Original Article

Perceived financial decline related to breast reconstruction following mastectomy in a diverse population-based cohort

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BACKGROUND: Despite mandated insurance coverage for breast reconstruction following mastectomy, health care costs are increasingly passed on to women through cost-sharing arrangements and high-deductible health plans. In this population-based study, the authors assessed perceived financial and employment declines related to breast reconstruction following mastectomy. **METHODS:** Women with early-stage breast cancer (stages 0-II) diagnosed between July 2013 and May 2015 who underwent mastectomy were identified through the Surveillance, Epidemiology, and End Results registries of Georgia and Los Angeles and were surveyed. Primary outcome measures included patients' appraisal of their financial and employment status after cancer treatment. Multivariable models evaluated the association between breast reconstruction and primary outcomes. **RESULTS:** Among 883 patients with breast cancer who underwent mastectomy, 44.2% did not undergo breast reconstruction, and 55.8% underwent reconstruction. Overall, 21.9% of the cohort reported being worse off financially since their diagnosis (25.8% with reconstruction vs 16.6% without reconstruction; $P = .002$). Women who underwent reconstruction reported higher out-of-pocket medical expenses (32.1% vs 15.6% with expenses greater than $5000; $P < .001$). Reconstruction was independently associated with a perceived decline in financial status (odds ratio, 1.92; 95% confidence interval, 1.15-3.22; $P = .013$). Among women who were employed at the time of their diagnosis, there was no association between reconstruction and a perceived decline in employment status ($P = .927$). **CONCLUSIONS:** In this diverse cohort of women who underwent mastectomy, those who elected to undergo reconstruction experienced higher out-of-pocket medical expenses and self-reported financial decline. Patients, providers, and policymakers should be aware of the potential financial implications related to reconstruction despite mandatory insurance coverage. ***Cancer* 2022;128:1284-1293**. © *2021 American Cancer Society*.

KEYWORDS: breast reconstruction, financial toxicity, out-of-pocket costs.

INTRODUCTION

Growing concerns about financial burdens experienced by patients with cancer have led to substantial interest in quantifying the costs of cancer therapies and the experiences of patients related to these costs.[1] In the current paradigm of treatment and survivorship, women diagnosed with breast cancer navigate a complex and expensive continuum of care with a diverse group of providers across multiple care settings. Despite increasing enrollment in high-deductible health plans, the financial burden of these services remains poorly understood and underappreciated by patients, health care providers, and policymakers.[2-5]

Breast reconstruction has been shown to improve health-related quality of life and psychosocial outcomes for women after mastectomy.[6-8] Reconstruction tends to involve several stages and a number of expensive and discretionary technologies, such as preoperative angiography and acellular dermal matrices.[9-11] Mandated insurance coverage for all stages of breast reconstruction by the Women's Health and Cancer Rights Act reduced financial barriers to these procedures, although increased cost sharing in health insurance plans has shifted the financial burden of medical services to patients over the past decade.[2,12] Our understanding of financial toxicity related to cancer therapies has improved, yet there is a paucity of studies that have focused on breast reconstruction, which is an increasingly important component of treatment and survivorship.[13-16] Understanding the experiences of women electing to undergo breast reconstruction following mastectomy will inform costs-of-care discussions between providers and patients and cost-sharing decisions at the payer level and may lead to strategies that protect vulnerable patients from financial consequences of surgical decision-making. This information may also provide additional information to surgical oncologists counseling patients who are considering preference-sensitive,

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comparably effective surgical treatments for early-stage breast cancer and thereby improve both decision-making and financial outcomes for patients.

In this population-based study, we sought to characterize perceived financial and employment declines experienced by women who pursued breast reconstruction following mastectomy. Specifically, we compared self-reported perceptions of financial and employment experiences between women who elected to undergo breast reconstruction and those who did not after mastectomy. We also investigated whether specific subgroups of women were more susceptible to financial and employment declines related to breast reconstruction. We hypothesized that breast reconstruction would be independently associated with a self-reported financial and employment decline after adjustments for clinical and sociodemographic characteristics.

MATERIALS AND METHODS

Study Sample

Women diagnosed with early-stage breast cancer (stages 0-II) who were surgically treated between July 2013 and May 2015 were identified through the Surveillance, Epidemiology, and End Results (SEER) registries of Georgia and Los Angeles and were surveyed by mail. These patients were identified as part of the Individualized Cancer Care (iCanCare) study, which is a population-based survey of women with early-stage breast cancer and their providers.[5,17] Patients were excluded if they had been diagnosed with stage III or IV disease or if they could not complete a questionnaire in Spanish or English. Patients with Spanish surnames were sent materials in both languages. Surveys were mailed to 7303 women, and responses were received from 5080 women (response rate = 69.6%). The cohort was then limited to 868 women with stage 0 to II disease who had undergone self-reported mastectomy with or without breast reconstruction.

Data Collection

Patients were identified via rapid case ascertainment and surveyed at a median duration of 7.7 months (interquartile range, 4.7 months) from diagnosis. We provided a $10 cash incentive up front and used extensive follow-up methods to improve response rates.[18] Survey responses were combined into a single data set and then merged with clinical data from SEER.

Survey Measures

Questionnaires were developed through a literature review, measures that had been previously developed to assess relevant constructs, and theoretical models. Before the study, the survey underwent standard techniques of content validation, including a systematic review by design experts, as well as sequential pretesting and cognitive interviews with patients.[19-23] Patient perceptions of financial and employment status with respect to breast cancer therapies and treatments were adapted to this study evaluating breast reconstruction.

Measures of Financial Status

We adapted questions from the Consumer Bankruptcy Project and prior population-based surveys to assess financial experiences.[24,25] There were several measures of financial impact. First, we asked patients whether they felt that they were worse off financially since their cancer diagnosis. We then asked how much of this was due to their breast cancer and treatment (not at all, a little bit, somewhat, quite a bit, or very much), and we coded responses of quite a bit or very much as having a financial decline due to breast cancer. The threshold for dichotomization was chosen because we were most interested in whether or not patients experienced a substantial perceived decline in their financial status. Patients who reported that they were worse off (quite a bit or very much) were considered to have had a financial decline related to breast cancer therapies, including breast reconstruction (if they reported receipt of breast reconstruction). Second, we asked patients to quantify their out-of-pocket medical and nonmedical expenses related to their breast cancer ($0, $1-$500, $501-$2000, $2001-$5000, $5001-$10,000, or >$10,000). We asked patients to describe spillover effects from the financial impact of these therapies (eg, savings, credit card payments, spending on food, utilities, and eviction). Finally, we asked whether they currently had debt related to breast cancer therapies (yes/no).

Measures of Employment Status

For questions related to employment experiences, we adapted questions from surveys conducted by the Bureau of Labor Statistics and items previously developed by labor economists for use in patients with cancer.[26,27] These measures included whether women perceived that they were worse off with respect to their employment status since their cancer diagnosis and, if so, whether that was due to breast cancer. We inquired whether survivors had been employed at diagnosis, and models for employment decline were limited to this subsample of women (61.6% of the analytic cohort [n = 535]). In this subsample, we also inquired whether women experienced a loss of employment since their diagnosis and asked them to quantify how much of their income they had lost because

of time off from work since their cancer diagnosis ($0, $1-$500, $501-$2000, $2001-$5000, $5001-$10,000, or >$10,000).

Other Survey Measures

Patient self-reported race and ethnicity, education, and annual household income were determined from responses to the survey. Clinical factors included comorbidities, a history of chemotherapy, a history of radiotherapy, a history of hormonal therapy, and characteristics related to mastectomy (unilateral vs bilateral) and the type of breast reconstruction (autologous tissue vs implant-based vs other/unspecified). Patients who underwent latissimus dorsi myocutaneous flap reconstruction with simultaneous tissue-expander placement were included in the autologous tissue category. The stage of breast cancer and the age at diagnosis were available from SEER, and the survey included questions regarding breast cancer recurrence. Patients were also asked how much they worried about current and future financial problems as a result of breast cancer and treatments.

Analytic Approach

We compared clinical and sociodemographic characteristics between women who did and did not undergo reconstruction. We also compared self-reported financial and employment experiences of women who did and did not undergo breast reconstruction. Unadjusted analyses were performed with χ^2 tests for categorical variables and with *t* tests for continuous variables. We constructed 2 multivariable logistic regression models to assess determinants of a perceived decline in financial or employment status. Relevant covariates in these models included age, race/ethnicity, education, annual household income, insurance type, comorbidity, stage, history of chemotherapy, history of radiotherapy, history of hormonal therapy, employment status (for the financial decline model only), mastectomy laterality, and history of breast reconstruction. We also separately tested the interaction between mastectomy laterality and reconstruction in multivariable models. Although missing data were less than 5% for most variables that were included in the models, approximately 20% of income information was missing. Therefore, we used multiple imputation for missing income data in a manner previously described.[25] We performed a sensitivity analysis to assess the impact of setting different thresholds for dichotomization of our primary outcomes (eg, not at all vs a little bit, somewhat, quite a bit, or very much) on findings in our multivariable models. We performed another sensitivity analysis to determine whether the time to survey completion affected our model findings. This study was performed after institutional review board approval for human subjects investigations. All analyses were conducted with SAS (version 9.3; SAS Institute, Cary, North Carolina).

RESULTS

Among 883 patients with breast cancer who underwent mastectomy for early-stage breast cancer, women who underwent breast reconstruction were less likely to have invasive disease (76.5% vs 88.3% with stage I or higher; $P < .001$), less likely to have a history of chemotherapy (32.3% vs 39.5%; $P = .026$), and more likely to undergo bilateral mastectomy (63.9% vs 26.7%; $P < .001$; Table 1). Patients who underwent reconstruction were also younger (43.1 vs 62.3 years; $P < .001$), more likely to have higher educational attainment (80.0% vs 53.6% with some college or higher; $P < .001$), more likely to have a higher annual household income (44.2% vs 15.9% with an annual household income ≥ $90,000; $P < .001$), more likely to be employed at the time of diagnosis (71.8% vs 49.9%; $P < .001$), and more likely to be privately insured (76.0% vs 40.8% with private insurance; $P < .001$; Table 1). Among women with breast reconstruction, 18.7% (n = 92) underwent autologous tissue reconstruction, 69.3% (n = 342) underwent implant-based reconstruction, and 12.0% (n = 59) reported another/unspecified type of reconstruction.

Approximately 21.9% of the cohort reported being worse off financially since their diagnosis (25.8% with reconstruction vs 16.6% without reconstruction; $P = .002$; Table 2). Women who underwent reconstruction reported higher out-of-pocket medical expenses (32.1% vs 15.6% with expenses greater than $5000; $P < .001$; Table 2). Approximately 38.1% of the women reported having debt related to breast cancer therapies and treatments at the time of the survey (42.1% with reconstruction vs 33.1% without reconstruction; $P = .007$; Table 2). Because of the financial impact of having breast cancer, 52.5% of the women who underwent reconstruction and 41.0% of the women without reconstruction reported using savings ($P < .001$). There were no other differences with respect to privations by reconstruction status. Among women who underwent bilateral mastectomy, those who underwent reconstruction were more likely to report worrying about current or future financial problems (Table 2).

TABLE 1. Comparison of Clinical and Socioeconomic Characteristics of Women Who Underwent Mastectomy With and Without Breast Reconstruction

	Total Sample (n = 883), No. (%)	Without Breast Reconstruction (n = 390), No. (%)	With Breast Reconstruction (n = 493), No. (%)	*P*
Stage				<.001
0 (DCIS)	157 (18.4)	43 (11.7)	114 (23.5)	
1	400 (46.8)	177 (48.0)	223 (46.0)	
2	297 (34.8)	149 (40.3)	148 (30.5)	
Chemotherapy				.026
No	570 (64.6)	236 (60.5)	334 (67.7)	
Yes	313 (35.4)	154 (39.5)	159 (32.3)	
Radiation therapy				.244
No	768 (89.6)	330 (88.2)	438 (90.7)	
Yes	89 (10.4)	44 (11.8)	45 (9.3)	
Hormonal therapy				.294
No	270 (31.7)	111 (29.8)	159 (33.1)	
Yes	583 (68.3)	262 (70.2)	321 (66.9)	
Mastectomy laterality				<.001
Unilateral	464 (52.5)	286 (73.3)	178 (36.1)	
Bilateral	419 (47.5)	104 (26.7)	315 (63.9)	
Reconstruction type				—
Autologous tissue	92 (18.7)	—	92 (18.7)	—
Implant-based	342 (69.3)	—	342 (69.3)	—
Other/unspecified	59 (12.0)	—	59 (12.0)	—
Age, mean (SD), y	57.1 (11.2)	62.3 (10.1)	43.1 (10.4)	<.001
Comorbidity index				<.001
0	612 (69.3)	222 (56.9)	390 (79.1)	
1+	271 (30.7)	168 (43.1)	103 (20.9)	
Race/ethnicity				<.001
Non-Hispanic/Latina White	411 (46.5)	151 (38.7)	260 (52.7)	
Non-Hispanic/Latina Black	143 (16.2)	63 (16.2)	80 (16.2)	
Hispanic/Latina	199 (22.6)	109 (27.9)	90 (18.3)	
Other	99 (14.7)	51 (17.2)	48 (12.8)	
Education				<.001
High school or less	272 (31.6)	175 (46.4)	97 (20.0)	
Some college or higher	589 (68.4)	202 (53.6)	387 (80.0)	
Income				<.001
<$40,000	249 (35.4)	166 (56.3)	83 (20.2)	
$40,000-$89,999	228 (32.3)	82 (27.8)	146 (35.6)	
≥$90,000	228 (32.3)	47 (15.9)	181 (44.2)	
Employed before cancer diagnosis				<.001
No	325 (37.8)	188 (50.1)	137 (28.2)	
Yes	535 (62.2)	187 (49.9)	348 (71.8)	
Insurance				<.001
None	33 (4.3)	15 (4.6)	18 (4.0)	
Medicaid	44 (5.7)	29 (8.9)	15 (3.4)	
Medicare	223 (28.8)	149 (45.7)	74 (16.6)	
Private	473 (61.2)	133 (40.8)	340 (76.0)	
State				<.001
State of Georgia	466 (52.8)	172 (44.1)	294 (59.6)	
LA County, California	417 (47.2)	218 (55.9)	199 (40.4)	

Abbreviations: DCIS, ductal carcinoma in situ; LA, Los Angeles; SD, standard deviation.
P values represent comparisons between women who did and did not undergo breast reconstruction.

Among women who were employed at diagnosis (n = 535), 63.5% continued working, and 36.5% experienced a loss of employment. In this subsample of women who were employed at diagnosis, 65% underwent reconstruction; 12.3% of those who underwent reconstruction reported being worse off with respect to their employment status in contrast to 19.0% of those who did not undergo reconstruction ($P = .043$; Table 2).

In multivariable models, receipt of reconstruction was independently associated with a self-reported decline in financial status (odds ratio [OR], 1.92; 95% confidence interval [CI], 1.15-3.22; $P = .013$; Table 3). A history of chemotherapy and a history of radiation therapy were also independently associated with a perceived financial decline (OR for chemotherapy, 2.57; 95% CI, 1.63-4.04; $P < .001$; OR for radiation

TABLE 2. Financial and Employment Experiences of Women Electing to Undergo Mastectomy With and Without Breast Reconstruction

	Without Breast Reconstruction (n = 390), No. (%)	With Breast Reconstruction (n = 493), No. (%)	*P*
Measures of financial status			
Are you worse off regarding your financial status as a result of breast cancer or its treatment?			.002
No	292 (83.4)	348 (74.2)	
Yes	58 (16.6)	121 (25.8)	
How much have you paid out of pocket for medical expenses related to your breast cancer (including copayments, hospital bills, and medication costs)?			<.001
$0	31 (17.9)	12 (3.5)	
$1-$500	51 (29.5)	44 (12.9)	
$501-$2000	28 (16.2)	75 (22.1)	
$2001-$5000	36 (20.8)	100 (29.4)	
$5001-$10,000	18 (10.4)	86 (25.3)	
>$10,000	9 (5.2)	23 (6.8)	
How much money have you spent over and above your normal budget due to out-of-pocket nonmedical expenses related to your breast cancer?			.012
$0	33 (19.1)	29 (8.6)	
$1-$500	73 (42.2)	138 (41.1)	
$501-$2000	43 (24.9)	113 (33.6)	
$2001-$5000	17 (9.8)	38 (11.3)	
$5001-$10,000	6 (3.5)	12 (3.6)	
>$10,000	1 (0.6)	6 (1.8)	
Do you currently have debt from your breast cancer treatment?			.007
No	247 (66.9)	278 (57.9)	
Yes	122 (33.1)	202 (42.1)	
Due to the financial impact of having breast cancer …			
I had to use savings.			.001
No	199 (59.0)	217 (47.5)	
Yes	138 (41.0)	240 (52.5)	
I could not make payments on credit cards or other bills.			.926
No	259 (81.7)	351 (81.4)	
Yes	58 (18.3)	80 (18.6)	
I cut down on spending for food.			.952
No	227 (68.4)	302 (68.2)	
Yes	105 (31.6)	141 (31.8)	
I had my utilities turned off because the bill was not paid.			.151
No	297 (94.3)	412 (96.5)	
Yes	18 (5.7)	15 (3.5)	
I had to move out of my house or apartment because I could not afford to stay.			.592
No	304 (96.5)	416 (97.2)	
Yes	11 (3.5)	12 (2.8)	
How much do you worry about current or future financial problems as a result of your breast cancer and treatments?			.064
Not at all	128 (35.0)	127 (26.2)	
A little	93 (25.4)	132 (27.2)	
Somewhat	56 (15.3)	98 (20.2)	
Quite a bit	47 (12.8)	71 (14.6)	
A lot	42 (11.5)	57 (11.8)	
Measures of employment status[a]			
Are you worse off regarding your employment status as a result of breast cancer or its treatment?			.043
No	141 (81.0)	299 (87.7)	
Yes	33 (19.0)	42 (12.3)	
Since your breast cancer diagnosis, how much money (income) have you lost due to time off from work?			.651
$0	74 (44.1)	130 (38.9)	
$1-$500	4 (2.4)	12 (3.6)	
$501-$2000	24 (14.3)	38 (11.4)	
$2001-$5000	25 (14.9)	55 (16.5)	
$5001-$10,000	19 (11.3)	44 (13.2)	
>$10,000	22 (13.1)	55 (16.5)	
Did you work for pay during any of your breast cancer treatment?			<.001

TABLE 2. *Continued*

	Without Breast Reconstruction (n = 390), No. (%)	With Breast Reconstruction (n = 493), No. (%)	*P*
No	124 (68.5)	172 (50.3)	
Yes	57 (31.5)	170 (49.7)	
Are you currently working for pay?			<.001
No	90 (48.9)	103 (29.8)	
Yes	94 (51.1)	243 (70.2)	

P values represent comparisons between women who did and did not undergo breast reconstruction.
[a]Among patients who were employed at the time of their cancer diagnosis (n = 535).

TABLE 3. Multivariable Models Predicting Self-Reported Financial and Employment Declines Among Women Undergoing Mastectomy for the Treatment of Breast Cancer

	Financial Decline			Employment Decline[a]		
Variable	OR	95% CI	*P*	OR	95% CI	*P*
Age			<.001			.423
≤64 y	Reference			Reference		
≥65 y	0.29	0.16-0.54		1.38	0.63-3.06	
Race/ethnicity			.252			.085
Non-Hispanic/Latina White	Reference			Reference		
Non-Hispanic/Latina Black	1.46	0.79-2.70		1.03	0.42-2.49	
Hispanic/Latina	0.91	0.52-1.60		2.42	1.17-4.99	
Other	0.65	0.32-1.35		1.16	0.47-2.85	
Education			.345			.255
Some college or higher	Reference			Reference		
High school or less	0.78	0.46-1.31		0.65	0.31-1.37	
Income			<.001			.023
≥$90,000	Reference			Reference		
<$40,000	5.16	2.76-9.66		3.20	1.40-7.33	
$40,000-$89,999	2.20	1.28-3.77		1.98	0.95-4.16	
Insurance			.426			.662
Any insurance	Reference			Reference		
None	1.57	0.52-4.73		0.72	0.17-3.09	
Stage			.270			.812
0 (DCIS)	Reference			Reference		
1+	0.71	0.38-1.31		0.91	0.40-2.03	
Comorbidities			.178			.907
0	Reference			Reference		
1+	1.39	0.86-2.23		1.04	0.53-2.03	
Chemotherapy			<.001			.214
No	Reference			Reference		
Yes	2.57	1.63-4.04		1.42	0.75-2.69	
Radiation therapy			.009			.283
No	Reference			Reference		
Yes	2.38	1.24-4.57		1.70	0.74-3.91	
Hormonal therapy			.172			.288
No	Reference			Reference		
Yes	1.40	0.88-2.26		0.71	0.38-1.33	
Mastectomy laterality[b]			.322			.835
Unilateral	Reference			Reference		
Bilateral	1.28	0.87-2.26		0.94	0.50-1.76	
Breast reconstruction[b]			.013			.927
No	Reference			Reference		
Yes	1.92	1.15-3.22		0.97	0.49-1.91	
Employment status			<.001	—	—	—
Not working at diagnosis	Reference			—	—	—
Kept working after diagnosis	1.29	0.75-2.21		—	—	—
Stopped working after diagnosis	4.52	2.59-7.89		—	—	—

Abbreviations: CI, confidence interval; DCIS, ductal carcinoma in situ; OR, odds ratio.
[a]Among patients who were employed at the time of their cancer diagnosis.
[b]Interaction terms between mastectomy laterality and reconstruction were not significant.

therapy, 2.38; 95% CI, 1.24-4.57; $P = .009$; Table 3). Compared with women who were not working at diagnosis, those who were working and experienced a loss of employment were independently more likely to report a perceived financial decline (OR, 4.52; 95% CI, 2.59-7.89; $P < .001$; Table 3). Among women who were employed at the time of their diagnosis (n = 535), there was no association between breast reconstruction and a perceived decline in employment status in multivariable models (OR, 0.97; 95% CI, 0.49-1.91; $P = .927$; Table 3). Women reporting a lower annual household income (<$40,000), in comparison with women reporting an annual household income ≥ $90,000, were more likely to report being worse off with respect to both their financial status (OR, 5.16; 95% CI, 2.76-9.66; $P < .001$) and their employment status (OR, 3.20; 95% CI, 1.40-7.33; $P = .023$; Table 3). Sensitivity analyses with different thresholds of dichotomization for primary outcomes and with the inclusion of the time to survey completion did not change major findings of our models.

DISCUSSION

In this diverse cohort of women who underwent mastectomy for early-stage breast cancer, we report 2 main findings related to the financial and employment experiences of women who elected to undergo mastectomy for the treatment of breast cancer. First, pursuing breast reconstruction was independently associated with a self-reported decline in financial status even after adjustments for key clinical and socioeconomic variables. This underscores the need to counsel patients regarding the potential downstream costs related to reconstruction procedures after breast cancer. Second, women with lower annual household incomes were more likely to experience a decline in both self-reported financial and employment status, and job loss was independently associated with a decline in financial status. Altogether, despite mandatory coverage for breast reconstruction in the United States, patients, providers, and policymakers should be aware that there may be long-term financial implications for patients who undergo these procedures. Multilevel strategies to identify and support women with breast cancer who are disproportionately vulnerable to financial and employment declines must be developed and implemented at a system level.

For the nearly 1.7 million individuals diagnosed with cancer annually in the United States, treatment-related financial hardship is a growing problem that has received increased attention recently in the oncology literature.[1,3,4,25] Among breast cancer survivors, previous studies have focused on the financial burden of contralateral prophylactic mastectomy or other preference-sensitive, comparably effective surgical treatments.[4,28,29] These studies have not focused on the impact of breast reconstruction beyond mastectomy laterality, which has become an important part of the spectrum of cancer care and often involves several stages and a number of expensive and discretionary technologies (eg, acellular dermal matrices and preoperative angiography).[9-11] Other studies may have limited generalizability because of a single-center design or the inclusion of lumpectomy patients, who are not technically eligible for breast reconstruction after the surgical treatment of breast cancer.[14,15] Our findings likely reflect cost-sharing arrangements among patients with breast cancer as well as the cumulative financial and time burden of procedures and postoperative complications in the current paradigm of breast reconstruction. Although breast reconstruction has been shown to improve health-related quality of life and psychosocial outcomes for women after mastectomy, patients must be informed of the initial and potential downstream costs.

Acknowledging the impact of cancer care on patients' financial well-being, the American Society of Clinical Oncology has formally encouraged oncologists to discuss costs of care with patients before starting treatment.[30] Despite a growing awareness of this issue in the oncology community, a recent survey of breast surgeons identified potential barriers to these discussions, including insufficient knowledge or resources, a perceived inability to help with costs, inadequate time, and some concern that discussing costs may affect the quality of care that patients receive.[4] In contrast to the American Society of Clinical Oncology, there is currently no formal recommendation from the American Society of Plastic Surgeons regarding costs-of-care discussions with patients. In a recent study of plastic surgeons, despite most surgeons feeling comfortable with having discussions about out-of-pocket costs, only 24% of surgeons reported routinely engaging in these discussions with patients.[31] Provider-level factors (gender, ethnicity, experience, and practice compensation type) may also determine cost consciousness by providers who perform breast reconstruction.[32] Increasing awareness and professional guidelines are necessary but not sufficient to promote discussions with patients about costs of care. Multilevel strategies are needed that also consider the clinical workflow, organizational commitment, price transparency, and timing of conversations as well as provider education and training.[33-36]

In our study, we demonstrated that women with lower annual household incomes and those who experienced

job loss after their cancer diagnosis were independently vulnerable to a perceived decline in financial status after adjustments for confounding variables. Additionally, among women who were employed at the time of their diagnosis, those with lower annual household incomes were more likely to report self-reported employment declines. These associations reflect the disproportionate financial burden of cancer care on women who have fewer financial resources and rely on their own employment for discretionary income. Taken together, these findings provide a more comprehensive understanding of which patients are most vulnerable to the burdens of medical and surgical care provided throughout the continuum of cancer care. Future studies are needed to understand what accounts for the financial and employment toxicities experienced by these women with the objective of designing and implementing strategies to mitigate the risk for these complications. Financial and employment toxicities must be understood not only from the standpoint of clinical care but also from the perspective of social determinants of health and health equity. Most studies to date on this topic have been limited by small sample sizes of women from diverse and underrepresented backgrounds.[13,14]

This study includes a number of notable strengths, including a diverse patient sample and measures of financial and employment status from the literature on financial distress. An important limitation is that questions related to financial and employment status were asked as they related to breast cancer therapies as a whole and adapted to this study evaluating breast reconstruction. To account for this limitation, we adjusted for differences in breast cancer treatment in our models, including receipt of chemotherapy, radiation therapy, hormonal therapy, and mastectomy laterality. The primary outcomes were self-reported perceptions of a decline in financial and employment status because objective measures of financial and employment decline were not available. This dependent variable may not be perfectly correlated with financial toxicity, which is a conceptually distinct concept with validated patient-reported outcome measures.[37] However, it is critically important to understand patients' perceptions of how their lives may have been affected negatively by breast cancer treatments and other health care services because this may influence other behavioral outcomes, regardless of objective assessments. Additionally, the study surveyed women from 2 large metropolitan areas, and this may limit the generalizability of the findings to rural areas and other areas with differences that may affect the financial or employment status of patients with breast cancer. We were also underpowered to study the effect of the reconstruction type on the primary outcomes. Future studies are needed in this area. Some women may not have completed reconstruction by the time of the survey if they were undergoing staged procedures; thus, our assessment of the short-term impact of reconstruction on financial outcomes may be an underestimate. Finally, models to assess the perceived employment decline were limited to a sample of women who were employed at the time of their diagnosis; therefore, these models were also potentially underpowered to detect the impact of breast reconstruction on this outcome.

In conclusion, although mandated insurance coverage for all stages of breast reconstruction by the Women's Health and Cancer Rights Act reduced initial financial barriers, many women who elect to undergo these procedures still experience a perceived decline in their financial status. The current approach to breast reconstruction, which often involves several stages and elective surgical revisions, necessitates counseling patients regarding these burdens before they embark on the process of reconstruction. Multilevel strategies to identify and support patients with breast cancer who are vulnerable to financial and employment declines must be developed and implemented at a system level.

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CONFLICT OF INTEREST DISCLOSURES

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AUTHOR CONTRIBUTIONS

Nicholas L. Berlin: Concept and design; acquisition, analysis, or interpretation of data; drafting of the manuscript; administrative, technical, or material support; supervision; accountability for all aspects of the work and ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved; and critical revision of the manuscript for important intellectual content. **Paul Abrahamse:** Concept and design; acquisition, analysis, or interpretation of data; statistical analysis; and critical revision of the manuscript for important intellectual content. **Adeyiza O. Momoh:** Concept and design; acquisition, analysis, or interpretation of data; and critical revision of the manuscript for important intellectual content. **Steven J. Katz:** Concept and design; acquisition, analysis, or interpretation of data; funding; and critical revision of the manuscript for important intellectual content. **Reshma Jagsi:** Concept and design; acquisition, analysis, or interpretation of data; funding; and critical revision of the manuscript for important intellectual content. **Ann S. Hamilton:** Concept and design; acquisition, analysis, or interpretation of data; funding; and critical revision of the manuscript for important intellectual content. **Kevin C. Ward:** Concept and design; acquisition, analysis, or interpretation of data; funding; and critical revision of the manuscript for important intellectual content. **Sarah T. Hawley:** Concept and design; acquisition, analysis, or interpretation of data; drafting of the manuscript; funding; administrative, technical, or material support; supervision; and critical revision of the manuscript for important intellectual content.

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