


ORIGINAL ARTICLE

Predictive factors of satisfaction and quality of life after immediate breast reconstruction using the BREAST-Q[©]

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Aims and objectives: To analyse quality of life and satisfaction after immediate breast reconstruction due to cancer and its determining factors.

Background: Studying breast reconstruction is important because of its frequency and variability. In addition to the surgical results, it is necessary to analyse the quality of life and patient satisfaction using a specific tool.

Design methods: An ambispective design was used ($n = 101$; $\alpha = 0.05$; precision = 10%), studying anthropometric, sociocultural data, Fagerström test and the BREAST-Q[©] questionnaire. A logistic regression analysis was performed to identify variables associated with quality of life and satisfaction.

Results: Mean age of the patients on diagnosis was 44.87 ± 8.5 years. Forty-one of the patients were carried out a skin-sparing mastectomy (42.7%). Immediate reconstruction was performed with implant in 73 (74.5%). The domains on the BREAST-Q[©] for quality of life with the lowest scores were physical well-being chest (74) and sexual well-being (61.5). The satisfaction domain with the lowest score was with the breast (59). The variables associated with the worst quality of life in the physical well-being chest domain were the skin-sparing mastectomy (OR, 4.2; 95% confidence interval (CI), 1.2–14.1) and lymphedema (OR, 12.9; 95% CI, 1.0–159.9). Antibody treatment was associated with a worse score on the psychosocial well-being domain (OR, 4.25; 95% CI, 1.0–18.0) and sexual well-being domain (OR, 7.34; 95% CI, 0.9–54.6). Satisfaction was associated with nicotine dependence on the breast and outcome scale. The higher the dependence on nicotine, the greater the dissatisfaction with the breasts (OR, 2.41; 95% CI, 1.1–5.3) and with the result (OR, 2.45; 95% CI, 1.0–5.9).

Conclusions: The type of treatment and lymphedema modify the patients' quality of life. Nicotine dependence is associated with lower satisfaction with the breast and with the outcome.

Relevance to clinical practice: This study suggests the need for multidisciplinary attention during the first year of adjuvant treatment despite the benefits of immediate reconstruction. It shows the need for preoperative assessment of the level of

nicotine dependence, anxiety and depression of smoking patients before preoperative counselling.

KEYWORDS

breast neoplasms, breast reconstruction, patient satisfaction, quality of life

1 | INTRODUCTION

Although the surgical management of breast cancer has changed over time to favour breast-conserving procedures, mastectomies are still common; approximately 20%–30% of women with breast cancer underwent mastectomy (removal of all breast tissue; Schmauss, Machens, & Harder, 2015).

The aim of breast reconstruction is to restore the appearance of the breast following a mastectomy. The breast mound may be reconstructed at the time of mastectomy (immediate reconstruction) or at a later stage (delayed reconstruction). About 21% of women who underwent mastectomy have a concurrent immediate reconstruction. Multiple factors may influence whether patients undergo immediate breast reconstruction along with mastectomy for breast cancer (Kruper et al., 2011); some of them are as follows: the stage of the disease, the need of radiotherapy, morbid obesity, nicotine dependence or the patient's personal decision (Hu & Alderman, 2007).

A study suggests that immediate breast reconstruction is a safe treatment and should be considered as part of integral cancer treatment to reduce the impact of the mastectomy (Veronesi et al., 2011). Studies on reconstruction focus on analysing quality of life and satisfaction, carrying out a woman-centred intervention to obtain a patient-reported outcome (PRO) (Deshpande, Rajan, Sudeepthi, & Abdul Nazir, 2011). The evaluation of the surgical result is still essential, although it is no longer sufficient (Kanatas et al., 2012).

There are specific validated questionnaires to measure the quality of life and the satisfaction of breast reconstruction to develop a comprehensive measurement of surgical outcome. The Michigan Breast Reconstruction Outcomes Study—Satisfaction (MBROS-S) questionnaire and the Michigan Breast Reconstruction Outcomes Study—Body Image (MBROS-BI) questionnaire were designed to evaluate patient perceptions of satisfaction and physical appearance after breast reconstruction (Kanatas et al., 2012). The Breast Reconstruction Satisfaction (BRECON-31) questionnaire is designed to assess patient satisfaction after breast reconstruction (Temple-Oberle et al., 2013;). The BREAST-Q[©] measures the impact of breast reconstruction on women's quality of life, the satisfaction with breasts and overall outcome, and satisfaction with care. It is a big step forward in understanding the emotional and physical well-being of women. The BREAST-Q[©] was the perfect tool for this study because it focused on the breast surgery process and helped measure the care process as well (Pusic et al., 2009).

What does this paper contribute to the wider global clinical community?

- This study shows that antibody treatment is associated with a lower score on the psychosocial well-being domain.
- Our study indicates that patients with immediate reconstruction who develop lymphedema are more likely to report worse physical well-being of the chest.
- Our study indicates that neither the type of mastectomy nor the type of reconstruction is associated with satisfaction with breasts or outcome. Nicotine dependence is the variable associated with lower satisfaction with the breasts and with the outcome.

It is necessary to study breast reconstruction by analysing the surgical results, quality of life (QoL) and satisfaction, using specific tools (Javid, Lawrence, & Lavallee, 2017). However, it is also important to know the risk variables and to identify which patients are more likely to be unsatisfied and perceive a worse quality of life, something that is essential in the decision-making process or to deal with the problem at the right stage of the process.

Health-related QoL is subjective in nature and represents the patient's general perspective of the effects of their illness; its treatment; and the different physical, psychological, social and sexual aspects of life (Deshpande et al., 2011). To know how women perceive their body image, we need to include perceptions, feelings and emotions related to the body and its functioning. The changes in their image and the adaption they will have to deal with will affect their well-being (Fingeret, Nipomnick, Crosby, & Reece, 2013).

Studies have analysed QoL and women's satisfaction with their breast reconstruction using the BREAST-Q[©] questionnaire (Dean & Crittenden, 2016). However, few studies have been made to predict factors that may have an influence on QoL and satisfaction (Dieterich et al., 2015). This study was carried out with the aim of improving counselling in the decision-making process and developing strategies that favour the holistic recovery of women. The aim of this study was to examine the QoL and satisfaction of women with immediate breast reconstruction and to analyse factors influencing these two variables using the BREAST-Q[©] questionnaire (Pusic et al., 2009).

2 | PATIENTS AND METHODS

2.1 | Study population

The study included women diagnosed with breast cancer who underwent mastectomies and immediate reconstruction in the Complejo Hospitalario Universitario A Coruña (Spain), between September 2004 and January 2016.

The criteria for inclusion were women with a histopathological diagnosis of breast cancer with immediate breast reconstruction postmastectomy. All of the women were Spanish speakers. The study excluded women who were unable to complete the questionnaire, those who underwent breast reconstruction to reduce the risk of cancer and those patients with failed reconstructions, whose device was removed because of infection or exposure.

The study sample was selected as shown in the flow diagram (Figure 1). During the study period, 1,082 patients diagnosed with breast cancer underwent surgical treatment. Of these 1,082, 150

received immediate reconstruction, 109 of whom met the inclusion criteria. After considering losses and refusals to participate, the final sample size was 101 patients. This sample size made it possible to estimate the parameters of interest with a 95% confidence interval and a precision of $\pm 10\%$.

Informed consent of the patient and ethical review board was obtained (Galician Clinical Research Ethics Committee code 2013/253).

2.2 | Patient-reported outcomes

The patients were selected at least 6 months from the time of their reconstruction surgery and were given an appointment with the nursing service on the day of their revision with the surgeon. Patients without an appointment programmed in the near future were called by telephone, and if they agreed to take part, they were given an appointment at the breast unit or were sent information about the study, an authorisation form and questionnaires by email or post.

Anthropometric, cultural and social data were gathered, together with the patient's nicotine addiction level using the Fagerström test (Fagerstrom & Schneider, 1989), comorbidity details using the Charlson index (Charlson, Pompei, Ales, & MacKenzie, 1987), and details of their personal background. Subsequently, in a private room, each woman filled in the BREAST-Q[©] questionnaire (Pusic et al., 2009), using the specific postsurgery breast reconstruction module (116 items), validated in Spanish for Spanish-speaking women.

The BREAST-Q[©] consists of three domains of QoL and three domains of satisfaction. The quality of life domains are as follows: psychosocial well-being with items that ask about body image (accepting of body, attractive) and woman's confidence in social settings; physical well-being with items that ask about physical problems such as pain and problems in the breast area, activity limitations and sleep problems due to discomfort; and sexual well-being with items that ask about feelings of sexual attractiveness when clothed and unclothed and sexual confidence as it relates to one's breasts, as well as how comfortable or at ease a woman feels during sexual activity. The domains of satisfaction are as follows: satisfaction with the breasts (16 items), satisfaction with the outcome (seven items) and satisfaction with the care received. Satisfaction with care measures satisfaction with information provided about breast reconstruction surgery (15 items); satisfaction with surgeon (12 items), satisfaction with members of the medical team (seven items); and satisfaction with members of the office staff (seven items). The questionnaire can be completed in about 10–14 min. The data from the questionnaire were imported into the BREAST-Q[©] scoring software, which transformed them into scores from 0 to 100. A higher score indicates a better result. Psychometric evaluation reveals high reliability, validity and responsiveness to surgical intervention across all scales. The BREAST-Q[©] has a test–retest reliability, as measured by intraclass correlation coefficients ranged from 0.85 to 0.98.

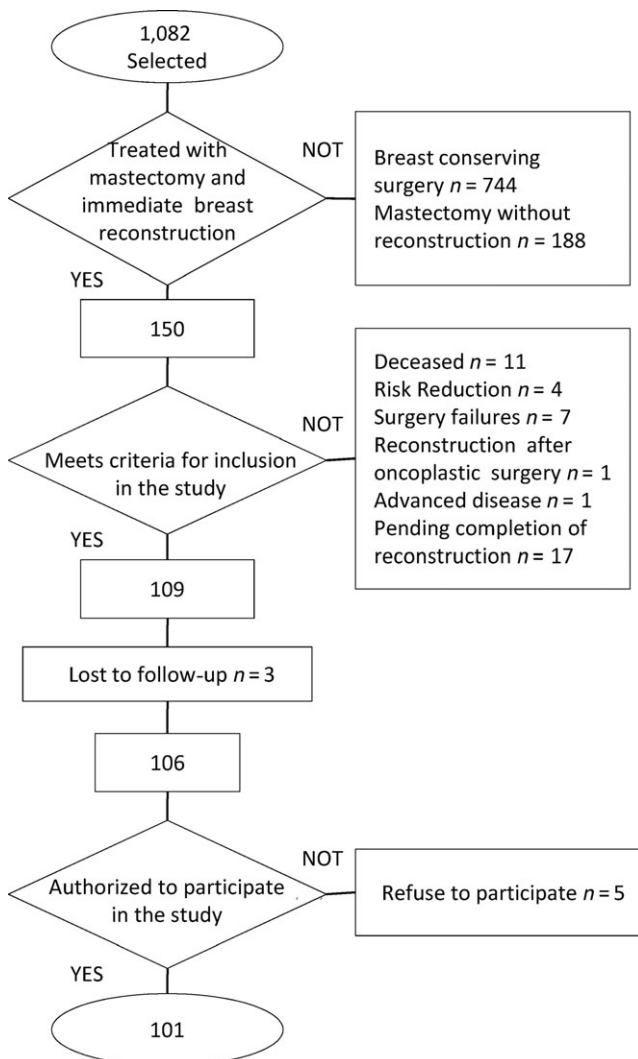


FIGURE 1 Patient selection. Flow diagram

2.3 | Statistical analysis

Descriptive analysis was performed for all variables studied. Continuous variables were reported using means \pm standard deviation (SD), median and range. Absolute numbers, percentages and their 95% confidence interval (CI) were computed as dichotomous/categorical variables.

Univariate analysis was performed to detect the associations of sociodemographic, comorbidity, breast reconstruction surgery and treatment variables with quality of life and satisfaction outcomes (data not shown). Correlations between continuous variables were made using the Pearson correlation coefficient or the nonparametric Spearman rank correlation. BREAST-Q[®] scores were compared according to different variables using Student's *t* test, ANOVA, Mann–Whitney and Kruskal–Wallis test as appropriate.

The effect of different variables on each of the BREAST-Q[®] domains was investigated via four logistic multivariable models that took into account, respectively, significant factors for sociodemographic and comorbidity (Model 1), breast reconstruction surgery (Model 2), pathological anatomy (Model 3) and treatment (Model 4) blocks of variables. For each block, all variables with a *p*-value $< .05$ in the univariate analysis were considered for selection into the multivariate logistic regression approach. To build each of the four multivariable block models for each dimension, a manual stepwise backward procedure was performed, removing any variables with *p*-values for the Wald chi-square test ≥ 0.05 .

Finally, results from the four block models were combined in the final logistic regression model. *p*-values for each variable in each final model are presented, together with odds ratios and 95% confidence intervals. Goodness of fit for the final logistic model was assessed by the Cox–Snell *R*² statistic. IBM SPSS software, version 19 (IBM, Armonk, NY, USA), and R software, v3.2.1 (The R Foundation for Statistical Computing), were used for statistical analysis.

3 | RESULTS

The mean age of patients at diagnosis was 44.87 ± 8.5 years, with a median of 45 years. An average of 3 years had elapsed between reconstruction and interview. A total of 44.6% of the women had university studies, and 65.3% lived together with a partner (Table 1). The prevalence of excess weight was 28.0%, and 8.0% were obese. The prevalence of tobacco use was 29.7%, and 11.4% of the smokers were highly dependent on nicotine according to the Fagerström test.

A total of 42.7% underwent a skin-sparing mastectomy, and the most frequent reconstruction was with an implant (74.5%; Table 2). About 21.6% of the patients experienced postoperative complications. The most frequent of which was haematoma (16.7%), followed by cutaneous necrosis (16.7%) and seroma of the back (16.7%). Twelve per cent of the patients received neoadjuvant chemotherapy, while 22.8% received postoperative radiotherapy.

TABLE 1 Anthropometric, social characteristics and comorbidity of the patients

Variable	<i>n</i>	Mean \pm SD	Median	Range
Age at diagnosis (years)	101	44.87 \pm 8.5	45.0	27–61
Age at the interview (years)	101	48.2 \pm 9.2	48	27–70
Charlson age-adjusted	101	2.8 \pm 0.92	2	2–5
Variable	<i>n</i>	(%)		
Education level	101			
Primary education	16	15.8		
Secondary education	5	5		
General certificate of education	15	14.9		
Vocational education and training	5	5		
Certificate of higher education	15	14.9		
University degree	45	44.6		
Marital status	101			
Single	18	17.8		
Married/couple	66	65.3		
Divorced/separate	11	10.9		
Widowed	6	5.9		
BMI (kg/m ²)	100			
Underweight (<20)	7	7		
Normal weight (20–24.9)	57	57		
Overweight (25–29.9)	28	28		
Obese (30 or > 30)	8	8		
Tobacco addiction	101			
Yes, I smoke every day	30	29.7		
Yes, I smoke occasionally	8	7.9		
No, I have never smoked	37	36.6		
No, I'm an ex-smoker	26	25.7		
Fagerström test of nicotine dependence	35			
Low dependence	23	64.9		
Moderate dependence	8	22.8		
High dependence	4	11.4		
Anxiolytic/antidepressant therapy	95			
Yes	18	18.9		
Hormonal therapy	101			
Yes	50	49.5		

BMI, body mass index; SD, Standard deviation.

The results of the BREAST-Q[®] (Table 3) showed that the quality of life domain with the highest score corresponds to the psychosocial well-being dimension (75.3 ± 19.5) followed by the physical well-being chest dimension (70.4 ± 16.8). In the satisfaction domains, the highest scores corresponded to satisfaction with the care provided by the nurses (97.5 ± 7.8), the medical staff (96.3 ± 10.8) and the surgeon (95 ± 0.4). Of the remaining satisfaction domains, the highest score corresponded to satisfaction with the outcome (75.3 ± 20.2), while the lowest score corresponded to satisfaction with the breasts (60.8 ± 8.8).

TABLE 2 Characteristics of surgery, pathology and treatments of patients

Variable	n	(%)
Type of mastectomy	101	
Radical mastectomy	29	30.2
Skin-sparing mastectomy	41	42.7
Nipple skin-sparing mastectomy	26	27.1
Not available	5	
Type of reconstruction	101	
Autologous	25	25.5
Implant	73	74.5
Autologous plus implant	3	3
Breast symmetrisation (1st surgery)	100	
Yes	31	31
Axillary lymph node dissection	90	
Yes	40	44.4
Postoperative complications	97	
Yes	21	21.6
Overall complications	24	
Haematoma	4	16.7
Abscess	1	4.2
Lymphangitis	1	4.2
Breast seroma	3	12.5
Wound dehiscence	1	4.2
NAC necrosis	1	4.2
Cutaneous necrosis	4	16.7
Back seroma	4	16.7
Prosthesis extrusion	1	4.2
Tissue expander puncture	1	4.2
Panic attack	1	4.2
Bleeding around tissue expander cavity	2	8.3
Lymphedema	100	
Yes	8	8
Molecular subtype	80	
Luminal A	29	33
Luminal B HER2-	15	18.8
Luminal B HER2+	18	22.5
HER2+	9	11.3
Basal like	9	11.3
Stage	82	
In situ	11	13.4
IA	27	32.9
IB	5	6.1
IIA	26	31.7
IIB	2	2.4
IIIA	9	11.0
IIIC	2	2.4
Neoadjuvant therapy	100	
Yes	12	12

(Continues)

TABLE 2 (Continued)

Variable	n	(%)
Adjuvant therapy	92	
Radiotherapy	21	22.8
Chemotherapy	64	69.6
Immunotherapy	17	18.7
Hormone therapy	65	70.7

NAC, Nipple areola complex.

TABLE 3 Scores of the different domains of the BREAST-Q[©] questionnaire

BREAST-Q [©]	Mean ± SD	Median	Range
Quality of life domains			
Psychosocial well-being (n = 101)	75.3 ± 19.5	79	23–100
Sexual well-being (n = 94)	63.4 ± 23.7	61.5	16–100
Physical well-being chest (n = 101)	70.4 ± 16.8	74	25–100
Physical well-being abdomen (n = 3)	82.6 ± 10.9	89	70–89
Satisfaction domains			
Satisfaction with breast (n = 100)	60.8 ± 18.8	59	11–100
Satisfaction with nipples (n = 52)	71.3 ± 24.4	74	26–100
Satisfaction with outcome (n = 100)	75.3 ± 20.2	75	27–100
Satisfaction with care: information (n = 100)	74 ± 19.1	71	19–100
Satisfaction with care: surgeon (n = 100)	95 ± 10.4	100	36–100
Satisfaction with care: medical staff (n = 100)	96.3 ± 10.8	100	39–100
Satisfaction with care: nursing (n = 100)	97.5 ± 7.8	100	58–100

SD, Standard deviation.

With respect to the quality of life dimensions, after carrying out a multivariate analysis, taking into account the variables age at the time of the interview, marital status, comorbidity, anxiolytic medication, type of mastectomy, contralateral surgery, presence of lymphedema, Her2 + molecular profile, antibody treatment and radiotherapy treatment, we found that the variable that was most associated with a lower score in the psychosocial well-being dimension was antibody treatment (OR = 4.25; $p = .05$; Table 4). The same trend was observed in the sexual well-being dimension in relation to antibody treatment. This treatment increased the probability of lower scores (OR = 7.34; $p = .05$). As regards the physical well-being dimension, the variables with an independent effect for lower scores in this dimension were the presence of lymphedema (OR = 12.9; $p = .04$) and SSM vs. radical mastectomy (OR = 4.27; $p = .02$).

TABLE 4 Results of the multivariate logistic regression analysis of different variables with lower scores than median in the quality of life domains

Variable	Psychosocial well-being			Sexual well-being			Physical well-being chest			
	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>	
Age at the interview (years)	0.98	0.92–1.04	.39	1.02	0.96–1.09	.49	0.99	0.94–1.06	.98	
Marital status										
Single		Reference								
Married	0.52	0.13–2.05	.35							
Divorced	6.90	0.56–83.65	.13							
Widowed	0.69	0.08–5.79	.73							
Charlson comorbidity index	2.10	0.73–6.05	.73							
Anxiolytic therapy (Yes)				3.48	0.83–14.65	.08				
Type of mastectomy										
Radical mastectomy		Reference						Reference		
SSM	3.03	0.87–10.56	.08				4.27	1.29–14.1	.02	
NSSM	1.37	0.34–5.53	.65				2.14	0.54–8.4	.28	
Breast symmetrisation							2.49	0.71–8.67	.15	
Lymphedema (Yes)							12.9	1.04–159.95	.04	
HER2										
0					Reference					
1+				1.53	0.34–6.79	.58				
2+				0.31	0.04–2.35	.26				
3+				0.91	0.18–4.49	.91				
Immunotherapy (Yes)	4.25	1.0–18.02	.05	7.34	0.98–54.65	.05				
Radiotherapy (Yes)							1.34	0.36–4.98	.66	
<i>R</i> ² Cox y Snell		<i>R</i> ² = 0.21				<i>R</i> ² = 0.16			<i>R</i> ² = 0.14	

CI, confidence interval; NSSM, nipple skin-sparing mastectomy; OR, Odds ratio; *p*, *p*-value; SSM, skin-sparing mastectomy.
 Note: The values shown in bold are statistically significant.

With regard to satisfaction with breasts, after taking into account the variables age at the time of the interview, nicotine dependence, marital status, type of mastectomy, type of reconstruction, Her2 + molecular profile and antibody treatment, we observed that nicotine dependence increased the probability of dissatisfaction with breasts (OR = 2.41; *p* = .02) and outcome (OR = 2.45; *p* = .04; Table 5). The higher the dependence on nicotine, the greater the dissatisfaction with the breasts and the outcome. Also, marital status showed that being married or in a couple in comparison with single women reduced the probability of dissatisfaction (OR = 0.009; *p* = .04). The only variable we found to be associated with dissatisfaction with the nipples was the Her2 + molecular profile (OR = 10.48; *p* = .01).

In the case of the patients' satisfaction with care received (Table 5), we found that the variable that increased the probability of dissatisfaction with the information was the nipple skin-sparing mastectomy (NSSM), compared with a radical mastectomy (OR = 4.21; *p* = .04). Dissatisfaction with the surgeon was modified by a higher level of education. Patients with secondary education studies had a lower probability of being dissatisfied than patients who only had primary studies (OR = 0.07; *p* = .03), with the age at the limit of statistical significance: the higher the age, the lower the probability of being dissatisfied (OR = 0.93; *p* = .07). In turn, the

only variable that had an independent effect to predict lower scores with the medical staff was the hormonal treatment; patients who were receiving hormonal treatment had a lower probability of being dissatisfied (OR = 0.10; *p* = .04).

Supporting information tables can be found online (Tables S1, S2 and S3).

4 | DISCUSSION

With respect to the quality of life, this study reveals that antibody treatment, type of mastectomy and presence of lymphedema modify the patients' QoL. Our results, like others, showed that the patients' age did not influence QoL (Johnson et al., 2016).

Antibody treatment was the predictive variable for the psychosocial well-being and sexual well-being for women with cancer with immediate reconstruction. Our study coincides with the findings of other studies inasmuch as the surgical procedure for women with cancer had a limited effect on their psychosocial well-being (Atisha et al., 2008; Nicholson, Leinster, & Sassoon, 2007). It would seem necessary to consider other factors apart from surgery. In this study, we described that antibody treatment was related with decreased

TABLE 5 Results of the multivariate logistic regression analysis of different variables with lower scores than median in the satisfaction domains

Variable	OR Breast	95% CI	<i>p</i>	OR Nipple	95% CI	<i>p</i>	OR Outcome	95% CI	<i>p</i>
Satisfaction with breasts									
Age at the interview (years)	0.90	0.77–1.04	.15	1.05	0.94–1.17	.34			
Fagerström test	2.41	1.1–5.30	.02				2.45	1.01–5.90	.04
Marital status									
Single									Reference
Married							.009	0.0–0.80	.04
Divorced							.03	0.0–3.60	.15
Widowed							.02	0.0–4.27	.16
Type of mastectomy									
Radical mastectomy									Reference
SSM				1.66	0.31–8.86	.55	5.87	0.11–310.47	.38
NSSM				3.43	0.0–	.99	0.78	0.03–20.65	.88
Type of reconstruction									
Autologous									Reference
Implant	1.25	0.03–51.35	.91						
HER2 (recode)									
Negative (0 y 1 +)									Reference
Indeterminate (2 +)	0.40	0.01–12.16	.59	1.89	0.21–17.11	.57			
Positive (3 +)	5.65	0.09–357.1	.41	10.48	1.77–61.95	.01			
Immunotherapy (Yes)	2.63	0.02–351.54	.69						
R^2 Cox y Snell		$R^2 = 0.44$				$R^2 = 0.32$			$R^2 = 0.32$
Variable	OR Information	95% CI	<i>p</i>	OR Surgeon	95% CI	<i>p</i>	OR Medical staff	95% CI	<i>p</i>
Satisfaction with care									
Age at the interview (years)	0.97	0.91–1.03	.32	0.93	0.86–1.008	.07	0.91	0.82–1.01	.10
Education level									
Primary education									Reference
Secondary education				0.07	0.006–0.82	.03			
Degree				0.33	0.08–1.36	0.12			
Previous breast cancer (Yes)	2.59	0.36–18.26	.34						
Type of mastectomy									
Radical mastectomy									Reference
SSM	2.14	0.66–6.92	.20	2.42	0.52–11.10	.25			
NSSM	4.21	1.04–16.95	.04	312	0.57–16.93	.19			
Molecular subtype									
Luminal A									Reference
Luminal B HER2–							2.17	0.27–17.38	.45
Luminal B HER2+							0.78	0.07–8.09	.83
HER2+							0.17	0.006–4.91	.30
Basal like							2.01	0.16–24.37	.58
Oestrogen receptors + (Yes)				0.54	0.08–3.58	.53			
Chemotherapy (Yes)							1.80	0.18–17.75	.61
Hormone therapy (Yes)				0.37	0.06–2.36	.29	0.10	0.01–0.96	.04
Immunotherapy (Yes)	1.87	0.49–7.16	.36						
R^2 Cox y Snell		$R^2 = 0.15$				$R^2 = 0.20$			$R^2 = 0.16$

CI, confidence interval; NSSM, nipple skin-sparing mastectomy; OR, Odds ratio; *p*, *p*-value; SSM, skin-sparing mastectomy.

Note: The values shown in bold are statistically significant.

psychosocial and sexual well-being. Patients with antibody treatment have more exposure to adjuvant treatment. And, in addition to the side effects of chemotherapy and radiation therapy, antibody treatment is associated with cardiotoxicity and increased fatigue (Seidman et al., 2002). During the first year, the psychosocial well-being of patients who have undergone immediate reconstruction due to cancer is similar to that of mastectomy patients, and emotional support is recommended, despite the accompanying benefits of reconstruction (Metcalf et al., 2012; Peled et al., 2014).

With regard to type of mastectomy, in our study, SSM was a risk factor with probability of predicting poorer physical well-being chest (OR = 4.27), compared with radical mastectomy. Autologous reconstruction was in most cases with SSM (95.7%) and latissimus dorsi flap reconstruction (88%) with consequences of shoulder function morbidity (Smith, 2014). There were no autologous cases in the category of radical mastectomy.

The incidence of lymphedema found in our study was 8%, lower than that found in other studies, which ranged between 11.6% and 36% (Menezes et al., 2016; Miller et al., 2016). These studies showed that the reconstruction does not increase the risk of lymphedema, and they identified axillary dissection, radiotherapy and obesity as risk factors. In our study, if the patient developed lymphedema, this increased the probability of their physical well-being chest worsening (OR = 12.9). Helyer, Varnic, Le, Leong, and McCready (2010) noted that the risk of developing lymphedema in the first 2 years was mainly and significantly associated with the body mass index (BMI). Patients with a BMI > 30 (obese) had an OR of 2.93 in comparison with those with a BMI < 25. In our data, the patients who developed lymphedema had a significantly higher BMI than those who did not (26.8 ± 3.4 vs. 23.7 ± 3.44 kg/m²). This would allow us to carry out multidisciplinary interventions to prevent excess weight and a prevalence of obesity. Obesity is associated with lower survival rates in breast cancer (Druesne-Pecollo et al., 2012), in postmenopausal cancer and in premenopausal cancer, as suggested by recent studies (Chan et al., 2014; Warren et al., 2016). It would seem that more studies are necessary with regard to the QoL of women with cancer with immediate breast reconstruction, taking other variables into account apart from the surgical variables. The breast cancer patients' experiences will be different to those of women who do not have cancer.

With regard to satisfaction, in our study, neither the type of mastectomy nor the type of reconstruction was associated with satisfaction with breast or outcome. The patient's level of nicotine dependence was a predictive factor for satisfaction with breast and with outcome. The higher the level of dependence, the greater the risk of dissatisfaction. According to the World Health Organization, the disorders caused by nicotine are related to the level of dependence and withdrawal syndrome (World Health Organization). Smoking increases the risk of complications occurring in breast surgery (Ducic, Spear, Cuoco, & Hannan, 2005). It is recommended that patients stop smoking at least 4 weeks prior to surgery in order to reduce the risks (Spear, Ducic, Cuoco, & Hannan, 2005). According to Repko, van den Brink, and Huyser (2007), we need to verify

whether patients who stop smoking are more likely to develop symptoms of depression before planning to stop tobacco consumption, as high comorbidity between daily tobacco use and depression, and stressful moments in life are risk factors for this comorbidity. In turn, Guimond et al. (2016) showed that having breast cancer was a predictor for giving up smoking (OR = 3.08) and that these patients were more likely to stop smoking than patients with other types of cancer. However, those who did stop smoking had higher levels of anxiety ($p = .03$) and fear of the cancer reappearing ($p = .01$). In our study, one patient had an anxiety attack due to nicotine withdrawal. It would therefore seem necessary to evaluate the level of nicotine dependence and the patient's anxiety and depression prior to counselling in order to reach decisions.

In the same way as those of Robiolle, Quillet, Dagregorio, and Huguier (2015), our results gave higher scores to autologous reconstruction in the satisfaction with breasts (67.45 ± 18.45 vs. 60.22 ± 17.87) and with outcomes (76.39 ± 21.38 vs. 76.21 ± 19.60), although without reaching statistical significant difference. The review of Guyomard, Leinster, and Wilkinson (2007) suggested that women are satisfied with the reconstruction regardless of the technique used, their age and the moment of reconstruction. Other recent studies have provided results showing greater satisfaction with autologous tissue (Atisha et al., 2015). In our study, neither was radiotherapy with an expander a predictive factor for lower satisfaction scores. Other studies have suggested that radiotherapy does not affect satisfaction, although it does increase the complications (Anker et al., 2015). Cordeiro et al. (2015), comparing radiotherapy with an expander vs. implants, showed that radiotherapy had a negative effect on satisfaction with the breasts, which was higher with the expander ($p = .02$). This information can help in the decision-making process and to define suitable expectations for these patients (Albornoz et al., 2014; Cordeiro et al., 2015), taking into account the fact that the surgeon's view may be different to the patient's evaluation (Thomson et al., 2008).

Numerous studies have analysed the presence of nipple areola complex (NAC), comparing NSSM vs. SSM. Some studies considered the symmetry of the breast and the aesthetic quality of the nipple as the factors that most affect the patient's satisfaction (Kim et al., 2012). NSSM provides greater satisfaction with the breast and with the result, when comparing NSSM vs. SSM in bilateral risk-reduction mastectomy (Metcalf et al., 2015). Other studies did not find any differences in terms of satisfaction with the presence of NAC and suggested that this may be due to the position of the nipple and loss of sensitivity (Peled et al., 2014; van Verschuer et al., 2016). Neither did Venus and Prinsloo (2010) find any differences, even between women with reconstruction of the NAC vs. those without any NAC reconstruction. In our study, the Her2+ molecular profile (OR = 10.48) was a predictive factor for dissatisfaction with the nipple. We do not know the rational of this association. Perhaps there are other confounding variables responsible for this relationship. Neither antibody treatment, the type of mastectomy, tattoo, nor reconstruction of the NAC were associated with satisfaction. These results once again suggest the need for studies that analyse other

variables that affect women apart from the surgical variables, which may influence their satisfaction. Temple-Oberle, Ayeni, Webb, Bettger-Hahn, and Mychailyshyn (2014) indicate that greater satisfaction may be achieved using a patient-centred approach, providing detailed information, appreciating the characteristics of each woman and adapting the reconstruction plan to the person.

The studies coincide in highlighting the importance of good counselling before the surgery that leads to realistic expectations. The preoperative BREAST-Q[®] (Pusic et al., 2012) was developed to identify the needs of each patient and to provide them with individualised information. Different studies have analysed these expectations depending on the patient's age or level of self-efficacy (Cagli, Cogliandro, Barone, & Persichetti, 2014; Zhong et al., 2013). In our study, the predictive variable for satisfaction with the information was the NSSM, with the risk of increasing dissatisfaction with regard to radical mastectomy (OR = 4.21). One reason could be the need for more information about the nipple to have realistic expectations. Our results were similar to those of Cohen et al. (2016) and contrasted the difference in terms of satisfaction with the information (mean = 72.8) vs. satisfaction with the care received (mean = 89.5–95.5), suggesting the need to improve the information in order to provide patient-centred care.

Satisfaction with the surgeon is essential to analyse the importance of the interaction between the surgeon and the patient. By knowing the expectations and needs of the woman, it is possible to improve the counselling process in terms of taking decisions and deciding on the most suitable technique for the patient. Ho, Klassen, Cano, Scott, and Pusic (2013) suggested that this surgeon–patient interaction had a significant influence on the patient's satisfaction with their breasts and with the outcome. In our analysis, satisfaction with the surgeon was significantly related to a higher level of education, and with increased age, at the limit of statistical significance. We also found a relationship between satisfaction with the surgeon and satisfaction with the information ($p < .01$) and a relationship between satisfaction with the surgeon and satisfaction with the breast ($p = .01$). These results suggest that the interaction between the surgeon and the patient in the preoperative counselling process, according to their needs and expectations, can influence patient satisfaction scores.

The satisfaction with the care provided by the nurse had the highest score. Our results showed that women who underwent breast reconstruction were satisfied with the nursing care received. Breast cancer nurses play an important role in breast reconstruction, providing psychosocial care and helping women in the process of receiving information. These results coincide with those of other studies, which indicated women who had undergone breast reconstruction considered the care provided by a nurse as important (Halkett, Arbon, Scutter, & Borg, 2006).

The limitations of the study are as follows: this study is only applicable to patients with breast cancer diagnosis treated with immediate reconstruction after mastectomy. We include all the consecutive patients during the study period. Satisfaction only refers to women who had completed the reconstruction process. Our study

demonstrated external validity through consistency with other studies. Length of time between surgery data collection is also limitation due to the recall bias. We used validated questionnaires with trainee interviewers to minimise information bias. A multivariate logistic regression analysis was performed to take into account the confounding effect of different variables.

This study provides clinical and epidemiological information on the profile of patients who underwent immediate reconstruction following a mastectomy due to cancer. It makes it possible to identify the variables that modify quality of life, and satisfaction with breast cancer reconstruction and care received. It suggests the need for multidisciplinary attention in the care and monitoring of women with immediate breast reconstruction.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

CONTRIBUTIONS

Study design: CG, PF, AN; data collection and analysis: RV, GN, SP, BB; and manuscript preparation: BR.

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SUPPORTING INFORMATION

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