

ORIGINAL ARTICLE

## Differences between women who have and have not undergone breast reconstruction after mastectomy due to breast cancer

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### Abstract

*Aim.* This study compares potential differences between women with breast cancer who after mastectomy had undergone breast reconstruction with those who had not. *Material and methods.* All women (N=149) in the northern medical region of Sweden who had undergone mastectomy in 2003 received a self-reported questionnaire entitled “Life After Mastectomy (LAM)” that included standardized measures of sociodemographic, decision-making process, breast reconstruction (BR) yes or no, sexuality, and body image. SPSS was used for data processing. *Results.* In total 85% of the women returned the questionnaire and of these 25% had undergone BR. In accordance with previous studies, we found that the mean age of the women in the BR group was significantly lower (52 vs. 64 years), they had a higher education, and a higher proportion were employed, influenced by the physician’s opinion regarding BR, sexually active, and rated a negative impact concerning the factors attractiveness and body disclosure. A multiple regression analysis, however, showed that the choice to undergo breast reconstruction or not was only independently associated with age, feeling of attractiveness and sexual interest. *Discussion.* Age explained most differences found between the two groups. When researchers try to identify what differentiates the groups of women who undergo reconstruction between those who do not undergo reconstruction after mastectomy, it is thus necessary to take into consideration that the meanings of mastectomy, body image, attractiveness and similar variables may vary due to the phase of a woman’s life. In conclusion, considering the impact of age is of paramount importance in future studies for our understanding of women’s experiences.

### Introduction

From a historical perspective, the breast represents fertility and motherhood as well as sorcery and sexuality. Since antiquity, the woman’s breast has been of interest for doctors for two different reasons – milk bringing and disease [1]. The healthy breast is life giving, but the sick breast may cause death. Breast cancer is a significant health concern for women. In the Western world, breast cancer is the most common type of cancer among women today and one of the main reasons for cancer-related death. In Sweden, around 7 000 women are diagnosed with breast cancer each year, representing nearly one-third of cancer incidents. With early detection and advanced treatment options, survival rates have improved considerably and three of four women survive 10 years after diagnosis [2].

Many factors are related to how women deal with breast cancer. The initial crisis of getting the

diagnosis and the following treatments affects the woman’s psychological well-being as well as her physical appearance, not only leaving emotional marks but also leaving physical marks on the woman’s body [3–5]. After a mastectomy, women have reported reduced self-esteem associated with a negative view of their body and decreased feelings of ‘femininity’ and sexuality, all feelings that negatively influence their daily life [5,6].

In Sweden about 40% of the women undergo a mastectomy [7] and afterwards they have three options: surgically reconstruct the breast, wear an external prosthesis, or do nothing. The first alternative provides an opportunity to restore the appearance of the breast; it is a means to restore cosmetic “normality” and to reduce the psychological distress. Breast reconstruction (BR) can be done immediately after the mastectomy or as a delayed procedure [8].

A majority of older women do not undergo breast reconstruction. Research suggests that these women [9] tend to play down the importance of the breast and are likely to be satisfied with the external breast prosthesis: in fact, in these studies a majority did not regard reconstruction to be essential for their physical or emotional well-being. A fear of surgery also contributed to their choice of not opting for reconstruction [9,10].

Due to improved diagnosis and treatment, an increasing number of women live with breast cancer for many years or for their whole life. Subjection to or abstaining from breast reconstructive surgery is a part of how they deal with a new everyday life. There is a scarcity of studies with the main purpose of comparing women who only undergo mastectomy compared to mastectomy with reconstruction since contemporary research is for the most part concerned with investigations of women's experiences or outcomes of different types of reconstructions [9,11–13]. However, most women do not undergo reconstruction. As a contribution to increase our understanding, this study compares women who have not undergone breast reconstruction after mastectomy with those who have.

## Material and methods

### *Study sample and context*

A study of all women who had undergone mastectomy for breast cancer in 2003 in the northern medical region (Norrland) of Sweden was conducted. In 2003, 400 women were diagnosed with breast cancer and of these 149 had undergone mastectomy. The women were identified by the Regional Centre of Oncology, Umeå University Hospital. The study was approved by the Ethics Committee of the Faculty of Medicine.

### *Instrument*

Since few specific instruments exploring women's experiences of living without a breast after mastectomy could be found, a self-reported questionnaire entitled "Life After mastectomy" (LAM) was designed to investigate women's experiences of living without a breast and the decision-making process for or against BR. The items included in the questionnaire were prompted by the items in the Body Image Questionnaire [14], the EORTC-QLQ BR23 [15], literature reviews, and clinical experience. Face and content validity of LAM was established during consultation and discussion with four women who had undergone mastectomy (not included in the study) and during discussions with professionals: a breast cancer nurse,

physicians at the plastic surgical unit and with health care staff at the psychosocial unit at the Department of Oncology during a focus group. In these discussions, a think-aloud method [16] was used to ensure that items were understandable and relevant and that the participants understood the questions.

The final version of the questionnaire consisted of four parts: 1) socio-demographic details (age, education, family status, employment, treatment, and if reconstructed or not); 2) the three single items from EORTC-QLQ-BR 23 evaluating sexual function BR14 "To what extent were you interested in sex?"; BR15 "To what extent were you sexually active?"; and sexual enjoyment BR16 "Answer this question only if you have been sexually active: To what extent was sex enjoyable for you?". The response categories of these items are ranked on an ordinal scale ranging from 1 (not at all) to 4 (very much); 3) three questions investigating who or what influenced the decision for or against reconstruction; and 4) 15 statements related to the experience of being without a breast (body image). Here, in part 4, the respondents were asked to consider changes in body image after the mastectomy and to respond on an ordinal scale ranging from 1 (strongly disagree) to 6 (strongly agree). Five of the items depended on whether the woman had a partner and/or children. Thus, to these five items the additional option 'not relevant' was added. Translation between Swedish and English was conducted according to common practice in the scientific community [17].

### *Data collection and analysis*

Data were collected in the spring 2007. All women who had undergone mastectomy ( $n=149$ ) during 2003 were sent a questionnaire, and if it was not returned within two weeks, the woman was contacted by telephone. The questionnaire was returned by 126 participants (85%). The women ranged in age from 36 to 79 years (mean 61 years, SD 10.6). Demographic and treatment characteristics are presented in Table I. The women who had undergone a BR had a delayed reconstruction 6–44 months after the mastectomy (mean 22.4 months, SD 10.7). The standard technique for delayed reconstruction in northern Sweden between 2003 and 2007 was to place a permanent adjustable prosthesis under the pectoral muscle or a latissimus dorsi flap.

Of the 23 women (15%) who declined to participate, 10 mentioned that they preferred not to think about their cancer, felt too weak and/or had another illness, and one woman referred to relapse of her cancer. The reasons for the remaining 13 women who declined are unknown. There was no statistical significant difference in the mean age of the women who did not return the questionnaire

Table I. Demographic characteristics of the sample (n=126) and comparisons between the Breast Reconstruction and non-Breast Reconstruction group.

Demographic data	Total	Non-BR <sup>1</sup> n=95	BR <sup>2</sup> n=31	p-value
Age mean (SD) n=126	61 (±10.6)	64 (± 9.7)	52 (± 8.4)	<0.001
Living condition before mastectomy n=123 (%)				
Cohabiting	102 (83)	78 (84)	24 (80)	0.624
Living condition after the mastectomy n=123 (%)				
Cohabiting	91 (73)	69 (75)	22 (71)	0.658
Education n=125 (%)				
≥10 years of education	70 (56)	46 (49)	24 (77)	0.007
Employment n=125 (%)				
Being employed	74 (59)	48 (53)	25 (81)	0.029
Treatment n=126 <sup>3</sup> (%)				
Mastectomy alone	42 (33)	30 (32)	12 (39)	0.465
Chemotherapy (CT)	25 (20)	16 (17)	9 (29)	0.139
Radiotherapy (RT)	64 (51)	49 (52)	15 (48)	0.758
Endocrine	54 (43)	44 (46)	10 (32)	0.170

<sup>1</sup>Non-BR=women who had not undergone breast reconstruction. <sup>2</sup>BR=women who had undergone breast reconstruction. <sup>3</sup>More than one option could have been chosen.

compared to those who complied (65 years, SD 9.8 vs. 61 years, SD 10.6, p=0.076).

Dichotomous variables were analysed by means of Pearson's Chi-square test, Fisher's exact test and continuous variables by Student's t-test and, when appropriate, Mann-Whitney U-test. A varimax principal component factor analysis was conducted on part four of the LAM to reduce the number of factors and to identify underlying dimensions. We have chosen to extract factors with eigenvalues above 1.00 which produced four factors that

conveyed meaningful information. These factors are labelled as follows: *attractiveness*, *body disclosure*, *relational comfort*, and *scar avoidance* (Table II). Each factor includes items with a loading above 0.5. The item "after the mastectomy, it feels more difficult to change clothes in a public dressing room" was excluded as it loaded equally in several factors and two other items – "after the mastectomy, it is less comfortable to exercise" and "my choice of clothing has been influenced after the mastectomy" were excluded due to low factor loadings.

Table II. Comparison between the Breast Reconstruction and non-Breast Reconstruction group regarding mean scores for single items and the total index score for each factor in part 4 "Body Image" of the Life After Mastectomy Questionnaire

	Non-BR <sup>1</sup> n=92 mean (SD)	BR <sup>2</sup> n=31 mean (SD)	p-value
<i>Attractiveness</i>			
I feel as attractive now as I did before the mastectomy.	4.1 (±1.9)	4.8 (±1.7)	0.063
I feel as content with how my body looks now as I did before the mastectomy.	4.3 (±1.9)	4.9 (±1.6)	0.094
I feel as feminine now as I did before the mastectomy.	3.8 (±2.0)	4.4 (±1.8)	0.133
I feel as sexually attractive now as I did before the mastectomy.	4.0 (±1.9)	4.8 (±1.6)	0.043
Index score for factor <i>attractiveness</i> <sup>3</sup> (range 4–24)	16.2 (±6.9)	18.9 (±5.8)	0.035
<i>Body disclosure</i>			
I am more prone to hide my body from my partner after the mastectomy.	1.9 (±1.3)	2.8 (±1.8)	0.022
I am more prone to hide my body from my children/grandchildren after the mastectomy.	2.3 (±1.5)	2.8 (±1.7)	0.113
After the mastectomy I am uncomfortable during sexual intimacy.	2.3 (±1.5)	2.6 (±1.4)	0.464
Index score for factor <i>body disclosure</i> <sup>3</sup> (range 3–18)	6.6 (±3.6)	8.2 (±4.0)	0.043
<i>Relational comfort</i>			
I feel as interesting in physical contact like hugging now as I did before the mastectomy.	2.5 (±1.7)	2.4 (±1.7)	0.606
My partner feels as sexual interested in me as before the mastectomy.	2.4 (±1.5)	2.8 (±1.3)	0.825
I feel as comfortable now with family/friends as I did before the mastectomy.	2.4 (±1.8)	2.3 (±1.5)	0.776
Index score for factor <i>relational comfort</i> <sup>3</sup> (range 3–18)	7.3 (±4.0)	7.0 (±3.3)	0.674
<i>Scar avoidance</i>			
I avoid looking at my mastectomy scars.	1.7 (±1.3)	1.9 (±1.5)	0.429
I am afraid touching the mastectomy scars.	1.4 (±1.0)	1.3 (±1.0)	0.828
Index score for factor <i>scar avoidance</i> <sup>3</sup> (range 3–18)	3.1 (±1.9)	3.3 (±2.2)	0.672

<sup>1</sup>Non-BR=women who had not undergone breast reconstruction. <sup>2</sup>BR=women who had undergone breast reconstruction. <sup>3</sup>Higher index score on each factor indicates a negative impact of the mastectomy.

Table III. Multiple logistic regression analysis of factors associated with breast reconstruction/non-Breast Reconstruction.

	Odds ratio	95% confidence interval	p-value
Age	0.884	0.832–0.940	<0.001
Attractiveness	0.913	0.835–1.000	0.049
Sexual interest	5.538	1.772–17.307	0.003

Model Cox and Snell  $R^2=0.29$ , concordance between observed and predicted value=73.2.

In items rated “not relevant” ( $n=5$ ) a mean value based on the scores for the BR and the non-BR group was imputed. Missing values on single items were imputed by the mean value of the answered questions from each of the groups, a procedure recommended by Tabachnick & Fidell (2001) as a way to reduce internal dropout or missing cases without changing the mean of the sample as a whole [18]. Three questionnaires were excluded since there were too many missing items; therefore, the factor analysis included 123 questionnaires. An index score was calculated based on scores from items in each factor and higher index scores indicate a negative impact of the mastectomy (Table II). The variables in each factor were tested for internal consistency using Cronbach’s alpha (0.67–0.92).

A multivariate logistic regression analysis (Table III) was performed to test for associations between BR/non-BR concerning age, education, family status, employment, sexual interest and activity, attractiveness, body disclosure, relational comfort and scar avoidance. The associations are reported as odds ratios with a 95% confidence interval.

All analyses performed were 2-tailed and a p-value of  $<0.05$  was considered to indicate the statistical significance. SPSS version 15.0 was used for data processing.

## Results

The results from all four parts of the LAM are presented here below.

### Part 1: Socio-demographic characteristics

Socio-demographic characteristics of the two groups are shown in Table I. Of the 126 women, 25% had undergone BR and these women were significantly younger, 52 years (SD 8.4) compared to 64 years (SD 9.7) of age in the non-BR group. A significantly higher proportion of the women in the BR-group had 10 years or more of education ( $p=0.007$ ) and was to a greater extent employed ( $p=0.029$ ). No significant differences were found between the groups concerning breast cancer treatment, living conditions, or change in living conditions after the mastectomy.

### Part 2: Sexual function

In total, 112 women answered the questions related to sexual interest, activity, and enjoyment during the last four weeks. A higher proportion of the women in the BR group indicated that they had been interested in sex (47% vs. 12%,  $p<0.001$ ), been sexually active (47% vs. 9%,  $p<0.001$ ), and if being sexually active had enjoyed sex (95% vs. 53%,  $p=0.002$ ).

### Part 3: The decision-making process

Of the 106 women who had a partner, 20% indicated that they had not discussed the issue of reconstruction with their partner. The majority of the participating women ( $n=112$ , 82%) indicated that they had not been influenced by anybody when making their decision. However, this was significantly more pronounced in the non-BR group (78% vs. 50%,  $p=0.004$ ), whereas a significantly higher proportion of women in the BR group (32% vs. 9%,  $p=0.007$ ) indicated that the physician had influenced their decision. No significant difference between the two groups was found in relation to the influence of their partner.

### Part 4: Body image

An index score was built based on item scores in each factor. These index scores were used in comparisons between the two groups (BR/non-BR). The items included in each factor and index scores, are shown in Table II. Higher index scores indicate a negative impact of the mastectomy.

A significantly higher index score was found in the BR group concerning the factors *attractiveness* ( $p=0.035$ ) and *body disclosure* ( $p=0.043$ ). No statistical differences were found between the groups in the index score for the factors *relational comfort* and *scar avoidance*.

The multivariate regression analysis resulted in three independent factors associated with BR (Table III). The three factors were; age, attractiveness (Table II), and sexual interest. Model Cox Snell  $R^2 = 0.29$ , concordance between observed and predicted value = 73.2.

## Discussion

Results from the present study show that in 2003, 149 of the 400 (37%) women diagnosed with breast cancer in northern Sweden had undergone a mastectomy. Of these women, 126 (85%) participated in the present study and 31 (25%) of the women had undergone a breast reconstruction. We found that the mean age of women in the BR group was significantly lower (52 vs. 64 years), they had a higher

education, and a higher proportion were employed, influenced by the physician's opinion regarding BR, sexually active, and rated a negative impact concerning the factors attractiveness and body disclosure. The logistic regression resulted in three factors independently associated with BR. These were younger age, interest in sex and a negative impact on feelings of attractiveness (Table II).

This study is significant since it includes 85% of all women in the northern medical region in Sweden who have undergone mastectomy. Although this is a type of population study, it is nevertheless limited in size as a quantitative study. A limitation in this cross-sectional study is the lack of information about changes, if any, in body image before, as well as after the reconstruction. Although we asked each woman to rate changes in body image after the mastectomy, we cannot control for possible selective response bias, since, in retrospect, being reconstructed may have affected how these women assessed being without a breast. However in-depth interviews with 10 of the women revealed that they were indeed able to vividly describe detailed experiences of living with only one breast. In an ongoing study we are compensating for this potential limitation with a prospective follow-up of these women. The LAM is also a newly developed instrument and its reliability and validity need to be further confirmed in future studies.

Our sociodemographic findings are in line with what others have found: women who undergo breast reconstruction are younger [9,10,12,19], have higher education [9,20] and are to a greater extent employed [11,21]. However, both the differences as to education and employment were closely related to age. Furthermore, as in our findings, Shameem et al. [10] did not find that treatment influenced the extent of reconstruction. Contrary to our findings, studies in Malaysia, in Australia, and in the US found that the groups differ as to marital status – women who had undergone breast reconstruction were to a greater extent married [9–11]. When scrutinizing this difference, we should focus on the different sociocultural contexts: i.e., in Sweden, health care is publicly financed, implying that low personal income would not hinder reconstructive treatment.

Previous studies have suggested that reconstruction provides a variety of benefits for women. For example, as shown in a longitudinal randomized study by Brandberg et al. [22], women perceived, irrespective of method, that the breast reconstruction did change their lives, and they felt more whole and less bothered in social and intimate situations.

Still the majority of women do not undergo BR after mastectomy. In our study, 25% of the women had undergone a delayed reconstruction. This may be compared with a study from Stockholm where a third of the women had undergone immediate breast

reconstruction [7]. This difference in proportion and procedure may be due to the uneven distribution of reconstructive facilities in Sweden, as there are fewer available facilities in the northern part of the country [7]. Nevertheless, on a country level a higher proportion of women in Sweden undergo BR compared to the UK [23], Australia [12], Malaysia [10], and the US [24], where 5–20% undergo BR. Understanding what affects a woman's decision is crucial, and the provider factor whether and how the women actually are offered the opportunity for reconstruction is shown to be of significant importance [10,23]. In an interesting French study, Ananian [21] showed that if women were systematically offered the opportunity to have immediate or delayed reconstruction or no reconstruction, a great majority of the women (81%) chose immediate or delayed reconstruction. This is far higher than our findings of 25%. Furthermore, nearly half of the women in their study said that the consultation with the surgeon was the critical factor for their decision, which contrasts with the 32% in our BR group who had been influenced by the physician in their choice. Finally, 48% of the French women declared that they had made a decision by themselves which should be compared to 82% in our study.

These comparisons may be interpreted in different ways. From a cultural perspective, Swedish women may be or at least appear to be more autonomous. From a health care perspective, Swedish women may not systematically be given a proper chance to reflect on the different options available.

That young age, lower feelings of attractiveness and sexual interest are associated with breast reconstruction are also shown in the other studies [5,19,21]. The impact of age is illustrated by a study showing that younger women who had undergone mastectomy reported poorer body image and quality of life than older women [20]. Furthermore, the safeguarding of attractiveness, femininity and sexuality is described as less important for older women [19,25].

When researchers try to identify what differentiates the groups of women who choose to undergo BR or not after mastectomy, it is necessary to take into consideration that the meanings of mastectomy, body image, attractiveness, and similar variables may vary due to the phase of a woman's life. Simply speaking, being without a breast may have another impact on a woman's life if she is 30 years old rather than 65 years of age. In addition, age may also bear impact on studies suggesting that reconstruction improves the quality of life and well-being [14,22]. Although this may be the case, we must avoid drawing the general conclusion that reconstruction improves the quality of life. Those who abstain may not need reconstruction for their well-being due to

their life circumstances or for other reasons. We may be talking of different groups of women.

In conclusion, women who had undergone breast reconstruction after mastectomy were younger in comparison to those who had no reconstruction. Age explained most differences found between the two groups. Matching for age in future studies is therefore of paramount importance for our understanding of women's experiences. In addition, concepts such as sexuality, attractiveness, and femininity need to be problematized. What is the meaning of these concepts when related to age? Few studies examine these concepts sufficiently to elucidate a woman's experiences of losing a breast in different phases of life and qualitative research studies are needed to gain a better understanding of these pertinent issues. Another focus for an important study is to further explore, by a systematic investigation, to what extent and in what way physicians discuss the issue of breast reconstruction with their patients. Do all women receive similar information or do age and socioeconomic factors matter?

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