in this study were married or cohabitating, had a higher education level, and intended to undergo reconstruction using an implant. These demographics are in line with the general profile of women seeking breast reconstruction after mastectomy.²⁰

An overwhelming majority of women expressed a desire for comprehensive information to prepare them for surgery, and most women wanted to be involved to some extent in decision-making. These findings emphasize the importance of patient-centered care and shared decision-making in breast reconstruction, which has been advocated by previous research.²¹

A breast reconstruction is a patient-chosen adjunct in breast cancer treatment. Women primarily choose breast reconstruction to enhance quality of life, and they invest time, endure discomfort, and put in recovery efforts to have it. Thus, one may expect their expectations of the results, in general, to be high. Our study revealed that patients had high expectations regarding breast appearance but relatively lower expectations for breast sensation. This mirrors the findings of previous studies,^{22–25} indicating that patients often prioritize aesthetic outcomes while being realistic about the return of breast sensation. The majority of women in this study expected a “fairly similar” appearance between the reconstructed breast and their natural breast. This aligns with research suggesting that many women undergoing breast reconstruction aim for symmetry with their unaffected breast.²⁶ However, it

is noteworthy that women who expected reconstruction using an implant had varied expectations, with a significant proportion expressing uncertainty about postoperative appearance and pain.

In our study, expectations related to pain postsurgery were moderate, which is similar to previous findings,^{24,25,27} suggesting that the women anticipated some degree of pain during the postoperative phase.

One noteworthy finding is the difference in expectations between women diagnosed with cancer before surgery and those undergoing prophylactic mastectomy. Women without cancer tended to expect higher levels of pain and breast sensation after surgery. This distinction could be attributed to differences in the underlying emotional and psychological factors between the two groups. Women with a cancer diagnosis might approach the procedure with a stronger motivation to eliminate cancer, which could influence their pain and sensation expectations.^{3,4}

The age-related differences in expectations are also intriguing. Younger women (40 years or younger) exhibited higher expectations for pain and breast sensation compared with older women. This could be related to a perception that younger individuals may be more in tune with bodily sensations and might anticipate a more challenging recovery process due to higher physical activity levels. Furthermore, societal pressure surrounding body image and appearance might influence younger women to have heightened expectations about their reconstructed breast.²⁸

Educational attainment and marital status emerged as additional factors influencing expectations. Women with higher education levels anticipated more pain, possibly due to greater awareness of potential complications. Single women also anticipated more pain compared with those in marital or cohabitating relationships. These results suggest that various psychosocial factors, such as personal experiences and support systems, may shape the way women form their expectations.^{3,4} Women generally had moderate expectations regarding support from the medical team. This aligns the findings of Pusic et al,¹⁶ who developed the BREAST-Q Expectations module and reported that patients tend to expect substantial emotional and time support during the reconstruction process. However, it is important to note that our results showed variations based on factors such as cancer diagnosis and age which have not been explicitly explored in previous studies.

The observation that 88.9% of the women expected to receive medical attention quickly when needed, rather than the ideal 100%, might reflect the subtle nuances of women's perceptions and experiences within a healthcare context. To further improve women's confidence in healthcare, healthcare providers could focus on enhancing communication strategies, setting clear expectations, and continuously striving to meet women's expected levels of care.

Expectations related to coping during the breast reconstruction process were relatively high in our study, consistent with previous research.²⁴ These findings indicate that women were generally optimistic about their ability to cope with the challenges of reconstruction. This aligns with the

study by Mundy et al,²⁹ which suggested that women often exhibit resilience and adaptability in dealing with the physical and emotional aspects of reconstruction.²⁹

Regarding long-term expectations, a substantial proportion of women expected their reconstructed breast to be fairly similar to their natural breast after 1 year. Similar to Oliveira et al,²⁵ we also found that a significant number also anticipated that further reconstruction procedures might be necessary after 10 years. These expectations underscore the importance of discussing both short-term and long-term outcomes during preoperative counseling.

The collaborative consultation model at our institute, involving breast and plastic surgeons, promotes a multidisciplinary approach for breast reconstruction. However, study findings suggest opportunities for improvement. To address diverse patient expectations, we propose tailored information sessions including focusing on body image changes, pain expectations, and breast sensation. Providing personalized written materials and guiding patients to reputable online resources can supplement consultations. Offering additional consultations post information review can empower patients to ask informed questions. Strengthening follow-up communication to align postoperative outcome with patient expectations would further enhance the model.

Study Limitations

There are several limitations to this study. The study was conducted at a single university hospital, which might limit the generalizability of the findings. The sample size of 146 participants might limit the statistical power and precision of the results, potentially reducing the ability to detect smaller effects. The cohort (n = 146) included seven patients with autologous reconstruction, a group that may differ from alloplastic in expectations. The study was conducted in a Norwegian-speaking population, which could introduce language and cultural biases. Furthermore, this sample is relatively homogeneous (mostly White, educated). The findings might not be directly applicable to diverse linguistic and cultural groups. The study's cross-sectional design might limit the ability to establish causality, especially in assessing how sociodemographic factors directly influence expectations.

CONCLUSIONS

In conclusion, our study's results regarding women's expectations in breast reconstruction, as assessed using the BREAST-Q Expectations module, align with previous research in terms of overall trends. However, our study provides a more nuanced understanding by exploring variations within different patient subgroups. These differences emphasize the need for personalized preoperative counseling and support to align women's expectations with realistic outcomes, especially for those unique demographic or medical characteristics.

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DISCLOSURE

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

PATIENT CONSENT

The patients provided their written informed consent to participate in this study.

ACKNOWLEDGMENT

The authors would like to thank the nurses and surgeons at the outpatient department for recruiting the women in our study.

ETHICAL APPROVAL

The study was conducted in accordance with the Declaration of Helsinki and was approved by the regional ethics committee (2017/1311 REK sør-øst B).

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