

Patient-Reported Quality of Life After Breast Reconstruction

A One-Year Longitudinal Study Using the WHO-QOL Survey

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Background: Patient-reported quality of life (QOL) is an important measure of the impact that breast reconstruction has on postmastectomy patients. This study seeks to describe psychosocial outcomes after breast reconstruction and to identify factors that influence them.

Methods: All patients who underwent immediate postmastectomy reconstruction by the senior author between 2009 and 2011 were offered participation in this study. Patients completed the World Health Organization QOL-BREF questionnaire preoperatively and 1-year postoperatively. Change scores were compared across reconstructive techniques, as well as across various demographic and clinical variables.

Results: One hundred twenty-nine women completed the preoperative questionnaire, and 60 patients completed the follow-up questionnaire at 1 year (response rate, 46.5%). Compared to the preoperative baseline, overall QOL was unchanged, general satisfaction with health improved significantly, and QOL in physical, psychological, social, and environmental domains decreased ($P < 0.05$ for all but social domains). On bivariate analysis, being in a relationship at the time of reconstruction was associated with a decline in overall QOL, as well as the quality of social relationships and environment. Educational level impacted how physical and psychological wellness evolved after surgery. Patients with a higher cancer stage reported a decrease in satisfaction with health at 1 year. Type of reconstruction, development of a complication, and need for additional surgery did not influence any of these outcomes.

Conclusions: At 1-year follow-up from postmastectomy reconstruction, breast cancer survivors report a similar overall QOL, but significant decrements in physical, psychological, and environmental QOL. Satisfaction with health improved. The type of breast reconstruction did not influence any of these outcomes.

Key Words: breast reconstruction, patient-reported outcomes, quality of life (*Ann Plast Surg* 2015;75: 144–148)

Reconstruction of the breast after mastectomy continues to be a popular option for many women faced with a diagnosis of breast cancer. Although the utilization of postmastectomy reconstruction has climbed during the last decade,¹ current estimates remain between 16.5% and 42%.

In navigating the many decisions that govern the reconstructive process, patients and surgeons consider the outcomes of various procedures. Traditional surgical metrics, such as the incidence of complications and rates of reoperation, are critically important, but patient-reported outcomes have garnered increasing attention from

patients, surgeons, and the general public. These include measures of satisfaction with the reconstruction and perceptions of body image, but also many psychosocial variables and quality of life (QOL).

Previous studies have demonstrated that postmastectomy reconstruction has a positive impact on a woman's psychological health and QOL,^{2–9} although inferences about psychosocial well-being are heavily influenced by survey design and content. In this study, we seek to contribute to our collective understanding of how breast reconstruction impacts a patient's QOL and to identify factors that influence those outcomes. A survey designed by the World Health Organization to assess health-related QOL was identified for this purpose.¹⁰ It queries patients on their QOL in various important areas, including their physical and psychological health and the condition of their social interactions and environment. As it has not been used previously in a breast cancer population, this novel survey instrument grants us new insights into the psychosocial outcomes of breast reconstruction.

METHODS

Study Population

All patients with a diagnosis of breast cancer who underwent immediate postmastectomy breast reconstruction performed by the senior author between 2009 and 2011 were offered participation in this study. Implant-based and autologous reconstructions were included. Patients who underwent reconstruction after partial mastectomy or delayed reconstruction after mastectomy were excluded.

Survey Instrument

The World Health Organization Quality of Life (WHO QOL) instruments were designed by the WHO to assess health-related QOL in a cross-cultural context. The WHO QOL-100 has been shown to be a reliable and valid tool to measure QOL among breast cancer patients.¹¹ Derived from the WHO QOL-100 survey, the WHO QOL-BREF is an abbreviated, 26-item questionnaire that queries patients on their overall QOL and satisfaction with general health, and then considers QOL in 4 domains, namely, physical health, psychological well-being, social relationships, and environment. Table 1 gives sample questions from each domain. Each question is scored on a 5-point scale, with 1 being the most negative and 5 the most positive. Overall QOL and general satisfaction with health are individual questions, such that their maximum scores are 5. The QOL domains are sets of related questions whose scores can be added to generate an overall domain score that is then transformed to a 1- to 100-point scale.

Procedures

Patients who consented to participate in this study independently completed the WHO QOL-BREF questionnaire at their preoperative clinic visit. Demographic data were collected at the time of initial survey. Respondents were recontacted via mail 1 year postoperatively to again complete the questionnaire. Nonresponders received additional mailings in an attempt to maximize the response rate. Using hospital and clinic records, data were collected on cancer stage, treatment with radiation, reconstructive technique, development of complications, and need for additional surgery.

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TABLE 1. Sample Questions From the WHO QOL-BREF Questionnaire

Physical health	
To what extent do you feel that physical pain prevents you from doing what you need to do?	
How satisfied are you with your ability to perform your daily living activities?	
Psychological health	
How much do you enjoy life?	
Are you able to accept your bodily appearance?	
Social relationships	
How satisfied are you with your personal relationships?	
How satisfied are you with your sex life?	
Environment	
How healthy is your physical environment?	
How satisfied are you with your access to health services?	

Statistics

Preoperative and postoperative scores for QOL, satisfaction with health, and the 4 QOL domains were compared using paired-sample *t* tests. One-way analysis of variance was used to compare mean change scores—the difference between preoperative and postoperative scores—across reconstructive techniques, as well as across various demographic and clinical variables. Finally, respondents at 1-year

follow-up were compared to nonrespondents in terms of known demographic and clinical variables using a χ^2 test. Preoperative survey scores were compared between respondents and nonrespondents using a Student *t* test. A *P* value less than 0.05 was considered statistically significant in all cases.

RESULTS

One hundred twenty-nine women completed the preoperative questionnaire, and 60 patients completed the follow-up questionnaire at 1 year, for a response rate of 46.5%. These 60 patients underwent a mix of expander reconstructions (*n* = 24, 40%), latissimus dorsi flaps with or without an implant (*n* = 23, 28.3%), and pedicled or free transverse rectus abdominis musculocutaneous (TRAM) flaps (*n* = 13, 21.7%). Most had stage 0 or I disease (*n* = 33, 55%), and 40% (*n* = 24) required radiation treatment. Demographic variables describing this cohort are summarized in Table 2, and clinical variables presented in Table 3.

As a whole, compared to the preoperative baseline, overall QOL was unchanged (4.55 vs 4.52, *P* = 0.71), whereas general satisfaction with health improved significantly (3.74 vs 4.09, *P* = 0.01). Quality of life decreased in all 4 domains, namely, physical, psychological, social, and environmental, achieving statistical significance in all but the social domain (Fig. 1).

No differences were observed across *type* of reconstruction for any QOL measure. Satisfaction with health differed by cancer stage. Patients with advanced cancer (stage III or IV) reported a decline in satisfaction, whereas patients with lower stage disease improved (out of maximum score of 5, stage 0: +0.6, stage I: +0.18, stage II: +0.55, stage III/IV: −0.5, *P* = 0.10, Fig. 2). No significant differences were observed when comparing patients by presence of obesity, treatment with radiation, development of a complication, or need for additional surgery.

Among demographic variables, relationship status impacted overall QOL, as well as the social and environmental domains. Women who were married or in a committed relationship at the time of surgery reported worse scores in these 3 areas than their single counterparts (overall QOL, maximum score 5; married/relationship, −0.13; single, +0.27, *P* = 0.05; social, maximum score 100, married/relationship, −6.8; single, +3.3, *P* = 0.05; environment, maximum score 100, married/relationship, −17.8; single, −9.6, *P* = 0.07). Educational attainment influenced how physical and psychological well-being evolved after surgery, with women with a high school education reporting the greatest physical decrement (maximum score, 100; high school, −26.7; college, −11.1; graduate school, −20.8, *P* = 0.10) and

TABLE 2. Patient Demographics

Variable	Frequency (%)
Age, y	
30–40	12 (20%)
40–50	28 (46.7%)
50–60	13 (21.7%)
>60	7 (11.7%)
Race	
White	25 (41.7%)
Nonwhite	35 (58.4%)
Relationship status	
Married or committed relationship	45 (75%)
Single	15 (25%)
Community setting	
Urban	13 (21.7%)
Suburban	40 (66.7%)
Rural	7 (11.7%)
Education	
High school	7 (11.7%)
College	25 (41.6%)
Graduate school	28 (46.7%)
Employment	
Full-time	34 (56.7%)
Part-time	11 (18.3%)
Retired	9 (15%)
Unemployed	6 (10%)
Insurance	
Private	51 (85%)
Medicare/Medicaid	7 (11.7%)
Private + Medicare	2 (3.3%)

TABLE 3. Clinical Characteristics

Variable	Frequency (%)
Type of reconstruction	
Expander	24 (40%)
Latissimus dorsi flap	23 (38.3%)
TRAM flap	13 (21.7%)
Cancer stage	
0	15 (25%)
I	18 (30%)
II	21 (35%)
III or IV	6 (10%)
Radiation	24 (40%)
Obesity (BMI > 30 kg/m ²)	21 (35%)
Any complication	36 (60%)
Additional surgery	30 (50%)

BMI indicates body mass index.

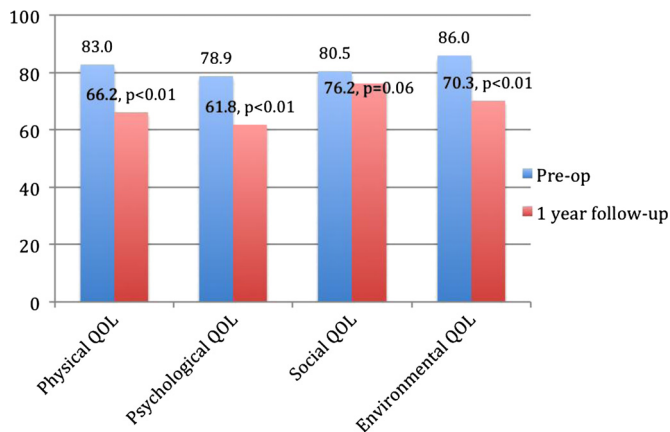


FIGURE 1. Quality of life domain scores.

women with graduate education reporting the greatest psychological losses (maximum score, 100; high school, -14.5; college, -8.7; graduate school, -26.0, $P = 0.02$). Age, race, community setting, employment status, and insurance type did not impact change scores for any QOL measures.

Only 46.5% of preoperative patients completed the follow-up questionnaire (responders). Comparing responders to nonresponders, nonresponders had more advanced disease at the time of surgery (stage III or IV; 25% vs 10%, $P = 0.05$), more often underwent additional surgery (85.5% vs 50%, $P < 0.01$), were more often single (40.6% vs 25%, $P = 0.06$), and more often had a college education but not graduate schooling (college, 59.4% vs 41.6%; graduate school, 24.6% vs 46.7%, $P = 0.03$). The groups did not differ by other demographic variables considered, including age, race, community setting, employment status, and type of insurance. They were also no different by type of reconstruction, incidence of complications, or need for radiation. Comparing their preoperative QOL scores, responders reported significantly better QOL indices across the board. This trend is depicted in Figures 3 and 4.

DISCUSSION

Postmastectomy breast reconstruction has been widely demonstrated to have a positive impact on a woman’s psychological health, self-esteem, body image, and social adaptation.²⁻⁹ Longitudinal studies that follow breast cancer patients from diagnosis to 1 or 2 years after mastectomy and reconstruction have shown improvements in various aspects of QOL.^{9,12-15} In this study, patients reported that their overall QOL was preserved despite having undergone surgical and for many

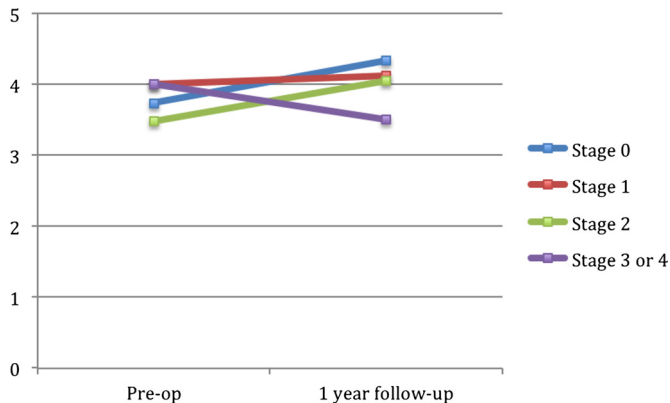
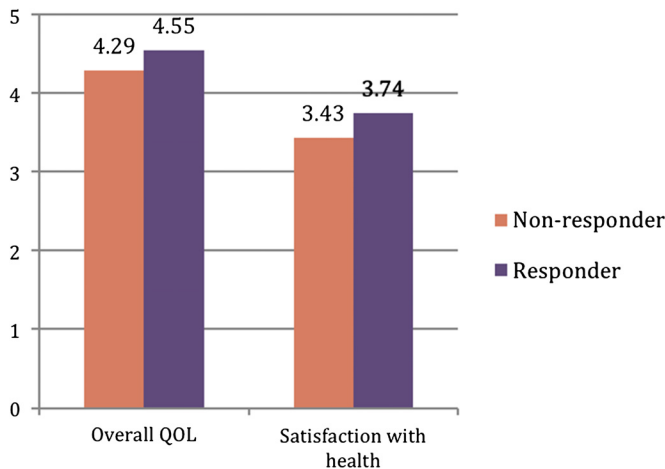


FIGURE 2. Satisfaction with health by cancer stage.

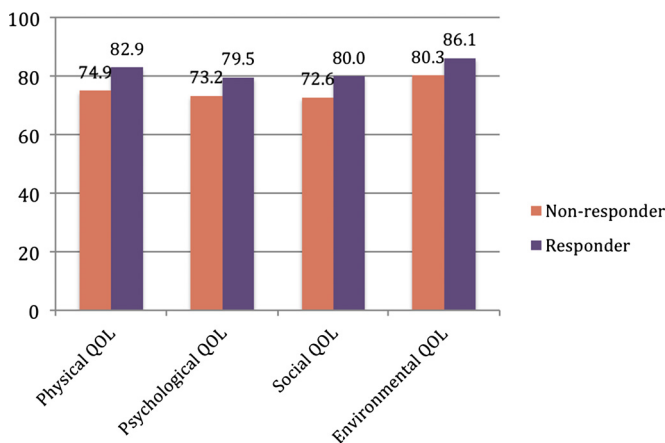


QOL p=0.03, satisfaction p=0.06

FIGURE 3. Preoperative QOL and satisfaction with health: 1-year responders vs nonresponders.

women medical treatment for breast cancer. Most women rated their QOL both before surgery and at 1-year follow-up as squarely between good and very good. Because this global assessment of QOL is based on a single question, it may be difficult to capture small incremental improvements over time as other studies have done. Nevertheless, our findings suggest overall good psychosocial adaptation 1 year after mastectomy and reconstructive surgery.

It is not possible to discern from our data the role of breast reconstruction, if any, in maintaining QOL. Most studies that enrolled women undergoing mastectomy with and without breast reconstruction report equivalent QOL measures between the 2 groups postoperatively.^{13,14,16-24} On the other hand, some studies have shown an advantage for reconstruction in terms of psychosocial adjustment, at least in certain demographics.^{4,5,7,12,25} Rubino et al⁵ found women who had undergone postmastectomy reconstruction to report a higher QOL, better social adaptation, and greater satisfaction with sexual relationships than their nonreconstructed counterparts at 1 year. In fact, their ratings in these areas were indistinguishable from those of healthy women. The extent to which recreation of the breast helps to insulate women from the psychological toll of mastectomy is controversial and



p<0.05 for all

FIGURE 4. Preoperative QOL domain scores: 1-year responders vs nonresponders.

probably reflects variable and highly individualized patient expectations, desires, and experiences as they confront the loss of a breast.

Because all patients in our cohort received breast reconstruction, we can only comment on the influence of specific *type* of reconstruction on QOL scores. We observed no difference in overall QOL or any QOL subdomain when comparing patients reconstructed with implant, latissimus dorsi flap, or TRAM flap. This is consistent with other studies that compared psychosocial outcomes after implant and TRAM flap reconstruction.^{9,15} Alderman et al²⁶ found an advantage in terms of aesthetic satisfaction for autologous techniques over implant-based reconstructions, but patients' satisfaction with their cosmetic result does not necessarily contribute to their psychological well-being or QOL. Again, that reconstructive technique does not influence psychological outcomes probably reflects good patient selection, patient involvement in the decision-making process, and management of patient expectations.

Unlike their overall perception of QOL, more specific questions used to gauge physical capacity, psychological adjustment, social integration, and health of their environment revealed significant losses. Breast cancer survivors continue to face challenges in each of these areas, which reflect physical pain, return to work, body image and self-esteem, social support, and financial burdens, to name a few. It is a mistake to believe that all breast cancer survivors are restored to their preoperative state with the completion of treatment and passage of 1 year's time. Our findings should remind all clinicians that the hardships of a breast cancer diagnosis persist 1 or more years out from surgery, and that adequate support in these areas is imperative. At the same time, that overall QOL remained good, whereas other areas apparently worsened may indicate that important elements of QOL are either overlooked or underestimated by the content of this survey.

Although neither the choice of reconstruction nor any other clinical variable impacted QOL in this study, certain demographic variables significantly influenced how QOL evolved after surgery. It is likely that relationship status and educational attainment affect a person's coping mechanisms in confronting breast cancer. The importance of demographic characteristics has been demonstrated elsewhere.¹³ It should be noted that the demographic data used were collected with the preoperative survey, and although not statistically analyzed, many status changes were evident at 1-year follow-up. For some patients, psychosocial adjustment may have been impacted more by a relationship status *change* than their situation before surgery.

General satisfaction with health improved significantly at 1-year follow-up. One might expect this, as most women would have recovered from surgery and completed radiation and chemotherapy, and no longer carried the new diagnosis of breast cancer. However, women with advanced cancer may have continued on more aggressive adjuvant therapy and felt the additional burden of the worse prognosis, so not unexpectedly were less satisfied with their health at 1 year.

This study contributes to our understanding of the psychosocial impact of enduring treatment for breast cancer, including mastectomy and breast reconstruction. Its prospective design and collection of longitudinal data are strengths. Also, the use of a novel survey instrument in this area may capture nuances overlooked in other research. At the same time, we recognize that the WHO QOL surveys, although validated in many populations including breast cancer patients,¹¹ were not designed to address surgery-specific issues, which may be underestimated in this study. Another contribution is the inclusion of the latissimus dorsi flap. Although this type of reconstruction is seldom analyzed in outcomes research, we have demonstrated equivalent outcomes for that option as well.

We acknowledge a number of limitations to this study. Recruiting patients from a single center and a single surgeon's practice may limit its generalizability. Our sample size was modest and response rate to the follow-up survey poor. Our comparison of 1-year responders to nonresponders reveals important differences between the 2 groups in certain demographic and clinical variables. Perhaps more importantly,

their baseline QOL indices were different, with nonresponders reporting a worse preoperative benchmark. This inevitably introduces a degree of nonresponse bias, although we cannot predict if those patients would more likely have adjusted to their diagnosis by 1 year after surgery and thus improved by the metrics studied, or if their lower preoperative scores reflect conditions that would have continued to hinder them at 1 year. Excluding women who underwent delayed reconstruction makes inferences about that population difficult. Other studies have demonstrated significant differences between immediate and delayed reconstructions not only in baseline psychosocial indices but also in the gains achieved by breast reconstruction, such as a lower prevalence of anxiety and depression and superior body image in an immediately reconstructed cohort.⁶ Although our efforts provide some insight into QOL 1 year after reconstruction, we acknowledge that this measure continues to evolve over time.

CONCLUSIONS

Although overall QOL was good 1 year after mastectomy and breast reconstruction, women in this study reported significant losses in terms of physical function, psychological well-being, social relationships, and the health of their environment. Breast cancer survivors require ongoing support in each of these areas. Quality of life measures are impacted by certain demographic variables, but the type of reconstruction pursued and other clinical variables did not influence these outcomes.

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