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ORIGINAL REPORT

Patient Satisfaction With Treatment of Breast Cancer: Does Surgeon Specialization Matter?

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ABSTRACT

Purpose
Experience and practice setting vary greatly among surgeons who treat breast cancer patients. However, less is known about how these factors influence patient satisfaction with their care.

Patients and Methods
We surveyed all ductal carcinoma in situ patients and a 20% random sample of invasive breast cancer patients diagnosed in 2002 reported to the Detroit, MI, and Los Angeles, CA, Surveillance, Epidemiology, and End Results registries. Attending surgeons were surveyed, yielding dyad information for 64.6% of patients (n = 1,539) and 69.7% of surgeons (n = 318). Logistic regression was used to examine the associations between surgeon specialization (percentage of practice devoted to breast disease) and hospital cancer program status, with four domains of patient satisfaction: (1) the surgical decision, (2) decision-making process, (3) surgeon-patient relationship, and (4) surgeon-patient communication, adjusting for patient and surgeon demographics and disease stage.

Results
In this sample, 34.5% of patients were treated by surgeons who devoted less than 30% (low volume) of their practice to breast disease, 32.5% by surgeons who devoted 30% to 60% (medium volume) of their practice to breast disease, and 33.0% by surgeons who devoted more than 60% (high volume) of their practice to breast disease. Compared to patients treated by low-volume surgeons, patients treated by higher volume surgeons were more satisfied with the decision-making process (medium volume, odds ratio [OR], 1.16; 95% CI, 0.80 to 1.67; high volume: OR, 1.79; 95% CI, 1.14 to 2.80) and with the surgeon-patient relationship (medium volume: OR, 1.13; 95% CI, 0.72 to 1.76; high volume: OR, 1.98; 95% CI, 1.08 to 3.61). Treatment setting was not associated with patient satisfaction after controlling for other factors.

Conclusion
Surgeon specialization is correlated with patient satisfaction. Examining the processes underlying these associations can inform strategies to improve breast cancer care.

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INTRODUCTION

Up to 20% of newly diagnosed patients with breast cancer may be dissatisfied with their decision for surgery, and only 50% of patients report participating in the decision to the extent that they desire.[1,2] Although prior research has primarily focused on patient-level correlates of satisfaction, much less is known about the effect of surgeon characteristics on patient outcomes after breast cancer surgery.

The majority of women with breast cancer are cared for by general surgeons without specialty training in breast disease or oncology. Typically, breast disease comprises less than 25% of their total practice volume, and approximately half perform only two or fewer breast procedures per month.[3,4] Previous work has largely examined the association between surgeon characteristics and their utilization of breast-conserving surgery (BCS). For example, higher surgeon procedural volume has been correlated with the probability of receiving BCS for localized breast cancer.[5,6] However, the effect of surgeon specialization in breast disease on patient-centered outcomes, such as patient satisfaction with care, is less clear. It is important to address the association between surgeon specialization and these outcomes, because they are more pertinent to the quality of breast cancer care than are rates of BCS alone.[7]

We surveyed a large, population-based sample of women with breast cancer to evaluate the effect of surgeon and practice setting characteristics on patient satisfaction with the decision for surgery and aspects of the surgical treatment decision process. We addressed the following question: What is the

independent association between patient satisfaction with the decision for surgery, the decision-making process, the surgeon-patient relationship, and surgeon-patient communication and surgeon attributes, including degree of specialization in breast surgery, sex, years in practice, and treatment setting?

PATIENTS AND METHODS

Study Population

Patients. The details of the study design and sample have been described elsewhere, and are briefly reviewed here.[2,6,8] Women aged 79 years and younger who were diagnosed with ductal carcinoma in situ (DCIS) or invasive breast cancer between December 2001 and January 2003 and underwent a definitive surgical procedure were identified by enrollment in the Surveillance, Epidemiology, and End Results (SEER) Cancer Registries of Detroit, MI, and Los Angeles, CA. All women with DCIS, and a 20% random sample of women with invasive breast cancer were included in the initial study sample. Women with DCIS and African American women were purposefully oversampled to increase their representation in the study sample. The initial sample of eligible women included 2,647 women. The study protocol was approved by the institutional review boards at the University of Michigan (Detroit, MI), Wayne State University (Detroit, MI), and the University of Southern California (Los Angeles, CA).

After the initial sample was identified, women who were unable to complete a questionnaire in either English or Spanish, women with lobular carcinoma in situ, and women with distant metastatic disease were excluded. Additionally, Asian women, and women younger than 50 years diagnosed with invasive breast cancer from Los Angeles were excluded because of enrollment in other studies. After these exclusion criteria were applied, 2,382 women were eligible for the study. Of these women, 77.4% (n = 1,844) completed the survey. The majority (92.4%) completed a written survey, and 7.6% completed an abbreviated telephone survey.

Surgeons. Surgeons eligible for the study were identified by the pathology reports contained in the SEER database for 98.5% of the patient sample (n = 456). Surgeons were surveyed with a mailed questionnaire using the Dillman method, and a telephone survey was used for those surgeons who did not respond to the mailed survey.[9] The response rate was 80% (n = 365), with 355 surgeons completing the mailed survey and 10 surgeons completing the telephone survey.

Merged Data Set

Using identifiers from each patient's pathology report, surgeon responses were matched to their patients' survey responses. Pathology reports were available for 94.6% of the sample, and we generated complete patient-surgeon dyad information for 65% of the accrued and eligible patients (n = 1,539) and 69.7% of the accrued surgeons (n = 318).

Variables

Dependent variables. We studied four dimensions of patient satisfaction derived from a conceptual model using information from the patient survey (Appendix, online only): (1) satisfaction with the type of surgical treatment received (five items; Crohnbach's alpha = 0.93), (2) satisfaction with the process in which the decision for surgery was made (four items; Crohnbach's alpha = 0.91), (3) satisfaction with the surgeon-patient relationship (four items; Crohnbach's alpha = 0.89), and (4) satisfaction with the surgeon-patient communication (four items; Crohnbach's alpha = 0.87). Factor analysis was performed to confirm that each domain was a unique aspect of overall satisfaction.

For each item in the survey, a 5-point Likert scale (strongly agree to strongly disagree) was used to measure patient's level of agreement with each statement. For each of the four domains of patient satisfaction detailed herein, scales were created by averaging responses to the included items to generate a response score. Response scores were then dichotomized, with scores of 4 and higher categorized as satisfied, and scores lower than 4 categorized as dissatisfied. Sensitivity analyses were performed to evaluate other strategies. Increasing the level of satisfaction to 5 or higher or decreasing the level of satisfaction to 3 or higher did not significantly change the results.

Independent variables. We included the following surgeon characteristics in our analysis: number of years in practice, surgeon sex, and specialization in breast surgery, defined as the percent of the surgeon's practice devoted to breast surgery procedures. Number of years in practice was categorized into three groups: 10 years or less, 11 to 20 years, and 21 years or more. Surgeons in practice 10 years or less were used as the reference group. Male surgeons were used as the reference group compared with female surgeons.

Surgeons were asked to report what percentage of their total practice was devoted to breast procedures. Responses were categorized into the following three groups: less than 30% of practice devoted to breast disease, 30% to 60% of practice devoted to breast disease, and more than 60% of practice devoted to breast disease. Surgeons with less than 30% of their practice devoted to breast disease were used as the reference group. Surgeons were also asked to report the number of breast surgeries performed in the previous calendar year. These responses were highly correlated with the percentage of the practice devoted to breast disease, and analysis using this variable did not significantly alter the results of our analysis.

We included hospital cancer program status in our analysis to evaluate the location where the patient received her surgery, determined from information from the Cancer Program of the American College of Surgeons (ACoS).[10] Information was gathered for the 114 hospitals where one or more patients in the study sample were treated, and grouped into three categories: National Cancer Institute (NCI)-designated comprehensive cancer center (n = 4), other ACoS-approved cancer program (n = 35), and no ACoS-approved cancer program (n = 75).

Demographic characteristics of the patient sample included in the analysis were patient age, race (white, African American, other), and patient education (some high school, high school graduate, some college, college graduate or beyond), as obtained by patient report from the mailed survey. Additionally, we included the following disease characteristics as covariates in our models: tumor stage (DCIS, stage I, stage II, and stage III disease), and patient report of type of surgery received (mastectomy, lumpectomy, and reconstruction after mastectomy).

Finally, to evaluate whether patient selection affected the results, we included a set of variables indicating patient report of how the treating surgeon was selected (Appendix).[11] The variables were (1) referred to their surgeon by a physician or health plan; (2) selected their surgeon on the basis of reputation; and (3) selected their surgeon on the basis of proximity.

Analysis

We used descriptive statistics to display the characteristics of patients and surgeons, and to generate bivariate associations between our independent and dependent variables. We then tested the independent association of each of the surgeon variables using logistic regression, after including the patient demographic (age, education, race) and clinical (tumor stage, surgery received) variables in the model. Odds ratios (ORs) were generated to predict satisfaction for each of the measures, and 95% CIs are reported. To evaluate the effect of patient selection, we included three variables regarding patient selection of their surgeon in a sensitivity analysis. We adjusted point estimates in all models to reflect the sampling design using a sample weight that accounted for the differential selection by race, stage, and patient nonresponse. Second-order interactions were tested, but no statistically significant interactions were found. SEs for all models were calculated to account for patients clustered within surgeons. Wald tests were used to test for differences for group variables. A P value less than .05 was considered statistically significant. All analysis was performed using Stata version 9.0 (StataCorp, College Station, TX).

RESULTS

Table 1 describes the characteristics of the patient population. The majority of women (70.4%) were white, with a mean age of 59 years (range, 29 to 79 years). Lumpectomy was the most common surgical procedure (70.0%), and 79% of women reported a diagnosis of DCIS

Table 1. Characteristics of the Study Patient Population

Characteristic	% of Patients (n = 1,539)
Age, years	
Mean	59.0
Range	29-79
Race	
White	70.4
African American	21.7
Other	7.9
Education	
Some high school	12.3
High school graduate	22.5
Some college	37.8
College graduate and beyond	27.4
Disease stage	
DCIS	54.4
I	24.5
II	16.5
III	4.6
Surgery received	
Lumpectomy	69.5
Mastectomy	19.5
Reconstruction following mastectomy	11.0
Patient report of surgeon selection*	
Patient selected based on reputation	37.9
Patient selected based on proximity to home	8.7
Patient referred to surgeon	74.3
Satisfaction with final decision	
Yes	88.4
No	11.7
Satisfied with decision-making process	
Yes	63.0
No	37.0
Satisfied with relationship with surgeon	
Yes	77.4
No	22.6
Satisfied with communication with surgeon	
Yes	75.9
No	24.1

Abbreviation: DCIS, ductal carcinoma in situ.
*Percentages sum to greater than 100% because patients could select all items that applied.

Table 2. Characteristics of the Study Surgeon Population

Characteristic	% of Surgeons (n = 318)	% of Patients (n = 1,539)
Age, years		
Mean	49.8	
Range	30-79	
Years in practice		
≤ 10	30.4	29.2
11-20	32.4	31.9
≥ 21	37.2	38.9
Sex		
Female	15.3	23.6
Proportion of practice involving breast disease		
Low (< 30%)	54.4	34.5
Medium (30%-60%)	29.6	32.5
High (> 60%)	16.0	33.0
Practice at a cancer center		
Non–ACoS-approved cancer program	48.4	34.1
NCI-designated comprehensive cancer center	7.6	12.3
ACoS-approved cancer centers	44.0	53.6

Abbreviations: ACoS, American College of Surgeons; NCI, National Cancer Institute.

or stage I disease. The majority of patients had either some college education (37.8%) or were college graduates (27.4%).

In this sample, 37.9% patients reported that they selected their surgeon on the basis of reputation, 8.7% reported they selected their surgeon on the basis of proximity, and 74.3% reported that they were referred to their surgeon by either a physician or their health care plan. Percentages sum to greater than 100% because patients could select all items that applied. Overall, patients reported relatively high rates of satisfaction with the final decision (88.4%), the decision-making process (63.0%), their relationship with their surgeon (77.4%), and their communication with their surgeon (75.9%; Table 1).

Table 2 describes the characteristics of the surgeon population. The majority of the surgeons were white, and the average surgeon age was 49.8 years. Approximately 15% of the surgeons were female. The majority (54.4%) of surgeons reported low (< 30%) breast procedure volume, 26.6% reported practices where breast procedures comprised 30% to 60% of their practice, and 16% reported a high (> 60%) breast procedure volume in their practice. Approximately half (48.4%) of the surgeons treated patients at sites that were non–ACoS-approved cancer programs, 44% treated patients at sites that were ACoS-approved cancer programs, and 7.6% treated patients at sites that were NCI-designated comprehensive cancer centers.

Table 2 also displays the distribution of patients by surgeon characteristics. Of the patients, 29.2% were treated by surgeons who were in practice 10 years or less, 31.9% were treated by surgeons in practice for 11 to 20 years, and 38.9% were treated by surgeons who were in practice 21 years or longer. Additionally, 23.6% of patients were treated by surgeons who were female. Approximately one third of patients were treated by surgeons who reported that less than 30% of their practice comprised breast disease, one third were treated by surgeons who reported that 30% to 60% of their practice comprised breast disease, and one third of patients were treated by surgeons who reported that more than 60% of their practice comprised breast disease. The majority of patients (53.7%) were treated at ACoS-approved cancer centers, 12.3% were treated at NCI-designated comprehensive cancer centers, and 34.1% were treated at non–ACoS-approved cancer programs.

Table 3 details the correlation between surgeon and practice setting characteristics and patient reported satisfaction with aspects of their treatment for breast cancer. Patients who were treated by surgeons who devoted more than 60% of their practice to breast disease were more likely to be satisfied with the decision-making process compared with patients treated by surgeons with less than 30% of their practice comprising breast disease (30% to 60% of practice devoted to breast disease: OR, 1.16; 95% CI, 0.80 to 1.67; more than 60% of practice devoted to breast disease: OR, 1.79; 95% CI, 1.14 to 2.80; Wald test = 6.61; $P = .037$). Additionally, patients who were treated by surgeons who devoted more than 60% of their practice to breast disease were more likely to report satisfaction with the surgeon-patient relationship compared with patients treated by surgeons who re-

Table 3. Correlates of Patient Satisfaction With Aspects of the Decision for Breast Cancer Surgery

Characteristics	Satisfaction With Decision for Surgery		Satisfaction With Decision-Making Process		Satisfaction With Surgeon-Patient Relationship		Satisfaction With Surgeon-Patient Communication	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Years in practice								
≤ 10	Reference		Reference		Reference		Reference	
11-20	0.83	0.45 to 1.53	0.81	0.54 to 1.21	1.01	0.61 to 1.68	1.36	0.82 to 2.26
≥ 21	0.88	0.48 to 1.58	0.74	0.48 to 1.15	0.60	0.36 to 1.00	0.75	0.45 to 1.24
Wald test	0.38		1.92		5.98		6.06	
P	.828		.382		.050		.048	
Sex								
Male	Reference		Reference		Reference		Reference	
Female	1.27	0.70 to 2.32	0.79	0.49 to 1.25	1.05	0.58 to 1.87	1.22	0.65 to 2.28
Specialization (% of practice devoted to breast disease)								
Low (< 30%)	Reference		Reference		Reference		Reference	
Medium (30%-60%)	1.00	0.57 to 1.71	1.16	0.80 to 1.67	1.13	0.72 to 1.76	1.09	0.70 to 1.70
High (> 60%)	1.60	0.84 to 3.06	1.79	1.14 to 2.80	1.98	1.08 to 3.61	1.49	0.85 to 2.63
Wald test	3.40		6.61		5.10		1.97	
P	.18		.037		.077		.373	
Treatment at a cancer center								
Non–ACoS-approved cancer program	Reference		Reference		Reference		Reference	
NCI-designated comprehensive cancer center	0.39	0.18 to 0.86	0.73	0.45 to 1.17	0.69	0.37 to 1.28	0.62	0.31 to 1.23
ACoS-approved cancer centers	0.76	0.43 to 1.36	1.11	0.77 to 1.55	0.65	0.43 to 0.98	0.69	0.47 to 1.04
Wald test	5.68		3.63		4.43		3.72	
P	.058		.163		.109		.155	

NOTE. Controlled for patient age, patient race, patient education, tumor stage, and surgery received.
Abbreviations: OR, odds ratio; ACoS, American College of Surgeons; NCI, National Cancer Institute.

ported less than 30% of their practice to comprise breast disease (30% to 60% of practice devoted to breast disease: OR, 1.13; 95% CI, 0.72 to 1.76; more than 60% of practice devoted to breast disease: OR, 1.98; 95% CI, 1.08 to 3.61; Wald = 5.10; $P = .077$). The effect of surgeon specialization persisted across each domain of satisfaction, with nonsignificant trends toward higher satisfaction among patients treated by surgeons who devoted more of their practice to breast disease.

Addition of surgeon years in practice, sex, and hospital cancer center status did not significantly change the effect of surgeon specialization on patient satisfaction with treatment. Finally, including the three variables that described patient report of how their surgeons were selected did not significantly change the magnitude or direction of the effect of surgeon specialization and patient satisfaction across any of the domains of satisfaction. Patient selection of surgeons was not correlated with patient satisfaction with the decision-making process (selected by reputation: OR, 1.23; 95% CI, 0.87 to 1.72; referred to surgeon: OR, 1.04; 95% CI, 0.68 to 1.61; selected by proximity: OR, 0.64; 95% CI, 0.39 to 1.05), or the decision for surgery (selected by reputation: OR, 1.42; 95% CI, 0.86 to 2.37; referred to surgeon: OR, 1.07; 95% CI, 0.63 to 1.83; selected by proximity: OR, 1.07; 95% CI, 0.49 to 2.30). Patients who selected their surgeons on the basis of reputation were more likely to report satisfaction with the surgeon-patient relationship (OR, 1.59; 95% CI, 1.08 to 2.33), and with the surgeon-patient communication (OR, 1.57; 95% CI, 1.06 to 2.33).

DISCUSSION

In this population-based study of breast cancer patients, surgeon specialization was significantly correlated with patient satisfaction with the surgical decision-making process and the surgeon-patient relationship. Women with breast cancer were more likely to report satisfaction with the surgical decision-making process and with the surgeon-patient relationship if they were treated by surgeons who devoted a large proportion of their practice to breast disease. We observed positive, although not statistically significant, associations between surgeon specialization and patient satisfaction with their decision for surgery, as well as surgeon-patient communication. In contrast, other surgeon characteristics, such as years in practice and sex, were not correlated with any measures of patient satisfaction. Finally, cancer program designation was not significantly associated with satisfaction measures after controlling for other factors.

We can only speculate about potential mechanisms that may explain the correlation between surgeon specialization in breast surgery and patient satisfaction. It is possible that surgeons who specialize in breast surgery may have better interpersonal skills developed through accumulated experience and greater interest in treatment of breast cancer patients. Prior studies suggest that more specialized breast surgeons have different attitudes about treatment options (eg, more likely to strongly endorse BCS) and perceive greater conflict with patients about choice of treatment especially when the patient favors more aggressive surgery than does the surgeon.[8,12] Despite these differences in surgeon perspectives on local surgical therapy, patients do not report large differences in how treatment options are discussed.[6] Thus, other interpersonal attributes of the relationship or communication may be at play.

It is also possible that specialized breast surgeons may have better technical outcomes compared with those of nonspecialized surgeons. Their patients may not require reoperation as frequently, or may have superior esthetic outcomes after surgery. Additionally, patients of specialized breast surgeons may report higher levels of satisfaction

resulting from attributes of the surgeon's practice setting. Although patient satisfaction was not correlated with cancer program status in our analysis, this designation may not fully capture the variation in the processes of care between different practice settings. For example, availability of support staff, informational materials, on-site diagnostic and therapeutic resources, and logistic ease of care may be more important predictors of patient satisfaction than cancer program designation alone. Future study is needed to fully elucidate the interplay between patient satisfaction and the specific details of breast cancer care.

Finally, previous work has demonstrated that patients who actively selected their surgeon were more likely to be treated by a more experienced surgeon.[11] These patients may have different initial expectations about the communication or the relationship with their surgeon, which could influence their perspectives measured after treatment. In our study, patients who selected their surgeon by reputation were more likely to report satisfaction with the relationship and communication with their surgeon. Nonetheless, the effect of surgeon specialization on patient satisfaction persisted after controlling for the independent effect of patient selection of their surgeon.

Several potential limitations of this work merit comment. Although we had an excellent patient and surgeon response rate, nonresponse may have biased our results or reduced their generalizability. Because Asian women and younger women were not included in the study sample, our results cannot be generalized to these groups. Additionally, although we were able to control for the clustering of patients within surgeons, we were not able to account for the clustering of surgeons within treatment settings in our analysis. Finally, we determined the amount of practice devoted to breast care by surgeon report of the proportion of their practice devoted to breast disease which may be imprecise. However, the categories of specialization were highly correlated with individual surgeon breast cancer surgery volume calculated using regional SEER registry data.[11] Furthermore, we repeated our analysis using surgeon report of their absolute number of breast cases performed per year, which did not alter our results.

Our study results have important implications for both surgeons and patients. From the perspectives of patients, surgeon specialization in breast surgery appears to be more important than surgeon sex, years in practice, or practice setting to ensure patient satisfaction with aspects of the decision-making process. Increasing surgeon specialization in breast disease may improve patient satisfaction with important elements of their breast cancer care, such as decision making and patient-provider communication. In fact, patient demand may achieve this aim and recent findings suggest that patients self-refer to more experienced surgeons.[11] In that study, provider-based patient referral was not associated with being treated by a higher-volume surgeon. However, it may not be feasible or desirable to re-engineer current referral patterns in the community to concentrate the surgical care of patients with breast cancer. A more prudent approach would be to identify the processes employed by specialized surgeons and disseminate these skills to less specialized surgeons. More research into the mechanisms by which experience yields better patient outcomes can illuminate the best strategy to improve patient satisfaction with breast cancer care.

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

The author(s) indicated no potential conflicts of interest.

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Appendix

The Appendix is included in the full-text version of this article, available online at www.jco.org. It is not included in the PDF version (via Adobe® Reader®).