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Patient satisfaction among patients who underwent mastectomy and immediate breast reconstruction with silicone implants in an oncology hospital

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ABSTRACT

Objective: Breast reconstruction after mastectomy has increased the expectations regarding aesthetic outcomes and increased quality of life for the patient. The survey is an important study tool to assess patient satisfaction among those undergoing cancer treatment. The study aims at identifying the level of satisfaction of patients who underwent mastectomy because of breast cancer, followed by immediate reconstruction with silicone implants. **Methods:** Retrospective cohort study with 42 patients who underwent mastectomy and immediate reconstruction with silicone prosthesis, who answered the BREAST-Q patient reported outcome questionnaire. **Results:** In general, 78.1% of the patients were satisfied or very satisfied with the reconstruction, and 64.3% were satisfied or very satisfied about their self-esteem. **Conclusion:** Reconstructive surgery after mastectomy should be provided for patients whenever possible since it leads to higher self-esteem and personal satisfaction.

KEYWORDS: mastectomy; breast reconstruction; implants; satisfaction.

INTRODUCTION

Total breast resection, which is considered as a mutilating surgery, may reduce women's self-esteem, and cause negative effects on their personal and professional lives. Therefore, reconstructive surgery aims at reestablishing body shape and reducing the psychological trauma caused by the breast cancer treatment[1].

The relevance of this study is owed to the fact that breast cancer has become a common condition, and its high incidence is associated with the increasing number of women undergoing treatment; therefore, there are some effects related to cancer treatment. This fact makes it important to raise awareness about the main sequelae related to the therapy and their impact on quality of life[2].

Federal Law no. 13,770, from December 19, 2018, ensures reconstructive breast surgery after a cancer treatment, including procedures for breast symmetry and reconstruction of the nipple-areola complex. The law also states that the reconstruction should be immediate in the presence of technical conditions[3].

The rates of postmastectomy breast reconstruction surgeries reflect the patients' demand for this procedure, but there is still room for discussion about the safety of breast implants and the effects of reconstruction in the follow-up of these patients[4]. Regardless of the technique used for reconstruction, the objective is to provide satisfaction both in the psychological and physical scopes for the patient, individually, to recover self-image and reach better acceptance of the new condition[5].

Validated questionnaires are considered as appropriate methods to study outcome satisfaction after a treatment. International analyses with questionnaires and platforms have been developed to assess the acceptance and level of satisfaction of breast

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reconstructive surgeries, both from the functional and self-esteem points of view[2,6].

Mastectomy patients who undergo reconstruction usually have high expectations of well-being in comparison to those who only undergo mastectomy. The perception of the patients themselves about breast reconstruction can be difficult to measure and report in a scientific study. Besides, a positive evaluation can simply mean acceptance and conformism towards the disease, and not exactly a good aesthetic outcome, let alone better quality of life. For that, it is important to consider the patients' opinions and translate them through questionnaires that have been developed and tested for this end[7].

The evaluation of quality of life is a complex matter, and its perception can vary individually and throughout the experiences of life[8]. According to the World Health Organization, quality of life is the "individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns"[9].

BREAST-Q is a questionnaire used for patients who underwent aesthetic and reconstructive breast surgery. It was translated to Portuguese. This assessment tool was created in 2009 to evaluate the level of patient satisfaction. It is used in independent modules for breast cancer to assess patients who underwent mastectomy with conservative surgery and breast reconstruction. Each module is composed of multiple independent functioning scales. It is based on two themes or main domains: quality of life and patient satisfaction. Each of these domains presents six sub-themes: psychosocial well-being; physical well-being; sexual well-being; satisfaction with breasts; satisfaction with the outcome; satisfaction with care[10-12].

The purposes of this study were to verify the level of patient satisfaction among those who underwent mastectomy due to malignant breast neoplasm followed by immediate breast reconstruction with silicone implants using the BREAST-Q questionnaire, and to identify the risk factors that could interfere with the level of satisfaction.

METHOD

A retrospective cohort study was carried out with data collection from medical records and qualitative analysis of the opinions of patients who answered the sociodemographic questionnaires, which contained the following explanatory variables: age, weight, height, schooling, profession, radiotherapy, axillary dissection, uni or bilateral mastectomy and reconstructive surgery of the other breast. The BREAST-Q questionnaire had nine questions related to satisfaction, answered in a scale from 1 to 5, in which 1 indicated "Very dissatisfied", 2 indicated "Dissatisfied", 3 indicated "Normal", 4 indicated "Satisfied", and 5 indicated "Very satisfied". The data consist of the answers to the nine questions in the BREAST-Q questionnaire related to satisfaction and nine other explanatory variables (sociodemographic questionnaire), resulting in a database with 42 answers and 18 variables.

The variables from the BREAST-Q questionnaire were interpreted as qualitative or categorical. Among the explanatory ones, there are six qualitative (schooling, profession, radiotherapy, axillary dissection, uni or bilateral mastectomy and reconstructive surgery of the other breast) and three quantitative variables (age, weight and height).

The selected patients underwent uni or bilateral mastectomy due to malignant breast neoplasm followed by immediate breast reconstruction with silicone implants at Instituto do Câncer do Ceará, reference center in cancer treatments in the city of Fortaleza (CE). An active search of digital and printed medical charts was carried out for analysis and selection of eligible patients. The study patients underwent treatment from March, 2013, to August, 2019, especially in the three last years because of the outdated record of older patients.

Patients who had not concluded adjuvant radiotherapy, the ones with local recurrence, patients with distant metastasis on palliative care and those who, due to any intercurrence, had to remove the silicone implants, were excluded from the study.

The patients were initially contacted by a telephone call to hear the explanation about the study and the questionnaires; after a verbal authorization, the Google Form questionnaires were sent through a message application, together with the Informed Consent Form.

The main ordinal and regression components of the tabulated data in the questionnaire were analyzed in order to present a summary and verify the level of patient satisfaction, as well as to investigate the main demographic or clinical factors that could significantly interfere in satisfaction[13].

The collection began after the project was approved on April 22, 2021, by the Research Ethics Committee in Instituto do Câncer do Ceará, with an Ethical Appreciation Presentation Certificate: 45873121.8.0000.5528.

RESULTS

Sixty-seven patients who fit the study profile were selected. Of this group, it was not possible to reach 17 patients, and eight did not accept to participate in the study. Therefore, 42 patients assisted at the mastology service of Instituto do Câncer do Ceará participated in the study and answered the BREAST-Q and the sociodemographic questionnaires.

Mean age was 49.17 years and ranged from 30 to 67 years. As to schooling, 14.3% had higher education; 40.5%, high school; 23.8%, incomplete elementary school; and 21.4%, complete elementary school. Radiotherapy was performed by 54.8%. Axillary dissection was performed in half of the patients. Mastectomy was unilateral in 92.9% of the patients, and bilateral mastectomy, in 7.1%. The reconstructive surgery in the other breast was performed in 33.3% of the patients.

There is relatively little information about the profession variable because there are 30 categories, and we dispose of 42 observations. We emphasize that eight interviewees are farmers. The bilateral mastectomy variable showed major imbalance between the unilateral and bilateral categories — only three patients underwent bilateral mastectomy. Therefore, both were excluded from the statistical analysis.

The questions in the questionnaire were associated to sub-themes related to satisfaction with the reconstruction. Question 1 (Q1) informs about general satisfaction with the reconstruction, whereas questions 2 to 9 are related to each satisfaction sub-theme: regarding the breasts, psychosocial, pain-related and sexual aspects. The sub-themes and their questions are specified in Table 1.

Among the patients' answers, one was not declared: one patient did not mention her profession. Therefore, this observation was declared as missing.

Figure 1 shows a graph with the satisfaction level for each question inserted in the BREAST-Q questionnaire. It is possible to observe that the "Very dissatisfied" event only occurred twice for each question, at most.

Table 1. Questions about satisfaction related to the sub-themes.

Sub-themes	Questions
Satisfaction with breasts	Q2, Q3 and Q4
Psychosocial satisfaction	Q5 and Q8
Satisfaction regarding pain	Q6 e Q7
Sexual satisfaction	Q9

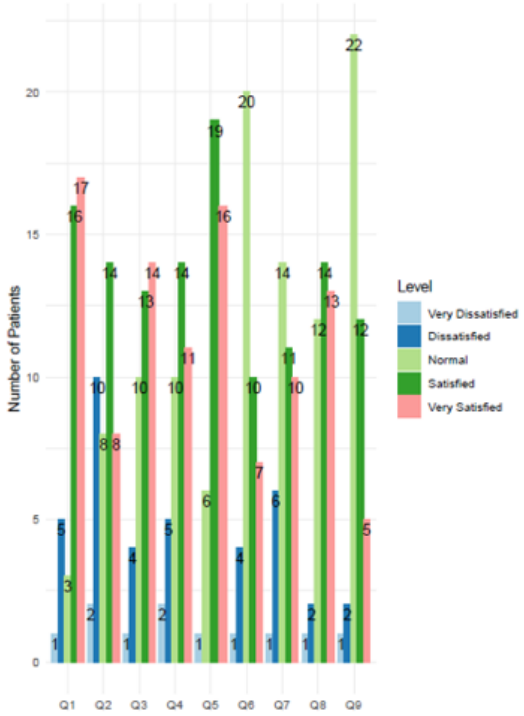


Figure 1. Level of satisfaction in each question related to satisfaction. Fortaleza, CE, Brazil, 2021.

In Figure 1, general satisfaction (Q1) indicates that 78.6% of the participants are at least satisfied with the result, using silicone implants after immediate breast reconstruction. Specifically regarding the breasts (Q2, Q3 and Q4), about 56.3% are at least satisfied, and 19% consider themselves as dissatisfied and very dissatisfied. About psychosocial (Q5 and Q8), about 73.8% of the patients are at least satisfied with the sensation of having their breasts reconstructed. Regarding the pain (Q6 and Q7), the pattern was patients feeling normal. About 52.4% of the patients reported feeling normal regarding sexual activity.

The BREAST-Q questionnaire brought information about patient satisfaction through questions that are implicitly related to one another. Questions 2 to 9 clearly have an impact on general satisfaction with the outcome (Q1).

The correlation matrix between each question about satisfaction and Q1 was analyzed (Figure 2). With the correlation matrix between the BREAST-Q questions, being ρ_{ij} the (ij)-th component of the R matrix for every $i = 1, 2, \ldots, 9$ and $j = 1, 2, \ldots, 9$. For the first line of the correlation matrix, it is possible to observe that only questions 3 and 6 (columns 3 and 6) are weakly correlated with general satisfaction, since the ρ_{13} and ρ_{16} coefficients are lower than 0.5. Therefore, there is evidence showing that satisfaction with size and pain have low correlation with general satisfaction. To verify the relationship between general satisfaction and the other sub-themes, it is observed that correlations between questions 1, 2 and 4 are strong, with correlation coefficients $\rho_{12} = 0.688$, $\rho_{14} = 0.807$ and $\rho_{24} = 0.820$.

Correlation values close to 1 indicate that the questions are directly proportional. Therefore, when the satisfaction of the interviewees in Q1 is high, then Q2 is also high. Likewise, when patient dissatisfaction in Q1 is high, then in Q2 it is usually high too. The interpretation is the same for the other questions. Even if Q3 is weakly correlated to Q1, Q2 and Q4, the strong relationship between general satisfaction and satisfaction with the breasts is clear. The same is true for the relationship between general, psychosocial, and sexual activity satisfaction. Only the relationship between general satisfaction and pain was moderate, with coefficients from 0.3 and 0.6.

Table 2 summarizes the relationship between satisfaction and outcome and the other sub-themes. In any way, it is suggested that the relationship between the sub-themes and general

$$R = \begin{bmatrix} 1.000 & 0.688 & 0.313 & 0.807 & 0.702 & 0.475 & 0.564 & 0.627 & 0.612 \\ 0.688 & 1.000 & 0.254 & 0.820 & 0.610 & 0.598 & 0.514 & 0.702 & 0.457 \\ 0.313 & 0.254 & 1.000 & 0.254 & 0.216 & 0.157 & 0.236 & 0.241 & 0.298 \\ 0.807 & 0.820 & 0.254 & 1.000 & 0.662 & 0.561 & 0.436 & 0.763 & 0.532 \\ 0.702 & 0.610 & 0.216 & 0.662 & 1.000 & 0.562 & 0.531 & 0.714 & 0.665 \\ 0.475 & 0.598 & 0.157 & 0.561 & 0.562 & 1.000 & 0.398 & 0.493 & 0.390 \\ 0.564 & 0.514 & 0.236 & 0.436 & 0.531 & 0.398 & 1.000 & 0.499 & 0.369 \\ 0.627 & 0.702 & 0.241 & 0.763 & 0.714 & 0.493 & 0.499 & 1.000 & 0.469 \\ 0.612 & 0.457 & 0.298 & 0.532 & 0.665 & 0.390 & 0.369 & 0.469 & 1.000 \end{bmatrix}$$

Figure 2. Correlation between each question related to satisfaction. Fortaleza, CE, Brazil, 2021.

satisfaction have a positive impact, that is, for that sample there is no sub-theme with a negative effect in relation to the general satisfaction of the patients.

To quantify the contribution of each covariable for the satisfaction level of the patients, a global satisfaction index was used as a response variable in a regression model. This index was obtained by performing an analysis of the main categorical components in the variables related to satisfaction. Therefore, the global satisfaction index was defined as the first main component, for being the most representative one, since it has most of the variability of the original data. Therefore, the global satisfaction index represents a scale to measure the satisfaction level based on every question related to satisfaction, that is, every sub-theme and general satisfaction.

For the regression model, we considered the explanatory variables — age, weight, height, radiotherapy, axillary dissection, and surgery in the other breast —, and the response variable was the general satisfaction index. As previously mentioned, the profession and mastectomy variables were excluded due to the low number of interviewees for each level (for instance, only three patients with bilateral mastectomy).

The schooling variable was also excluded for not presenting evidence of relationship with the response variable in the descriptive analysis. Besides, the schooling variable has four levels, so including it in the model with the five selected covariables could lead to estimation problems due to the sample size. With the same objective, the information about weight and height of the patients was synthetized into one variable: Body Mass Index (BMI), since it is more reasonable that the relationship between height and weight be more informative for the response variable than only height or only weight.

When we considered the most relevant variables as independent, observing the descriptive analysis, the simple linear regression model was computed. The estimated value and the respective standard error of each model parameter are presented in Table 3. We also show the descriptive level, p value, for the significance test of each parameter.

The regression model parameters associated with dichotomous variables (radiotherapy, axillary dissection, and surgery in the other breast) represent the difference in the global satisfaction level at the presence of such practices. Therefore, there is no evidence showing there is a difference between global satisfaction for the interviewees who did or did not undergo radiotherapy. Likewise, there is no evidence showing if the patients who performed axillary dissection present significantly different satisfaction than those who did not perform it. There is the same result for the other breast.

For quantitative variables, age and BMI, the parameters represent the expected increase in global satisfaction when the variable increases in one unit. However, the parameter values are too close to zero, which indicates that, in fact, the age and BMI variables do not have significant influence on global satisfaction of the patient.

Table 2. Level of relationship between general satisfaction and the Other sub-themes.

Sub-themes	Level
Satisfaction with breasts	Strong
Psychosocial satisfaction	Strong
Satisfaction regarding pain	Moderate
Sexual satisfaction	Strong

DISCUSSION

The mean of mastectomy followed by immediate breast reconstruction with implants at Instituto do Câncer do Ceará in 2016 and 2017 was of approximately 109.5 surgeries a year. The mean of 2018 and 2019 was 144.5 surgeries a year, a 31.9% increase. According to the Brazilian Society of Mastology, approximately 34% off the women who underwent a mastectomy in 2017 also had breast reconstruction[14].

This increased can be partly justified by law no. 13770/18, according to which "breast reconstruction will be performed at the surgical time of the mutilation". This law changes law n. 9,656, from June 3, 1988, and law no. 9,797, from May 6, 1999, to dispose about the plastic breast reconstructive surgery in cases of mutilation caused by cancer treatment[3].

It is necessary to know about the impact on the quality of life of patients who suffered from physical changes due to cancer treatments. This knowledge can be reached through validated surveys, such as BREAST-Q[15].

BREAST-Q can be used for a study of the impact and efficiency of breast surgeries considering the perspective of the patient by quantifying satisfaction and major aspects of quality of life, and through an approach based on evidence for the surgical practice[16].

An observational study with women who underwent mastectomy and reconstruction with implants assessed 75 patients regarding satisfaction and quality of life using the BREAST-Q questionnaire, comparing the period before and after the procedure, with 95.94% of immediate breast reconstruction. The

Table 3. Linear regression model for the first main categorical variable.

Variable	Parameter estimation	Standard error	p-value
Intercept	30.1241	10.0676	0.00498
Age	0.0824	0.1341	0.54277
BMI	-0.1172	0.3001	0.69847
Radiotherapy	2.8537	2.9081	0.33300
Axillary dissection	0.5130	3.0561	0.86762
Surgery in the Other breast	-1.5518	2.5412	0.54527

BMI: Body Mass Index.

authors obtained statistical significance both in the satisfaction with the breast and in the physical well-being domains, and concluded that the quality of life of the patients who underwent reconstruction with breast implants is higher in comparison to the period prior to the surgery[1].

A study that assessed pain after breast surgery, including mastectomy with reconstruction, showed that the incidence of pain was higher among the women who underwent mastectomy with reconstruction (49%), only mastectomy (31%) and reduction mastopexy (22%). Breast reconstruction with implants had high incidence of pain compared to reconstruction without implants. The incidence of pain among women who underwent reconstruction without implants was identical to that of women who only underwent mastectomy. All efforts should be made to reach a better aesthetic outcome in reconstruction, which justifies the use of implants. But patients should be informed about the possibility of developing chronic pain after the procedure[17].

In our study, in the assessment of pain in the reconstructed breast, the pattern was that patients feel normal, thus not having a negative influence on dissatisfaction. The questions related to size and pain had little correlation with general satisfaction.

A 12-month long prospective study with 303 patients who underwent breast cancer surgery in Canada used the BREAST-Q questionnaire and other types of evaluation surveys. The satisfaction level was higher among patients who underwent conservative surgery, followed by patients who underwent mastectomy with reconstruction, $p<0.001$. The patients who underwent mastectomy with immediate breast reconstruction felt psychosocial well-being just like those who underwent conservative treatment, $p=0.07$. Sexual and physical well-being was similar for conservative surgery, only mastectomy and mastectomy with reconstruction, $p>0.05$. The authors concluded that the level of satisfaction was higher among patients with conservative surgery and mastectomy with reconstruction[18].

The complaint of chronic pain after mastectomy is a known complication of breast surgery, with prevalence of 20 to 52%. A study using two pain scale questionnaires, visual analog scale and painDETECT, compared patients who underwent mastectomy with immediate reconstruction or mastectomy Only. There was no evidence of increasing acute or chronic pain among patients with immediate reconstruction and mastectomy only, which supports the possible benefit of immediate reconstruction[19].

The quality of life of 633 patients who underwent breast reconstruction with implants, with and without radiotherapy, was assessed using BREAST-Q, in a multicenter study in the United States and Canada. There was more dissatisfaction with breasts among patients who underwent radiotherapy (58.3 versus 64.0). Through the multivariate analysis, the conclusion was that radiotherapy had a negative effect on quality of life and the satisfaction of patients who underwent reconstruction with prosthesis, in comparison to those who did not undergo radiotherapy[20]. In our study, there was no evidence showing there was a difference between general satisfaction for the interviewees who did or did not undergo radiotherapy. Likewise, there is no evidence showing if the satisfaction of patients who underwent axillary dissection is different than that for the ones who did not.

Patients with mastectomy and breast reconstruction with autologous tissue or immediate prosthesis were assessed as to quality of life using the BREAST-Q questionnaire, with a two-year follow-up. The researchers concluded that the patients who underwent reconstruction with autologous tissue were more satisfied with the breasts and their psychosocial and sexual well-being than those who underwent reconstruction with implants, indicating there are differences in the outcomes of satisfaction and quality of life; therefore, this decision should be discussed in clinical practice[21].

The relationship between chemotherapy and complications in immediate breast reconstruction are little described. The influence of neoadjuvant and adjuvant chemotherapy was assessed in 1,881 mastectomy patients who underwent immediate reconstruction with breast implants or autologous tissue using the BREAST-Q questionnaire. Patients who underwent chemotherapy had radiotherapy more often, and adjuvant chemotherapy was the most common one. Among patients who chose reconstruction with prosthesis, the complication rates were higher, especially for adjuvant chemotherapy, in comparison to patients who did not have chemotherapy. But these differences were not statistically significant. In relation to the assessment of quality of life, there was no difference between the chemotherapy groups, except regarding sexual satisfaction among patients with breast implants, who had a lower score in the adjuvant chemotherapy group[22].

CONCLUSION

Most patients are at least satisfied in the psychosocial scope after breast reconstruction with prosthesis. The regression model did not present statistical significance for any sociodemographic variable.

Breast reconstruction allows the woman submitted to mastectomy to incorporate definitions of quality of life, integrity, and preservation of self-image to the cancer treatment. This leads to a less traumatic process of rehabilitation, which provides physical, psychological, and social benefits. Breast reconstruction with implants is associated with a higher level of general patient satisfaction. However, breast reconstruction is not free of negative repercussions, and the patient should be aware as to the limitations of the procedure in order not to create false expectations.

AUTHORS' CONTRIBUTION

LRAC: Investigation, Methodology, Writing – original draft, Project Administration, Formal analysis, Validation. EFG: Conceptualization, Investigation, Supervision, Formal analysis, Writing – review & editing, Visualization, Validation.

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