Original Article

Patient Race and Provider Predict Patient Satisfaction Following Post-Mastectomy Breast Reconstruction

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ABSTRACT

BACKGROUND

Post-mastectomy breast reconstruction is commonly performed in the United States with numerous options available to patients and providers. This study evaluated patient race and provider in prediction of patient satisfaction following post-mastectomy breast reconstruction.

METHODS

The patient satisfaction for women who underwent post mastectomy breast reconstruction at University of California, Irvine Medical Center was evaluated between 2012 and 2014, randomly using Press Ganey Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys. Patient demographics and surgery related variables including type of reconstruction received were determined.

RESULTS

Between 2012 and 2014, ninety breast reconstruction patients completed a HCAHPS satisfaction survey. Average satisfaction score was 9.67/10. Multivariate linear regression analyses revealed that 34% of the variability in satisfaction scores was accounted for by the variables included in our statistical model. Analyses revealed race/ethnicity and provider to be independent predictors of satisfaction ($p<0.05$). Satisfaction scores ranged from 6-10 and varied by 11.7% across different providers and 8.9% across different races. The following variables were included, but did not influence patient satisfaction: type, timing, or laterality of reconstruction, presence of post-operative complication, body mass index (BMI), age, presence of comorbidity, and insurance type.

CONCLUSION

Achieving patient satisfaction is an important outcome of breast reconstruction. This study is one of the first to identify provider and race/ethnicity as predictors of patient satisfaction following breast reconstruction. The information provided here can help inform providers and improve satisfaction for patients undergoing breast reconstruction.

KEYWORDS

Breast reconstruction; Breast surgery; Mastectomy; Breast cancer; Patient satisfaction

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INTRODUCTION

Mastectomy for breast cancer can lead to various physical and psychosocial consequences long term.[1,2] Breast reconstruction after mastectomy, however, can improve a patient's body image, quality of life, satisfaction, and psychosocial/sexual well being.[1-4] Further, studies have found cancer recurrence rates and overall mortality are not adversely affected by reconstruction.[5] As such, reconstruction is now routinely offered to patients and covered by insurance under the Women Health Rights Act in 1998.[6] Currently, numerous options are available for breast reconstruction and vary depending on the timing (immediate vs. delayed), type (implant vs. autologous), and laterality (unilateral vs. bilateral). While numerous studies have evaluated various outcomes following different reconstructive techniques (i.e. aesthetic outcomes, complication rates), few have evaluated the affects of these reconstructive techniques on patient satisfaction.[1,7-16]

Patient satisfaction is an important clinical outcome/marker for patients and providers. Satisfaction has been also shown to affect various other health related quality measures including readmission rates, patient compliance, health related quality of life measures, and malpractice lawsuits.[17-20] Various socio-demographic and clinical factors have been shown to influence patient satisfaction across medical and surgical patients including BMI, age, race, and post-surgical complications.[3,21-25] Despite the growing popularity and diversity of options for post mastectomy breast reconstruction, the factors for improving patient satisfaction for breast reconstruction patients have yet to be fully explored.

The objective of the current study was to evaluate satisfaction scores for post-mastectomy breast reconstruction patients to determine which patient and/or surgery related factors influenced patient satisfaction. Satisfaction scores in this study were evaluated using the well-cited and previously-validated Press Ganey HCAHPS surveys.[18,23,26-29] The HCAHPS survey has used across various medical specialties and serves as a generalizable satisfaction survey to compare outcomes.[28,30] Ultimately, we hope to obtain a better understanding to help guide provider recommendations, patient decision-making, and obtain better outcomes in the diverse setting of reconstruction.

MATERIALS AND METHODS

In the current study, we performed a retrospective, cross-sectional analysis investigating patient satisfaction rates for mastectomy patients who underwent breast reconstruction at the University of California (UC), Irvine Medical Center between 2012 and 2014 (1.8 years). Press Ganey Satisfaction surveys were independently administered via email or mail to UCI patients across various specialties and retrospectively collected via UC Irvine Patient Experiences office. Surveys were distributed at random to patients per physician per billing cycle with response rates for these surveys were estimated at 25%. Reconstruction patients were identified based on 2011 American Medical Association Common Procedural Terminology (CPTs) codes for breast reconstruction. Patient charts were evaluated for socio-demographic variables and variables related to surgery. Univariate and multivariate linear regression analyses were conducted to identify the independent predictors of patient satisfaction.

Patient satisfaction was evaluated using Press Ganey Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys. Press Ganey Associates, Inc., (South Bend, IN) is a hospital consultant group aimed at understanding and improving overall patient experiences and satisfaction. As a national survey vendor focused on hospital performance improvement, Press Ganey Surveys have been used by over 7,000 health care facilities throughout the United States and has been cited across various specialties, which have used the survey to understand and improve patient satisfaction.[28] The Press Ganey survey was previously validated in 2012 via a NIH-funded study by Hays *et al.* who determined the survey to be reliable and contain appropriate psychometric properties to assess patients.[30] The Press Ganey HCAHPS survey was used in this study, as it serves as a comparable method to evaluate patient satisfaction and compare satisfaction scores across different specialties, diagnosis related groups, and/or medical centers.

The specific HCAHPS satisfaction survey employed by UC Irvine contains 41 total questions pertaining to the various aspects of

care provided, including evaluation of their provider, nurses, and clinical staff members. Question responses were evaluated on a binary scale (yes/no), likert scales, and ordinal scaled responses. Patients were specifically asked to rate their satisfaction with provider on 1-10 scale with 10 being the most satisfied. Scores can be converted to a 0-100 scale and weighted to create a raw survey score and summary score for each service domain. According to the literature, a typical range of score is 78.9-94.5. The 50th percentile is approximately 90.5.[28] In the current study, raw satisfaction scores were used in data analysis. Survey response rates were estimated at approximately 25%.

Patients who underwent post mastectomy breast reconstruction were identified based on Common Procedural Terminology (CPTs). Patient charts were evaluated for various patient and surgery specific variables. Socio-demographic factors analyzed included the following: age, race/ethnicity, BMI, insurance type, and presence of comorbidities. Race was categorized as Caucasian, Asian, African American, and Other. Insurance types were categorized as Private, Medicaid (including Cal-optima), Medi-Cal, and no insurance. Surgery related factors evaluated in the study included the following: provider surgeon, timing of reconstruction (delayed vs. immediate), type of reconstruction (implant vs. autologous), laterality of reconstruction (bilateral vs. unilateral), presence of post-operative complication, and complication necessitating reoperation.

We defined immediate reconstruction as breast reconstructions performed at the time of mastectomy. Implant based reconstruction included direct to implant reconstruction and tissue expander to implant reconstructions. Autologous reconstructions that also employed implant (i.e. latissimus flap with implant) were classified as autologous reconstruction. Bilateral reconstructions were included as single events. We defined post-operative complication as minor or major based on need to re-operation.

Univariate and multivariate linear regression analyses were performed to identify the socio-demographic and surgery related variables that influenced patient satisfaction following reconstruction. We first performed a univariate analysis, where satisfaction scores were evaluated across each categorical or continuous variable using ANOVA. After identifying the significant predictors of satisfaction on univariate analysis ($p<0.05$), we performed a multivariate linear regression analysis to identify the significant predictors of patient satisfaction while simultaneously controlling for possible confounding variables. Statistical significance was set at p-values <0.05 with all tests two-sided. All statistical analysis was conducted with IBM SPSS software. Approval for this study was obtained from the Human Research Protection (HRP) and Institutional Review Board at the University of California, Irvine Medical Center.

RESULTS

The UC Irvine Patient Experiences office collected 90 satisfaction surveys from women who underwent post-mastectomy breast reconstruction at UC Irvine between 2012 and 2014. In total, five different plastic surgeons provided breast reconstruction for this cohort. Patients were asked to rate their satisfaction with provider from 1-10 with 10 being most satisfied. The average provider rating across the five surgeons was 9.67 out of 10. We found that 80% of patients rated their satisfaction as 10 of 10 scales, with no patient rating their satisfaction below a 6 out of 10 scale.

Retrospective chart review was conducted on all survey respondents to determine patient- and surgery-specific variables with a focus on the type of reconstruction received. Patient characteristics are summarized in Table 1. The mean age for patients included in this study was 53.8 years (range 19-82 years). The average body mass index (BMI) was 26.7 kg/m^2 (range: 18.6 kg/m^2-47.6 kg/m^2). With respect to race/ethnicity, 80% of patients identified as Caucasian, 11.1% as other (included Hispanic), 7.8% as Asian, and 1% as African American. The analysis revealed that 72.2% of patients had private insurance, 13% had Medicare, 12% had Medicaid, and no patients were uninsured. A review of patient medical histories revealed that 52.2% of the patients had 0-1 comorbidities, 34.4% had 2-3 comorbidities, and 13.3% had greater than 3 comorbidities.

Next, we evaluated surgery related variables and factors related to the timing, type, and laterality of the reconstructions. Of the 90 reconstructions, 68.9% were reconstructed on the day of mastectomy and represented immediate reconstruction, whereas 31.1%

Table 1: Patient characteristics

Variables	No.	%
Age		
Mean	53.8	
Std Dev	9.8	
BMI		
Mean	26.7	
Std Dev	5.8	
Provider		
#1	2	1.0
#2	15	16.6
#3	8	8.9
#4	16	17.8
#5	49	54.4
Race/Ethnicity		
Caucasian	72	80.0
Other	10	11.1
Asian	7	7.8
African American	1	1.1
Insurance		
Private	65	72.2
Medicare	13	14.4
Medicaid/caloptima	12	13.3
No insurance	0	0
Comorbidity		
0-1	47	52.2
2-3	31	34.4
>3	12	13.3
Type of reconstruction		
Immediate	62	68.9
Delayed	28	31.1
Implant/Expander	43	47.7
Autologous	47	52.3
Unilateral	43	47.7
Bilateral	47	52.3
Complication		
Yes	33	36.7
Minor	17	18.9
Major	16	17.8
No	57	63.3
Rating (0-10)		
Mean	9.67	
Std. Dev.	0.80	

underwent a delayed reconstruction. Further classification by reconstruction type revealed that 47.7% of patients underwent tissue expander and implant-based reconstruction versus 52.3% who underwent autologous reconstruction. We also evaluated for laterality of reconstruction and found 47.7% of patients underwent unilateral reconstruction versus 52.5% who underwent bilateral reconstructions. After reviewing clinic post-operative notes at follow up, we found that 36.7% had a postoperative complication (most commonly included seroma and superficial infection) and 17.8% suffered a complication requiring re-operation (most commonly infection and wound healing issues).

The impact of patient- and surgery-specific factors on patient satisfaction on univariate analysis is shown in Table 2. Few demographic variables were found to be associated with patient satisfaction. Here, we found that patient race/ethnicity was a significant predictor of patient satisfaction ($p<0.05$). Patients in our cohort showed similar levels of satisfaction irrespective of age, BMI, insurance type, and comorbidities. In terms of surgery-specific variables, we found the provider to represent a significant determinant of patient satisfaction score ($p<0.05$). Conversely, we failed to find the timing, type, or laterality of reconstruction, nor presence of post operative complication or re-operation, to impact patient satisfaction.

Table 2: Univariate analysis identifying independent predictors of patient satisfaction.

Variable	P value
Age	NS
BMI	NS
Race	<0.05
Provider	<0.05
Comorbidity	NS
Insurance	NS
Reconstruction:	
Timing	NS
Type	NS
Laterality	NS
Complication	NS
Re-operation	NS

Next, we performed a multivariate linear regression analysis to identify the independent predictors of patient satisfaction after controlling for potential confounding variables. Multivariate linear regression analyses revealed that 34% of the variability in satisfaction scores was accounted for by the variables included in our statistical model. As shown in Table 3, we again found only provider and patient race/ethnicity to be significant independent predictors of patient satisfaction. Our analysis revealed patient satisfaction scores to vary by 11.7% across different providers and by 8.9% across different races/ethnicities ($p<0.05$). We found Caucasian and African American patients were more likely to be satisfied relative to the Asian and "other" race/ethnicities. Similar to our univariate

Table 3: Multivariate analysis identifying independent predictors of patient satisfaction.

Variable	Coefficient of satisfaction	95% CI	P value
Provider			<0.05
A (ref)			
B	0.443	-0.385 to 1.272	
C	-0.731	-1.329 to -0.133	
D	-0.062	-0.586 to 0.463	
E	0.256	-0.173 to 0.684	
Race/ethnicity Caucasian (ref)			<0.05
Other	-0.583	-1.066 to -0.011	
African American	0.309	-1.21- to 1.824	
Asian	-0.261	-0.82 to 0.297	

*The following variable were considering but not included in the final model: age, insurance, BMI, modes of reconstruction, complication, comorbidity, re-operation from complication.

results, we did not find the remaining patient-or-surgery-specific factors to influence patient satisfaction. Ultimately, this study reveals that patient satisfaction does have defined predictors, but is also influenced by unaccounted variables.

DISCUSSION

In the current study, we evaluated patient satisfaction scores from 90 women who underwent post mastectomy breast reconstruction at UC Irvine between 2012 and 2014. Patients were highly satisfied following reconstruction with an average satisfaction score of 9.67/10. After further evaluating patient and surgery related variables, we found race/ethnicity ($p<0.05$) and provider ($p<0.05$) to be independent predictors of satisfaction. We found satisfaction scores varied by 11.7% across different providers and varied by 8.9% across different races with African American and Caucasian patients rating higher satisfaction relative to their cultural counterparts. In regards to reconstruction, we found women had similar satisfaction scores across the different types reconstruction received (implant vs. autologous, immediate vs. delayed, unilateral vs. bilateral).

Patient satisfaction is a critical aspect of health care, and is becoming a common health care quality metric.[31-33] Numerous studies have revealed its association with other important health-related quality measures.[31-33] Guldvog *et al.*, for example, showed patient satisfaction with medical treatment and information sharing was associated with improved physical and mental health-related quality of life measures.[34] Kovac *et al.* demonstrated the relationship between satisfaction and patient compliance, whereas Boulding *et al.* found satisfaction associated with lower 30-day hospital readmission rates.[31,33] Finally, Hickson *et al.* found a direct relationship between malpractice lawsuits and patient dissatisfaction/complaints.[32] Ultimately, satisfaction is an important marker for both patients and providers, wherein a better understanding of influential factors can help improve clinical outcomes.

Patient satisfaction is a priority in reconstructive breast surgery. To date, however, there is little consensus regarding the factors that influence satisfaction for mastectomy patients choosing reconstructive surgery. While studies have repeatedly shown receipt of reconstruction after mastectomy can improve the quality of life and patient satisfaction,[35-37] few studies have evaluated the specific determinants of satisfaction in reconstructed patients. Given the variety of options available and semi-elective nature of breast reconstruction, identifying the predictors of satisfaction has added value for reconstructive plastic surgeons.

Physicians play an influential role in the development of patient opinions regarding their health care experience. Studies have shown that involving a plastic surgeon with the surgical oncology team and treatment planning improves satisfaction in breast cancer patients.[13] In the current study, we extended these observations to include the individual surgeon as a significant independent predictor of patient satisfaction. Numerous studies outside of plastic surgery have found overall satisfaction correlates with a patient's satisfaction with their physician, nurses, and medical practitioners.[35,38] Other

studies further revealed the value of trust, continuity of care, organization/delivery of care, and interpersonal relationships with physicians in promoting satisfaction.[35,39,40] As the primary providers and decision makers in health care, physicians play an influential role in numerous satisfaction dependent variables. As shown in this study, the influence of different providers on satisfaction demonstrates the sensitivity and value patients place on their physician.

Race/ethnicity is a controversial topic in health care that has been shown to adversely influence health care access, diagnostics/treatments received, and clinical outcomes.[25,41] In the current study, we also found a patient's race/ethnicity to be an independent predictor of patient satisfaction and found African American and Caucasian women were more likely to be satisfied relative to their cultural counterparts. Lantz *et al.* similarly found women of ethnic minority were more likely to present with lower satisfaction and regret decisions regarding reconstruction.[36] Other groups have found similar satisfaction discrepancies based on race/ethnicity across various other medical specialties.[25,41]

This may reflect racial discordance, language barriers to communication, or different aesthetic norms/expectations. Further, we found only three Hispanic patients (3.3%) completed a survey despite previous studies showing Hispanic patients comprised an estimated 40-50% of UC, Irvine Medical Center patients.[42-44] This again may reflect language/cultural barriers versus socioeconomic barriers that limit access to computer/email. Patient race/ethnicity has been shown to influence various clinical outcomes and this study extends these observations to include satisfaction following post mastectomy breast reconstruction. As a complex, multifaceted issue that we have yet to fully understand, race/ethnicity continues to affect health related outcomes, wherein physicians must be cognizant of different culture perspectives and have a better understanding of patients expectations and goals.

Breast reconstruction after mastectomy is offered in various modalities that can vary by type, timing, and laterality of reconstruction. Satisfaction following various reconstruction procedures has provided conflicting data. While several studies, including those by Andrade *et al.* and Ho *et al.*, have shown no difference in patient satisfaction across the type, timing, or laterality of reconstruction, other studies have found significant differences.[38,45] Several authors have found non-autologous reconstruction to correlate with lower satisfaction scores following mastectomy.[2,3,22,38,46,47] Studies have also demonstrated increased satisfaction with immediate reconstruction as it allows for earlier aesthetic benefits, whereas others concluded symmetry as an important marker of patient satisfaction after finding higher satisfaction with bilateral vs. unilateral reconstructions.[1,8,22,48,49]

Our study failed to find a relationship between patient satisfaction across different reconstruction modalities. While the current study likely reflects comparable satisfaction scores across reconstructions, high overall patient satisfaction score or underpowered statistics may have influenced our results. Ultimately, post mastectomy breast reconstruction does improve patient satisfaction, however, it appears that the type, time, and laterality of reconstruction may not be as influential for patients.

Given the importance of patient satisfaction in the clinical setting, numerous surveys have been developed to evaluate patient satisfaction (i.e. HCAHPS, Breast Q, Patient Satisfaction Questionnaire, various institutional specific surveys). In this study, we evaluated HCAHPS survey scores as they are used nationally and across various medical specialties and represent a generalizable survey tool with which to interpret data scores. Press Ganey surveys have been used to study association between satisfaction and post discharge physician phone calls, pain scores at discharge, presence of students, hospital renovations, chaplain/religious integration during inpatient stay, and in the development of standardized care protocols in ED, breast care, and plastic surgery patients.[18,20,23,26,27,29,50-52]

Compared to standardized national HCAHPS satisfaction score of 8.4/10 and standardized California state HCAHPS score of 7.9/10, the satisfaction score of 9.67/10 found in this study suggests post mastectomy breast reconstruction patients represent a more satisfied patient population. Further, using this HCAHPS satisfaction survey allowed for one to compare the significance of patient's race/ethnicity and provider relative to previously described variables.

Patient satisfaction is a complex, multifactorial clinical measure that has yet to be fully understood. Our study found 34% of the

variability in satisfaction scores was accounted for by the patient and surgery specific variables included in this study. Ultimately, patient satisfaction is an important clinical marker that has both defined predictors, but one that is also influenced by various other unknown factors. To this end, additional research into the area of patient satisfaction is necessary to help guide decision-making and to improve clinical outcomes for both patient and providers. The increased use of HCAHPS type surveys nationally may also enhance provider accountability and create new incentives to improve quality of care based on patient satisfaction.

The results of this study should be considered in light of several limitations. This study consisted of a cross-sectional non-randomized population and thus has the potential for unmeasured and uncontrolled biases. Our study also consisted of patients from a single academic medical center and from single geographic location, and may not reflect national trends in sociodemographics or patient expectation/satisfaction. Various sociodemo-graphic variables were evaluated in our study, however, we did not include variables such as income, education, marital status, and use of chemotherapy/radiation, which may have also influenced satisfaction rates. Despite these limitations, this study identified important factors that can help improve patient satisfaction following post mastectomy breast reconstruction.

Achieving patient satisfaction is an important outcome of breast reconstruction. In the current study, we evaluated satisfaction scores for 90 women who underwent post mastectomy breast reconstruction and found the provider and patient's race/ethnicity, but not the modality of reconstruction, influenced patient satisfaction. While breast reconstruction after mastectomy improves quality of life and patient satisfaction, it appears that the physician-patient relationship and a patient's cultural background have greater influence on satisfaction than surgery related variables including type of reconstruction. While provider characteristics, patient race/ethnicity, and satisfaction are complex, multi-faceted factors that encourage additional research, they provide insight towards improving clinical outcomes for reconstructed breast patients.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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