

Disparities in Use and Access to Postmastectomy Breast Reconstruction Among African American Women: A Targeted Review of the Literature

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Abstract

Postmastectomy breast reconstruction is a therapy that has been shown to have positive psychological effects on its recipients. There is evidence that racial disparities in its use exist, particularly among African American (AA) women. The purpose of this targeted review of the literature was to examine the use of postmastectomy breast reconstruction among AA women and to explore factors that contribute to such disparities. Published literature that evaluated rates of breast reconstruction in AA women, as well as barriers to reconstruction in this population, was reviewed. All of the reviewed data consisted of retrospective studies. There are conflicting data in the literature regarding disparities in the rates of postmastectomy breast reconstruction among AA women. However, a majority of studies found that AA women were less likely (odds ratios: 0.36-0.71) to receive postmastectomy breast reconstruction compared to white women. System-associated factors, physician-associated factors, and patient-associated factors interact in a complex manner that contributes to the reported disparities. Although there are trends suggesting racial disparities in the rates of postmastectomy breast reconstruction exist, the published data are retrospective and are inherently limited. The pursuit of breast reconstruction is highly individual and involves multiple factors that interact in a complex manner. To this end, prospective studies encompassing sociodemographic factors, clinical factors, and patient preferences are necessary to determine what interventions by physicians can have the greatest impact in ensuring equal access to this therapy when it is desired.

Keywords

breast reconstruction minority, breast reconstruction African American, breast reconstruction access

Received December 1, 2016. Accepted for publication April 7, 2017.

Introduction

Breast reconstruction after mastectomy is a therapy that dates back to the 1800s.^{1,2} Data demonstrate positive psychological effects of postmastectomy breast reconstruction.³⁻⁶ Federal lawmakers passed the Women's Health and Cancer Right Act into law in 1998, a bill which mandated that insurance companies provide coverage for postmastectomy breast reconstruction.⁷ In the years following, there has been a steady increase in the number of women undergoing postmastectomy breast reconstruction.⁸ However, utilization remains lower than expected, with recent data suggesting 33% of eligible women

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Table 1. Postmastectomy Breast Reconstruction in African American Versus White Women.

Study	Years	Total N	Adjusted OR	95% CI	Covariates
Polednak ¹⁰	1988-1995	10 756	0.71	0.47-1.07	Age, race, tumor stage, poverty status, and marital status
Alderman et al ¹¹	1998-2002	10 406	0.51	0.4-0.65	Age, race, tumor stage, marital status, receipt of chemotherapy, and geographic location in the United States
Tseng et al ¹²	2001-2002	1004	0.36	0.18-0.71	Age, race, body mass index, tumor stage, insurance type, socioeconomic status
Wolfswinkel et al ¹³	2005-2011	387	0.82	Not reported	Age, race, marital status, body mass index, smoking status, comorbidities, tumor stage, lymph node involvement, and receipt of chemo- or radiotherapy
Enewold et al ¹⁴	1998-2007	3964	0.93	0.76-1.15	Age, race, marital status, comorbidities, tumor stage and grade, hormone receptor status, and receipt of chemotherapy, radiotherapy, or hormone therapy
Shippee et al ¹⁵	2002-2006	13 495	0.54	0.47-0.63	Age, race, insurance status, type of insurance, type of comorbidities, and hospital characteristics
Offodile et al ¹⁶	2005-2011	16 642	0.57	0.52-0.61	Age, race, smoking status, receipt of chemotherapy and/or radiotherapy, comorbidities, and presence of disseminated disease
Connors et al ¹⁷	2000-2012	4154	0.71	0.56-0.87	Age, race, insurance type, tumor stage, progesterone receptor status, and receipt of chemotherapy and/or radiotherapy

Abbreviations: CI, confidence interval; OR, odds ratio.

in the United States undergo immediate or early delayed breast reconstruction.⁹ Given the purported benefits of these procedures, there has been a continued interest in examining its rate of use. Of particular interest is the question of whether or not breast reconstruction is equally available across all populations in the United States. The purpose of this targeted review was to examine the use of postmastectomy breast reconstruction in minority populations, specifically African American (AA) women, as well as to explore barriers or factors reported in the literature that may contribute to such disparities.

Methods

Published literature that evaluated rates of breast reconstruction in AA women, as well as barriers to reconstruction in this population, was reviewed. The term “breast reconstruction minority” was used in a PubMed search that included MeSH terms “mammoplasty” and “minority groups.” The search encompassed literature from January 1, 1980, to October 6, 2016. Only articles using population data from the United States were included. Articles that were ultimately selected were those that provided qualitative data for white women and AA women. Additional articles in the references of selected articles were also included if they met inclusion criteria.

Results

Use of Reconstruction Between AA and White Women

Various studies have attempted to elucidate the effects of both race and sociodemographic factors on the receipt of breast reconstruction (Table 1). Using data from 10 406 women who underwent mastectomy for breast cancer treatment in 1998,

Alderman et al found that AA women were less likely to undergo immediate or early delayed (within 4 months of mastectomy) breast reconstruction at an adjusted odds ratio (OR) of 0.51 (95% confidence interval [CI] = 0.40-0.65) compared to white women. Multivariate analysis included age, race, tumor stage, marital status, receipt of chemotherapy, and geographic location within the United States. The sample included 7801 white women and 791 AA women. Data regarding socioeconomic status, insurance status, and medical comorbidities of the patients were not presented.¹¹

Tseng et al analyzed data on 1004 women who underwent mastectomy from 2001 to 2002, of whom 718 were white and 99 were AA women. The adjusted OR for AA women undergoing immediate breast reconstruction was 0.36 (95% CI = 0.18-0.71) versus white women. This multivariate analysis included patient age, race, body mass index (BMI), tumor stage, insurance type, and socioeconomic status. The receipt of radiation was not included, nor were comorbidities. Of these patients, 93.8% of white women and 84.8% of the AA women had public or private insurance. Mean income in thousands for the white cohort was 50.3 with standard deviation (SD) of 20.4 in contrast to 38.1 with SD of 16.5 for the AA cohort.¹²

In a study of 13 495 women from 2002 to 2006, Shippee et al found that AA women with either public or private health insurance were less likely to undergo breast reconstruction with adjusted ORs of 0.64 (95% CI = 0.45-0.91) and 0.54 (95% CI = 0.47-0.63), respectively, when compared to their white counterparts. The sample included 11 585 white women and 1226 AA women. There was no significant difference in reconstruction rates by race among uninsured women. This multivariate analysis included year of reconstruction, age, race, insurance status and type, presence of comorbidities, and hospital characteristics. Data regarding the socioeconomic status of patients were not known. This study also found that the rates of breast reconstruction by race increased over time but that this

change was smallest in AA women. Of note, they did not define whether or not breast reconstruction was immediate or delayed.¹⁵

Offodile et al performed a retrospective study using data from 2005 to 2011 for 16 642 women who underwent immediate breast reconstruction after mastectomy. Included in the sample were 13 873 white women and 1317 AA women. In multivariate analysis that included age, race, BMI, smoking status, receipt of chemo- and/or radiotherapy, comorbidities, and presence of disseminated disease, AA women were less likely (adjusted OR = .57, 95% CI = 0.52-0.61) to undergo immediate or early delayed breast reconstruction versus white women. This disparity was persistent for every year from which the data were gathered, indicating that there was no relative increase in the use of breast reconstruction in AA women compared to white women. Socioeconomic status and insurance status of the patients were not known.¹⁶

Connors et al noted a persistent disparity of statistical significance in the rates of breast reconstruction in AA women versus white women in their analysis of 4154 women who underwent mastectomy for breast cancer from 2000 to 2012 at a National Cancer Institute Comprehensive Cancer Center. The sample included 3332 white women and 822 AA women, of whom 82.5% had either public or private insurance. The authors found the adjusted OR for AA women to be 0.70 (95% CI = 0.56-0.87) compared to white women in multivariate analysis that included age race, insurance type, tumor stage, progesterin receptor status, and receipt of chemo and/or radiation.¹⁷ They did not analyze the rate of change in breast reconstruction rates over time, despite the long study period. Socioeconomic status of the patients was not obtained.

In contrast, there are also data to suggest that race does not correlate with the receipt of breast reconstruction. One of the earlier studies found on this topic was performed by Polednak in 1999 when he examined trends in breast reconstruction in Connecticut. Looking at data from 10 756 women who had undergone mastectomy for breast cancer from 1988 to 1995, he found no statistically significant difference in the receipt of breast reconstruction by AA women in multivariate analysis, which included age, race, tumor stage, poverty, and marital status (adjusted OR = 0.71, 95% CI = 0.47-1.07). In this sample, there were 9065 white women and 497 AA women.¹⁰ Insurance status of the patients in the sample was unknown.

In a study of Department of Defense beneficiaries, Enewold et al did not find a significant difference in the rates of breast reconstruction in AA women versus white women. They analyzed data from 3682 women who had undergone mastectomy for breast cancer between 1998 and 2007. Multivariate analysis of age, race, marital status, comorbidities, tumor stage and grade, hormone receptor status, and receipt of radiotherapy, chemotherapy, and/or hormone therapy revealed an adjusted OR of 0.93 (95% CI = 0.76-1.15) for AA women. Of this sample, 2974 were white and 708 were AA women. It should be noted that all of these women were afforded coverage of breast reconstruction as members of the military health system,

which provides universal care to all beneficiaries regardless of socioeconomic status.¹⁴

Wolfswinkel et al did not find a significant difference in the utilization of breast reconstruction among AA women compared to white women in data collected from 2005 to 2011. This was a retrospective review of data from 387 patients at 1 center, of which 38 were white and 100 were AA. Notably, this was a predominantly nonwhite population, with 47% of patients having Medicare or Medicaid and an additional 40% being described as "indigent." Multivariate analysis that included age, race, marital status, BMI, smoking status, comorbidities, tumor stage, lymph node involvement, and receipt of chemotherapy and/or radiation demonstrated no significant difference in the rates of immediate or delayed breast reconstruction in AA women compared to white women (adjusted OR = 0.82, $P = .69$; CI not reported). They attribute the possibility of these findings to the population sample, which included 10% white women, 26% AA women, 55% Hispanic women, and 9% "other."¹³ In this study, both white and AA women comprised a significantly smaller portion of the sample size, which may have contributed to the lack of statistical significance in the difference in rates of reconstruction due to inadequate power.

Type of Breast Reconstruction by Race

There is little published data regarding disparities in type of breast reconstruction chosen by race, but it is worth noting. A total of 4 articles were found, 3 of which did report an increased likelihood of AA women receiving autologous tissue reconstruction compared to white women with OR ranging from 1.88 to 2.33.^{11,16,18} These were all retrospective studies with sample sizes ranging from 1607 to 16 642. The remaining study was from a single institution and its affiliate facility with a sample size of 105; 50% of whom were AA. The authors did not find a disparity in the type of reconstruction chosen between AA and white women. The authors note that microsurgical reconstruction was not available at one of these sites and propose that this, in addition to established practice patterns, may be why there was no significant difference in the type of reconstruction chosen.¹⁹

Barriers to Breast Reconstruction in AA Women

System-associated factors. Insurance coverage and financial concerns can be a barrier to breast reconstruction, and this is reported more by AA women than white women. In 2014, Morrow et al found that AA women were significantly more likely to report not having insurance coverage than whites (32.7% AA, 2.2% whites, $P < .001$).²⁰ Rubin et al found in their survey of AA women who had undergone mastectomy that those with higher incomes were more likely to have had reconstruction, with 75% of women reporting annual income $> \$50 000$ undergoing reconstruction versus 22% of women with annual income $< \$20 000$ ($P = .09$). However, women who did not undergo reconstruction did not cite financial concerns as a barrier. Those who underwent reconstruction reported that they may not have done so if they had to pay out of pocket due to prohibitive cost.²¹ Beyond the

cost of the procedure itself are the lost days of work and income. This implies that insurance coverage and higher socioeconomic status facilitate access to breast reconstruction in AA women; however, as Rubin et al found among the AA women that they surveyed, it is not necessarily the most influential factor.

Physician-associated factors. Referral patterns to plastic surgeons have been cited as a factor contributing to the receipt of breast reconstruction. Tseng et al found lower referral rates by the surgical oncologist to a plastic surgeon for AA women compared to white women in multivariate analysis that included age, race, tumor stage, and BMI (adjusted OR = 0.52, 95% CI = 0.30-0.89).¹² Alderman et al in 2007 found that only 24% of general surgeons referred >75% of their patients undergoing mastectomy to a plastic surgeon to discuss reconstructive options prior to surgery. Female surgeons (OR = 2.3, $P = .03$), those with high-volume practices (OR = 4.1, $P < .01$), and those working at cancer centers (OR = 2.4, $P = .01$) were more likely to refer. They also evaluated surgeons' beliefs about why women did not undergo breast reconstruction. Sixty-four percent felt that patients were not interested, 57% felt that reconstruction was not important to the patient, and 46% reported that patients were concerned about the cost of reconstruction. These beliefs of the surgeon did not vary with referral pattern, implying that the spectrum of high-to-low referring surgeons held these views. Common among the low-referring surgeons, however, was the perception that the patients had access barriers such as inadequate knowledge about the procedure, procedure cost, and unavailability of plastic surgeons.²²

Surgeon practice patterns also influence the receipt of breast reconstruction. In addition to their finding that AA women received referrals to plastic surgeons at lower rates than white women, Tseng et al also noted that the surgeon was significantly less likely to recommend reconstruction to AA women in multivariate analysis that included age, race, tumor stage, and BMI (adjusted OR = 0.35, 95% CI = 0.12-1.03).¹² Importantly, comorbidities were not included as a covariate in this analysis, which may confound these findings. In a survey of women who did not undergo reconstruction, AA women were more likely than whites to report that reconstruction was not recommended or was discouraged by the surgeon.²³ This suggests that physician bias may contribute to disparities in which women are referred for breast reconstruction. It is important to note that recall bias may influence the responses provided by patients and, again, to bear in mind that medical comorbidities were not included.

Variation in the discussion between patient and physician has been hypothesized to influence patient decision-making about the pursuit of breast reconstruction. However, Chen et al did not find race to be a significant determinant of variation. It should be noted that this was a small study with $n = 315$, of which 58% were white and only 12% were AA. Thus, there may be a lack of statistical power, although this is an area that may warrant further investigation.²⁴

Patient-associated factors. Patient knowledge regarding breast reconstruction has also been identified as an access barrier.

Morrow et al in 2005 surveyed patient preferences and understanding of breast reconstruction in women diagnosed with breast cancer. They found that 78.2% of patients reported having had a conversation with their doctor about breast reconstruction, and there was no statistically significant difference in response to this question by race. African American women were more likely than whites to report that they didn't know enough about reconstruction. After multivariate analysis that controlled for age, education, and stage of disease, AA women were less likely to answer correctly any of 3 questions regarding facts about breast reconstruction when compared to whites (adjusted OR = 0.5, 95% CI = 0.3-0.7).²³ Along similar lines, Morrow et al in 2014 found that AA women were significantly more likely to report dissatisfaction with their decision-making process surrounding breast reconstruction, whether or not they underwent the procedure and irrespective of socioeconomic status or level of education (adjusted OR = 2.87, 95% CI = 1.27-6.51). This pertained to being satisfied about being informed about the issues surrounding breast reconstruction in addition to being satisfied with their decision to have reconstruction or not.²⁰ The reasons for this are not discussed. However, this suggests a disparity in patient-provider discussion of reconstruction and in knowledge among AA women regarding breast reconstruction. Both factors may contribute to a disparity in use of breast reconstruction among AA women. This is a correctable problem that physicians can easily address both during consultation and by providing educational resources.

Patient preference has been identified as a contributor to differences in the rates of breast reconstruction. Of course, each woman's choice to pursue breast reconstruction is highly personal. However, there is evidence that cultural perceptions among AA women about breast reconstruction may be incongruent with the prevailing idea that complete cancer care involves breast reconstruction (Table 2). Tseng et al found that AA women were less likely to accept a referral to a plastic surgeon even when offered (adjusted OR = 0.33, 95% CI = 0.16-0.71). Furthermore, they were less likely to accept reconstruction, even if it was recommended by the plastic surgeon (adjusted OR = 0.15-95% CI = 0.16-1.64).¹² Rubin et al note a fear of implants and persistent distrust of the medical field among the AA women they surveyed as reasons for declining breast reconstruction. They also report "body ethics" among AA women as an influence, with participants reporting that breasts are not the center of physical attraction in the AA community and that body acceptance is greater among AA women than white women.²¹

Discussion

There is ample evidence spanning nearly 20 years to suggest that racial disparities exist in the rates of postmastectomy breast reconstruction in the United States (Table 3). The literature is not homogenous; however, there are data in which reconstruction rates of AA women are not significantly different from their white counterparts. It is important to critically evaluate the nature and quality of these studies. Notably, the

Table 2. Barriers to Postmastectomy Breast Reconstruction in African American Women.

System-associated
Insurance coverage (Morrow et al ²⁰ ; Rubin et al ²¹)
Financial concerns (Rubin et al ²¹)
Physician-associated
Physician referral patterns (Tseng et al ¹² ; Alderman et al ²²)
Physician perception of patient barriers (Alderman et al ²²)
Surgeon practice patterns (Tseng et al ¹² ; Morrow et al ²³)
Patient-associated
Personal preference (Rubin et al ²¹ ; Tseng et al ¹²)
Cultural influences (Rubin et al ²¹)
Distrust of medical profession (Rubin et al ²¹)
Fear of breast implants (Rubin et al ²¹)
Limited knowledge of breast reconstruction (Morrow et al ²⁰)

Table 3. Percentages of Postmastectomy Breast Reconstruction Use in AA and White Women.

Study	Use of Reconstruction: White	Use of Reconstruction: AA	Comments
Polednak ¹⁰	6.9% (n = 9065)	6.5% (n = 497)	
Alderman et al ¹¹	16.7% (n = 7801)	16.1% (n = 791)	
Tseng et al ¹²	40% (n = 150)	20.2% (n = 76)	
Wolfswinkel et al ¹³	10% (n = 13)	19% (n = 25)	Majority Hispanic sample
Enewold et al ¹⁴	30.8% (n = 916)	32.6% (n = 231)	Military population
Shippee et al ¹⁵	82.9% (n = 11 585)	8.78% (n = 1226)	
Offodile et al ¹⁶	39.4% (n = 13 873)	26.8% (n = 1317)	
Connors et al ¹⁷	^a	^a	No raw data by race provided

Abbreviation: AA, African American.

^aThis table lists all studies that were discussed. It is notable that there was no raw data provided by Connors' article and was kept in the table on purpose despite this lack of raw data in order to be consistent with addressing all articles discussed.

studies presented here are all retrospective and can only evaluate correlation, not causation. Some of these studies failed to take into consideration patient insurance status and/or socioeconomic status, which may confound the impact that race has on breast reconstruction. The findings by Enewold et al that women with equal health insurance coverage do not demonstrate racial disparities in breast reconstruction rates are in contrast to the findings by Shippee et al that AA women had lower rates of breast reconstruction in spite of having either private or public insurance. Also notable in the study by Shippee et al was the lack of racial disparity among women without any insurance coverage. It should be iterated that all of these studies use data from before the passage and implementation of the Patient Protection and Affordable Care Act, which both expanded and mandated insurance coverage.²⁵ Clearly, the impact of insurance status on racial disparities warrants further investigation.

Other studies did not include crucial clinical components that may impact the receipt of immediate breast reconstruction, such as receipt of radiotherapy, chemotherapy, smoking status, significant medical comorbidities, tumor stage, or BMI. Obesity has been shown to have a negative impact on breast reconstruction. Additionally, comorbidities including diabetes mellitus, cardiovascular disease, and smoking have been negatively correlated with breast reconstruction.⁹ African American women have been found to have the highest prevalence of hypertension and obesity in the United States compared to men and women of all other racial groups.²⁶ As such, the inclusion of these variates in analyzing breast reconstruction rates is crucial.

Of the investigated barriers presented here, physician referral patterns, variation in discussion, and patient knowledge are very modifiable factors. Preminger et al found that 91.7% of referred patients were reconstructed and 100% of those not referred were not reconstructed, suggesting that those without referrals did not seek out reconstructive surgeons on their own.²⁷ This is a clear implication of the importance of the breast surgeon's influence in whether the patient undergoes reconstruction. The finding by Morrow et al that AA women were significantly less likely to be able to answer correctly questions regarding facts about breast reconstruction, despite controlling for education, has a number of implications. There may be cultural differences in the way that physicians communicate and the way that patients interpret the information. Physicians may have internal biases that are causing them to communicate differently with AA patients and white patients. This can only be remedied by awareness on the physician's part that their style of communication does not always suit the needs of their entire patient population. Furthermore, physicians must be willing to accept the possibility of internal bias impacting their practice patterns to the detriment of some patients.

Equally critical to understanding variations in the rate of breast reconstruction among racial groups is an understanding of the influence of cultural values and preferences. Rubin et al caution against assuming without further investigation that differences in rates of breast reconstruction between AA and white women represent true disparities, that is, unequal access to care. Such assumptions risk normalizing the prevailing feelings regarding mastectomy, body image, and breast reconstruction of the cultural majority and inappropriately projecting these beliefs onto cultural minorities.²¹ Conversely, it would be inappropriate to simply attribute racial variations in breast reconstruction rates to differences in cultural beliefs. Failing to take preferences and cultural beliefs into consideration, however, may result in a significant confounding of any results of studies examining this issue.

Conclusion

The receipt of postmastectomy breast reconstruction for women of all races is influenced by many factors. There are system-based barriers, physician-based barriers, and patient-based factors that interact in a complex manner. The current literature about disparities in breast reconstruction among AA women is not homogenous, although the trend is toward

unequal rates of reconstruction. Prospective studies encompassing sociodemographic factors, clinical factors, and patient preferences are necessary to delineate what factors health-care providers can address to ensure equal access to this therapy when it is desired. The data presented here suggest that giving patients the opportunity to meet with a reconstructive surgeon to discuss reconstructive options and facilitating patient education about breast reconstruction are immediate steps that can be taken by physicians to minimize disparities.

Authors' Note

No significant relationships exist between the authors and the companies/organizations whose products or services may be referenced in this article.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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