Variation in Physician-patient Discussion of Breast Reconstruction

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BACKGROUND: For women with early stage breast cancer, physician-patient discussion of breast reconstruction is an essential step in their participation in the decision-making process for their treatments. This study examines sociodemographic variation of physician-patient discussion of breast reconstruction and explores the impact of this discussion on the use of breast reconstruction.

METHODS: We used data from the Los Angeles Women's Study, a population-based study of women 50 years and older with breast cancer. Bivariate and multivariate logistic regression models were used to estimate the impact of patient and hospital characteristics on self-reported receipt of physician-patient discussion and use of breast reconstruction.

RESULTS: Of 315 post-mastectomy women, 81% and 27% reported physician-patient discussion and use of breast reconstruction, respectively. In multivariable analysis, women with an annual income <$20,000 were less likely to have physician-patient discussion than women with annual income ≥$40,000 (OR=0.23, 95% CI 0.07–0.82). Among the subset of women with physician-patient discussion, chest wall radiation, a known characteristic associated with higher rates of reconstruction complications, became an additional significant negative predictor of reconstruction.

CONCLUSIONS: Lower income women are at risk of not receiving physician-patient discussion of breast reconstruction. Physician-patient discussion of breast reconstruction appears to decrease the use of breast reconstruction among women with clinical characteristics associated with higher rates of reconstruction complications and failure. This highlights the need for interventions to increase physician-patient discussion of breast reconstruction among lower income women.

KEY WORDS: breast reconstruction; decision-making; low income.
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INTRODUCTION

Breast cancer is the most prevalent cancer diagnosed among women in the United States today.[1] Many women undergo mastectomy for breast cancer. Advances in surgical techniques allow the majority of post-mastectomy women to receive breast reconstruction. However, only 38% of post-mastectomy women received breast reconstruction in 2001–2003.[2]

Current data on outcomes for mastectomy patients with or without reconstruction are mixed. Although several studies have documented improved psychological, social, and emotional health of patients with breast reconstruction over mastectomy alone,[3–7] they have been criticized for methodological problems.[8] In this scenario, the woman's values and preferences are highly important; she should be included in the decision-making process for the use of breast reconstruction. Moreover, there are many studies supporting patient involvement in the medical decision-making process. Patients who make their own decisions are more satisfied with their health care, are more adherent to treatment recommendations, and have a better quality of life.[9–12]

Eight studies have examined predictors of breast reconstruction in the US and found wide sociodemographic variation in the use of breast reconstruction.[2,13–18] This large sociodemographic variation in the use of breast reconstruction may reflect disparities in patient involvement in the decision-making process.[19] Identifying characteristics of populations at risk of being excluded in the decision-making process for breast reconstruction can guide future targeted interventions to decrease sociodemographic disparities in the use of this procedure.

For women to be involved in the decision-making process for use of breast reconstruction, physicians need to discuss this procedure with their patients.[20] In a population-based study of women with breast cancer, Morrow et al. found that the majority of women (78.2%) reported discussion of breast reconstruction with their physician and found no significant differences in the rate of these discussions based on race or study site.[2,21] In contrast, Greenberg et al. found that patients who were younger, more educated, and not receiving radiation were more likely to have a discussion regarding reconstructive surgery.[21] The objectives of this study are (1) to examine sociodemographic variations in physician-patient discussion of breast reconstruction and (2) to explore the impact of physician-patient discussion on the use of this procedure.

METHODS

Design

We used patient self-report data from the Los Angeles Women's Study (LAW), a population-based, longitudinal, observational study of women with breast cancer 50 years and older in Los Angeles County.[22,23] The patient survey used in this study was developed in English and forward and back translated into Spanish. Baseline interviews were conducted a mean of 223 days after diagnosis (median 185 days, interquartile range 159–255), and follow-up interviews were conducted a mean of 732 days after diagnosis (median 714 days, interquartile range 698–738). Follow-up surveys were conducted 24 months later.

The sample was drawn from a census of incident breast cancer cases diagnosed March through November 2000 after excluding Asian-American women aged 55–70 years because the latter were already allocated to another study. A total of 2,745 patients were identified by Rapid Case Ascertainment (RCA) from 103 hospitals or other settings in which breast cancer was diagnosed.[24] Pathology reports from all these patients were reviewed by study oncologists to confirm diagnosis of invasive breast cancer or ductal carcinoma in-situ (DCIS). Of these women, 215 were unable to be contacted, 224 did not meet study inclusion criteria (had other cancer besides breast), 333 were ineligible for patient survey (did not speak English or Spanish), and 704 refused to participate in a 90-min baseline computer-assisted telephone interview (CATI) for a response rate of 64%. IRB approval was obtained from UCLA and RAND.

Analytical Cohort

Our analytical cohort includes 315 women who had a mastectomy on baseline or follow-up survey as the treatment for their breast cancer. To assure an equivalent observation window for detecting reconstruction, women who did not complete the follow-up survey were excluded from our analysis. However, when we performed a sensitivity analysis including and excluding the women who did not complete the follow-up survey, we found that the main multivariable results were consistent.

Analytical Variables

The two dependent variables were physician-patient breast reconstruction discussion and use of breast reconstruction reported on either the baseline or follow-up survey. Use of breast reconstruction was measured by saying to patients, "Breast reconstruction is a surgical procedure where an implant is placed under the skin, or the woman's own tissue is used to recreate the breast. Did you have breast reconstruction or plastic surgery to recreate your breast?" Women who did not have breast reconstruction were asked, "Did any of your doctors ever discuss with you the possible use of breast reconstruction or plastic surgery to recreate your breast?" Women who reported having breast reconstruction and those who responded "yes" to the discussion question were categorized as having physician-patient discussion of reconstruction.

The independent variables we assessed were from the baseline survey and included sociodemographic characteristics, such as age (50–59 years, 60–69 years, and 70 years or more), self-reported race/ethnicity (White, African-American, Latina who completed survey in Spanish, Latina who completed survey in English, and other), education (less than high school, high school graduate, some college, college graduate or more), income (<$20,000, $20,001–$40,000, >$40,000), health insurance status (yes/no), and employment (yes/no). Of note, we separated Latinas into two groups by language to account for differences in acculturation between the two groups.

We also assessed clinical characteristics, including the number of self-reported comorbidities (0, 1–2, >3),[25] body mass index (<30, ≥30) calculated from patient report of height and weight, and Short Form-12 physical and mental component scores for the 4 weeks prior to the survey.[26] The list of comorbidities is listed in the footnote in Table 1. We included history of chest wall radiation[27–31] because prior literature has shown that women who have received these treatments have higher rates of complications, especially with reconstruction using expander/implant prostheses. Using linked Surveillance, Epidemiology, and End Results (SEER) data, we categorized breast cancer stage as early (I, IIA) vs. advanced (IIB, III, IV). Of note, in our cohort only five women had stage IV breast cancer, and when we excluded them from our analysis, our results were the same. Two previous studies reported conflicting results regarding a possible association between receipt of chemotherapy and tamoxifen with breast reconstruction failure.[29,30] We performed a sensitivity analysis of results with and without chemotherapy and tamoxifen as predictors and found that our main effects were unchanged. Therefore, we present our analytical model without the receipt of chemotherapy and tamoxifen.

We assessed patient's social support with two measures: married or living with a companion, and a social support score (Table 1).[32] We characterized the hospital associated with the patient's diagnosis as no, low, or high teaching and as government, for-profit, or non-profit ownership. Hospitals that reported medical school affiliation to the American Medical Association but were not members of the Council of Teaching Hospitals (COTH) were defined as having low teaching status.[33] High teaching status hospitals were members of COTH. Hospital type was derived from matching hospital identification numbers with listings obtained from the American Hospital Association and the California Office of Statewide Health Planning and Development (1999–2001).[34]

Statistical Analysis

We performed univariate descriptive statistics of sociodemographic, clinical, social support, and hospital characteristics of our cohort. We checked for correlation of the independent variables and found no evidence of multicollinearity ($r<0.4$). Using multivariate logistic regression, we first assessed the likelihood of having a patient report of a discussion with their physician about breast reconstruction among the full cohort of women with mastectomy while controlling for all independent variables mentioned above. Second we assessed the impact of all independent variables (except health insurance status) on the likelihood of having breast reconstruction. We excluded health insurance status in this multivariable model because all women with reconstructive breast surgery were insured. Finally, we assessed the impact of the same independent variables on the likelihood of having breast reconstruction among women who had a discussion. Of note, there were no

Table 1. Descriptive Statistics of Women with Mastectomy*

	Mastectomy (n=315)
Age (years)	
50–59	30%
60–69	32%
>70	37%
Ethnicity	
White	58%
English-speaking Latino	13%
Spanish-speaking Latino	12%
African American	12%
Other	6%
Education	
Less high school	16%
High school graduate	30%
Some college	27%
College grad or more	27%
Income	
<$20,000	32%
$20,001 to $40,000	19%
>$40,000	49%
Health insurance (yes)	94%
Employment (yes)	24%
Physical SF-12†	49.4 (9.9)
Mental SF-12†	52.8 (10.3)
Number of comorbidities‡	
None	18%
1–2	47%
>3	35%
Obese (BMI≥30)	24%
Late stage (IIB, III, IV)	33%
Radiation therapy	11%
Social support score§	82.0 (22.9)
Living with a companion	55%

**Categorical variables are presented as percentages and continuous variables [Physical SF-12, Mental SF-12, BMI, and Social Support Score are presented as mean (standard deviation)]*

†*The Short Form-12 (SF-12) score, developed by the Medical Outcomes Study, is a 12-item, self-administered questionnaire that assesses symptoms, functioning, and quality of life. The responses to each question are weighted differently for mental and physical components, and thus generate two scores: a mental and a physical component score. For the general population, the physical and mental SF-12 scores have a mean of 50 and standard deviation of 10 (reference 26).*

‡*The comorbidities were derived from the following list of diagnoses: hypertension, coronary artery disease, congestive heart failure, myocardium infarction, other heart problems, stroke, emphysema/asthma, Crohn's disease, arthritis hip/knee, arthritis of the hand, sciatic leg pain, diabetes, other cancer, osteoporosis, scleroderma, and ever had prior radiation therapy to chest.*

§*The social support score (0 to 100) was calculated by averaging responses to eight questions: how often do you have someone to help you if confined to bed, to take you to the doctor if you needed it, to have a good time with, to prepare meals if you are unable, to help with daily chores if sick, to turn to for suggestions or deal with problems, who understands your problems, and to love and make you feel wanted? Individuals can choose from five response categories: all of the time (score=100), most of the time (75), some of the time (50), a little of the time (25), and none of the time (0). (reference 38)*

differences in results when we used age and BMI as continuous or categorical variables. For all multivariable analyses, we controlled for the intracluster correlation among women diagnosed in the same hospital and evaluated for goodness-of-fit using the Hosmer and Lemeshow test. C-statistics for all models were greater than 0.75, and p-values for Hosmer and Lemeshow tests were greater than 0.30.[35,36]

We used non-response weights developed using logistic regression of patients with incident breast cancer noted in the Registry's Rapid Case Ascertainment file as a function of age, race, stage at diagnosis, and dummy variables for hospital associated with diagnosis in the analyses. Comparison of respondents and non-respondents showed women who were non-white (p<0.0001), older (p<0.0001), and with stage III or IV breast cancer (p<0.0001) were more likely to be survey non-responders. We present the results of the multivariable analysis as odds ratios (OR) with 95% confidence intervals (95% CI). STATA version 9.2 was used for all analyses.

RESULTS

Table 1 summarizes the descriptive statistics of the mastectomy cohort. The majority of women were White (58%), had a high degree of social support (mean score=82, SD 23), and living with a companion (55%). The mean SF-12-physical score of the mastectomy cohort (score=49, SD 10) was not statistically different than that of the general population (score=50, SD 10). However, the mean SF-12 mental score of the mastectomy cohort (score=53, SD 10) was significantly higher than that of the general population (score=50, SD 10) (p< 0.01). A fifth (18%) had no comorbidities, and one quarter of women were obese (BMI>30). A third of women had breast cancer stage IIB or later, and 11% had radiation therapy.

Discussion of Reconstruction

Overall, 81% of 315 women post-mastectomy reported having a discussion of breast reconstruction with a physician. A small percentage (3.9%) did not answer the discussion question. There were no significant differences in characteristics between individuals who did and did not answer the discussion question. When controlling for covariates, women with annual household income <$20,000 were less likely to have a breast reconstruction discussion with a physician than women with annual household income ≥$40,000 (OR=0.23, 95% CI 0.07–0.82) (Table 2).

Surgical Reconstruction

A quarter of the women in this sample (27%) had breast reconstruction. In multivariable analysis age, income, and married or living with companion status were significant correlates of use of breast reconstruction (Table 2). Women aged 60 to 69 (OR=0.35, 95% CI 0.19–0.63) and >70 years (OR=0.23, 95% CI 0.11–0.47) were less likely than women aged 50 to 59 to have breast reconstruction. Women living alone were less likely than those married or living with a companion to have breast reconstruction (OR=0.45, 95% CI 0.22–0.94). Women with <$20,000 annual household income were less likely than women with >$40,000 annual household income to have breast reconstruction (OR=0.65, 95% CI 0.08–0.61).

When examining factors associated with breast reconstruction among subsets of women who discussed breast reconstruction with a physician, the multivariate analysis showed age, married or living with a companion status, and income to be statistically significant again in the same direction (p<0.05). Additionally, radiation therapy became a significant negative

Table 2. Multivariate Analysis of Discussion of Breast Reconstruction, Breast Reconstruction, and Breast Reconstruction Among Women with Discussion†

Cohort	Discussion OR (95% CI)	Reconstruction OR (95% CI)	Reconstruction OR (95% CI)
	Post-mastectomy (n=302)‡	Post-mastectomy (n=315)	Post-mastectomy with discussion (n=253)
Age			
50 to 59 years	1.00	1.00	1.00
60 to 69 years	0.64 (0.17 2.36)	0.35 (0.19 0.63)***	0.32 (0.17 0.61)***
≥70 years	0.51 (0.12 2.15)	0.23 (0.11 0.47)***	0.23 (0.10 0.52)***
Race			
White	1.00	1.00	1.00
Latina English-speaking	1.70 (0.40 7.16)	1.09 (0.40 2.90)	0.97 (0.36 2.60)
Latina Spanish-speaking	0.61 (0.13 2.86)	0.31 (0.05 1.93)	0.24 (0.05 1.27)
African American	0.63 (0.15 2.58)	0.45 (0.19 1.06)	0.49 (0.19 1.24)
Other	0.51 (0.11 2.47)	0.99 (0.19 1.06)	1.63 (0.46 5.74)
Education			
Less than high school	1.65 (0.42 6.43)	0.65 (0.15 2.79)	0.66 (0.16 2.75)
High school graduate	1.90 (0.60 6.03)	1.31 (0.66 2.62)	1.17 (0.52 2.63)
Some college	3.12 (1.00 9.77)	1.85 (0.89 3.83)	1.57 (0.75 3.29)
College graduate or more	1.00	1.00	1.00
Household income			
<$20,000	0.23 (0.07 0.82)*	0.65 (0.08 0.61)**	0.28 (0.10 0.80)*
$20,000 to $40,000	0.77 (0.15 3.88)	0.59 (0.24 1.50)	0.71 (0.29 1.71)
>$40,000	1.00	1.00	1.00
Insurance		Omitted§	Omitted§
Yes	1.00	–	–
No	0.71 (0.96 1.03)	–	–
Employment			
Yes	1.12 (0.35 4.10)	1.75 (1.00 3.04)	1.77 (0.93 3.37)
No	1.00	1.00	1.00
Physical Short Form-12 score	0.99 (0.96 1.03)	1.01 (0.97 1.05)	1.00 (0.96 1.04)
Mental Short Form-12 score	0.99 (0.95 1.03)	0.99 (0.97 1.01)	0.98 (0.94 1.03)
Comorbidity count			
None	1.00	1.00	1.00
1 to 2	0.58 (0.15 2.22)	1.41 (0.65 3.04)	1.26 (0.55 2.85)
≥3	0.25 (0.05 1.20)	0.83 (0.35 1.96)	0.91 (0.37 2.20)
Body mass index (BMI)			
Obese (BMI>30)	2.02 (0.83 4.90)	0.45 (0.82 1.91)	0.32 (0.15 1.02)
Not obese (BMI ≤30)	1.00	1.00	1.00
Stage			
I and IIA	1.00	1.00	1.00
IIB, III, and IV	0.90 (0.42 1.94)	0.68 (0.30 1.53)	0.74 (0.29 1.89)
Radiation therapy			
Yes	1.02 (0.38 2.74)	0.25 (0.06 1.08)	0.19 (0.04 0.83)*
No	1.00	1.00	1.00
Social support score	1.00 (0.99 1.02)	0.99 (0.97 1.01)	0.99 (0.97 1.01)
Married or living with companion			
Yes	1.00	1.00	1.00
No	0.91 (0.80 2.00)	0.45 (0.22 0.94)*	0.43 (0.20 0.90)*

*$p<0.05$, **$p<0.01$, ***$p<0.001$

†*Multivariate logistic analysis also controlled for hospital characteristics (i.e., teaching status, financial status) and the intra-cluster correlation between women diagnosed with breast cancer in the same hospital*

‡*Thirteen women did not answer the question "Did your doctor ever discuss with you the possible use of breast reconstruction?" There were no differences between responders and non-responders by sociodemographic characteristics*

§*This independent variable was omitted in the analysis because all women with breast reconstruction were insured*

predictor of breast reconstruction among the subset of women with a discussion.

DISCUSSION

Similar to results reported by Morrow et al., we found that the majority of women reported discussing breast reconstruction with their physicians (81%).[2] However, we also found significant variation in the rate of physician-patient discussion by income. Lower income women were significantly less likely than higher income women to report having a discussion of breast reconstruction with their physicians when controlling for health insurance and other factors. Lower income women may face significant barriers to the use of breast reconstruction. Although the Women's Health and Cancer Rights Act guarantees insurance reimbursement for breast reconstruction, insured lower income women may not be able to afford the ancillary costs associated with breast reconstruction.[37] Despite significant barriers to the use of breast reconstruction, lower income women should be involved in the decision-making process and be informed of the availability of the procedure to make an appropriate choice. Prior studies have found that patient involvement in the cancer decision-making

process enhances the quality of cancer care.[38] Specifically, the National Initiative for Cancer Care Quality (NICCQ)[39] considered physician-patient discussion of breast reconstruction prior to undergoing mastectomy a measure of breast cancer quality of care.[40] Not being included in the cancer decision-making process diminishes patients' trust in decisions about their health care and potentially decreases patients' compliance with future clinical recommendations.[9–12,41]

Despite having discussed breast reconstruction with a physician, women with advanced age, who were neither married nor living with a companion, or who were of low income were significantly less likely to receive breast reconstruction. Women with advanced age or who were neither married nor living with a companion may assign different values to cosmetic surgical procedures to maintain their body image and sexual attractiveness.[2] Of note, the use of breast prostheses is another option for women to maintain body image. Women of low income may also assign different values in choosing reconstruction as financial barriers associated with their use of reconstruction are likely to be more substantial than for affluent individuals. Whether the lower use of breast reconstruction among these women is due to access or a lack of interest in the procedure should be further studied.

Among the subgroup of women who discussed breast reconstruction with a physician, we found that prior radiation therapy was a significant negative predictor of breast reconstruction. This finding highlights the importance of patients knowing that radiation therapy has been associated with higher rates of reconstruction complications and failure.[29,30] Discussion of how benefits and risk of reconstruction vary as a function of clinical characteristics may help patients better understand how to interpret their own unique risk/benefit ratio.

Limitations

These results should be considered in light of several limitations. While this study is population-based with detailed data regarding demographic, socioeconomic, clinical, and hospital characteristics, it sampled women from a single city. Women without mastectomy were not asked about discussion of breast reconstruction, and thus we cannot account for the selection bias of women who chose to have mastectomy. Some women with mastectomy may not have recalled the discussion that they had with physicians about reconstruction. We were unable to examine whether our sample had a consultation with a plastic surgeon because we found that respondents couldn't adequately distinguish between general versus plastic surgeons. The 64% response rate is a potential source of bias; however, the overall response rate is comparable to or better than the response rates for the CDC's Behavioral Risk Factor Surveillance System in 27 states.[42] There was some response bias in our sample with regards to age, race, and stage at diagnosis. However, since our results are weighted for non-response, we do not expect non-response to limit the generalizability of our results.[43] In addition, we did not collect data on the timing of breast reconstruction (i.e., same time as mastectomy versus delayed until completing other cancer therapy) or type of breast reconstruction received (i.e., implant versus autologous tissue reconstruction). Finally, we were not able to examine important unmeasured factors, such as the quality of the breast reconstruction discussion and patient preferences about having the procedure.

In conclusion, sociodemographic disparities persist in the rate of physician-patient discussion of breast reconstruction. We found that lower-income women are at risk of not having a discussion of breast reconstruction with their physicians, and thus, not being included in the decision-making process for the use of breast reconstruction. In addition, among women with clinical characteristics associated with higher rates of reconstruction complications and failure, having a discussion of breast reconstruction with their physician appears to decrease the use of breast reconstruction. This highlights the importance of having physician-patient discussion of breast reconstruction. Without discussion of the procedure with a physician, women with mastectomy would not have been adequately informed about the benefits and risks of the procedure for her unique situation. Interventions to increase physician-patient discussion of breast reconstruction are needed particulary among lower income women. Such interventions have the potential of increasing patient involvement in the decision-making process, improving treatment adherence, and enhancing the quality of life in this vulnerable population.[9–12]

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