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The Impact of Travel Distance and Income on Breast Reconstruction after Mastectomy in a Rural Population

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Background: Factors that influence breast reconstruction after mastectomy have been previously examined in national databases. The purpose of this study was to determine the impact of patient travel distance and income on breast reconstruction after mastectomy in a rural population.

Methods: Retrospective review of mastectomy patients from 2017 to 2021 was performed from our prospectively enrolled tumor registry. Analysis included frequencies and percentages, descriptive statistics, χ^2 analysis, independent sample *t* tests, and multivariable analysis.

Results: In total, 462 patients were included. Median BMI was 27.6 kg/m^2, 96.1% of patients were White, and median age at diagnosis was 60.0 years. Reconstruction rate was 52.6%, and median length of follow-up was 24.6 months. No significant difference was found in the distance traveled by patients who underwent reconstruction (16.6 versus 16.7 miles; $P = 0.94$). Rates of reconstruction in patients who traveled 0–10 miles, 11–30 miles, and over 30 miles did not differ significantly ($P = 0.16$). Median household income was significantly different in reconstructed and nonreconstructed patients ($55,316.00 versus $51,629.00; $P = 0.047$). Rates of reconstruction were significantly higher in patients with median household income greater than $65,000 ($P = 0.024$). This difference was not significant on multivariable analysis.

Conclusions: Travel distance did not significantly impact reconstruction rates after mastectomy, while household income did on univariable analysis. Studies at an institutional or regional level remain valuable, especially in populations that may not be accurately represented in larger database studies. Our findings highlight the importance of patient education, resource allocation, and multidisciplinary approach to breast cancer care, especially in the rural setting. *(Plast Reconstr Surg Glob Open 2023; 11:e4802; doi: 10.1097/GOX.0000000000004802; Published online 2 February 2023.)*

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INTRODUCTION

One in eight women will be diagnosed with breast cancer in their lifetime, and many undergo mastectomy as part of their treatment. For many women, this results in loss of femininity and sexual identity, and long-term psychosocial impairment. Breast reconstruction after mastectomy offers physical, emotional and psychological benefits compared with mastectomy alone, but access to reconstruction has been a subject of continued research.[1–3] With improved survival of breast cancer patients, increasing rates of mastectomy, and the passage of the Women's Health and Cancer Rights Act of 1998, the determinants of health that limit access to breast reconstruction require intense scrutiny to improve quality care for all women.[2–5]

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Previously performed national and statewide database reviews demonstrated that those patients who underwent breast reconstruction had to travel farther than those who underwent mastectomy alone, with a linear correlation between travel distance and reconstruction rates.[4,6] Additionally, these studies showed that patients were traveling farther for autologous compared with prosthetic reconstruction, and reconstruction rates were higher at academic programs.[4,6] Furthermore, postmastectomy reconstruction was found to be significantly impacted by factors including race, ethnicity, age, household income, education level, population, and plastic surgeon density.[7,8]

In the rural population, many of these factors can be compounded, with access to plastic surgeons, lack of patient awareness of reconstruction options, and socioeconomic status becoming limiting factors for reconstruction after mastectomy. A 2007 study of the breast cancer survivorship experience of rural women demonstrated that urban and rural women receive different primary treatments for breast cancer, with higher rates of mastectomy in rural patients compared with their urban counterparts, increased difficulty negotiating their traditional gender roles during and after treatment, further distances traveled to receive oncology-related care, and less access to mental health therapy.[8] Although academic programs have the highest rates of reconstruction, they may be located farthest from patients' residences, and older, non-White patients, with lower education level and higher out-of-pocket costs may be less likely to undergo reconstruction.[1,4–7,9–12]

Previous studies examining factors that impact reconstruction after mastectomy have focused on national or statewide databases. The aim of this study was to identify specific factors that may affect rates and type of breast reconstruction after mastectomy in a rural patient population compared with national trends. We hypothesized that increased travel distance and lower median household income have a negative impact on rates of postmastectomy reconstruction.

Takeaways

Question: Is postmastectomy breast reconstruction influenced by either the distance traveled or the household income of patients in a rural population?

Findings: Postmastectomy reconstruction was not significantly associated with distance traveled on univariable or multivariable analysis. Increasing rates of reconstruction were significantly associated with increasing income, and the highest rate of reconstruction was seen in the highest income group on univariable analysis. There was no significant association on multivariable analysis.

Meaning: In a largely rural population, distance traveled by patients did not have a significant impact on postmastectomy breast reconstruction. Household income may have a more significant influence but requires further study.

METHODS

A retrospective review of patients who underwent mastectomy from 2017 to 2021 was performed, utilizing our institution's prospectively maintained tumor registry database. This study was institutional review board-approved with waiver of informed consent requirement. Each patient underwent retrospective review of all available information in our electronic medical records for inclusion. Patients with incomplete records, masculine gender, and those who did not undergo mastectomy at our institution were excluded from our study. All available patient data were reviewed and recorded, including basic demographics, patient reported identifications, comorbidities, surgical interventions, tumor information, oncologic treatment, pathology reports, complications, and status at most recent follow-up. The hospital and home ZIP code of the patient at the time of their diagnosis were used to determine the Euclidean travel distance in miles, from the patient's residence to The University of Tennessee Medical Center. Median household income was reported in US dollars, comparing the patient's home ZIP code with the most current US Census Bureau 5-year estimates per ZIP code from 2019. The identification of Tennessee as a largely rural population was based on the most current US Census Bureau information and definitions of rural, mostly rural, and urban areas by population percentage.[13] All patients who undergo mastectomy are referred to a plastic surgeon within our institution preoperatively to discuss breast reconstruction.

Statistical Analysis

The demographic and clinical characteristics of the sample were calculated using frequencies and percentages for discrete variables, and descriptive statistics (mean and standard deviation) were used to describe continuous variables. Chi-square analyses were performed to compare independent groups on categorical outcomes, and independent samples *t* tests were performed to test for differences between groups on continuous variables. Descriptive statistics were reported to give context to the group comparisons. Multivariable logistic regression analysis was performed to predict the relationships between significant variables found on univariable analysis and reconstruction. Statistical significance was assumed at $\alpha = 0.05$, and all analyses were performed using SPSS Version 28 (IBM Corp., Armonk, N.Y.).

RESULTS

Of all patients reviewed, 462 met the inclusion criteria for this study. The median BMI was 27.6 kg/m^2, with 96.1% of patients identifying as White, and the median age of diagnosis of 60.0 years (Table 1). A total of 243 patients (52.6%) underwent reconstruction following mastectomy. Table 1 summarizes the demographic information, insurance status, and comorbidities of patients during mastectomy. The patients who underwent reconstruction were significantly less likely to have diabetes ($P < 0.001$) and less likely to have history of smoking ($P = 0.003$). Patients who did not undergo reconstruction were significantly older at

Table 1. Patient Demographic Information

	All Patients (n = 462)	Reconstructed Patients (n = 243)	Nonreconstructed Patients (n = 219)	*P*
Race*				
White	444 (96.1%)	235 (97.5%)	209 (96.3%)	
Black	14 (3.0%)	6 (2.5%)	8 (3.7%)	0.59
Insurance status*				
Private insurance	8 (1.7%)	7 (2.9%)	1 (0.4%)	
Other public insurance	232 (50.2%)	155 (63.8%)	77 (35.2%)	
Medicare	182 (39.4%)	59 (24.3%)	123 (56.2%)	
Medicaid	34 (7.4%)	18 (7.4%)	16 (7.3%)	
Uninsured	6 (1.3%)	4 (1.6%)	2 (0.9%)	**<0.001**
Diabetes mellitus*				
No	398 (86.1%)	224 (92.2%)	174 (79.5%)	
Yes	64 (13.9%)	19 (7.8%)	45 (20.5%)	**<0.001**
Tobacco use*				
No	296 (64.1%)	173 (71.2%)	123 (56.2%)	
Yes	62 (13.4%)	24 (9.9%)	38 (17.3%)	
Former	104 (22.5%)	46 (18.9%)	58 (26.5%)	**0.003**
Age at diagnosis†	60.0	54.0	66.0	**<0.001**
BMI (kg/m²)†	27.6	27.4	27.9	0.48

Values in bold indicates statistical significance at $P < 0.05$.
*Denotes outcomes reported as total number (percentage).
†Denotes outcomes reported as median (50th percentile).

the time of diagnosis (66.0 versus 54.0 years; $P < 0.001$). Additionally, the reconstruction group had a significantly higher number of patients with private insurance and non-Medicare/Medicaid public insurance ($P < 0.001$), whereas the nonreconstruction group had a significantly higher number of patients with Medicare ($P < 0.001$).

Breast cancer diagnosis information of the patients with breast reconstruction and the total population is summarized in SDC 1 (**See table 1, Supplemental Digital Content 1,** which displays cancer demographics of patients. **http://links.lww.com/PRSGO/C388**). Similar rates of neoadjuvant therapy, postoperative chemotherapy, hormonal therapy, and radiation therapy were noted in all patients. Of the patients who underwent reconstruction, 62.1% had undergone bilateral total mastectomy. Among all patients, 96.3% had no evidence of disease at last follow-up. The median time to definitive surgery among all patients was 40 days, with significantly longer median time to definitive surgery in reconstructed patients (44 versus 34 days; $P < 0.001$). The median length of follow-up was 24.6 months.

Of all reconstructed patients, 79.0% underwent bilateral reconstruction, and 91.4% underwent immediate reconstruction (Table 2). Most patients underwent allogenic reconstruction, with 23.9% of patients undergoing autologous reconstruction. Of all patients who underwent implant-based reconstruction, 64.6% underwent immediate tissue expander placement with delayed definitive reconstruction (immediate two-stage reconstruction), and 26% underwent immediate direct-to-implant (one-stage) reconstruction.

Travel distance and median household income (MHI) were compared between patients who underwent reconstruction after mastectomy and those who did not (Table 3). No significant differences in the distance traveled was found between groups (16.6 versus 16.7 miles; $P = 0.94$). Patients who underwent reconstruction had a significantly higher MHI compared with nonreconstruction patients ($55,316.00 versus $51,629.00; $P = 0.047$). There was no statistically significant difference in distance traveled by patients or MHI when timing of reconstruction, type of reconstruction, and rate of complications were compared.

Table 2. Reconstruction Information

	Reconstructed Patients (n = 243)
Previous nononcologic breast surgery*	
No	217 (89.3%)
Yes	26 (10.7%)
Previous nononcologic breast surgery type*	
None	217 (89.3%)
Silicone implant	11 (4.5%)
Saline implant	8 (3.3%)
Reduction	3 (1.2%)
Autologous augmentation	2 (0.8%)
Mastopexy	2 (0.8%)
Bilateral reconstruction*	
No	47 (19.3%)
Prior contralateral procedure	4 (1.6%)
Yes	192 (79.0%)
Timing of reconstruction*	
Immediate	222 (91.4%)
Delayed	21 (8.6%)
Allogenic reconstruction*	
No	27 (11.1%)
Yes	216 (88.9%)
Allogenic reconstruction type*	
None	23 (9.5%)
Tissue expanders with delayed reconstruction	157 (64.6%)
Direct to saline implant	15 (6.2%)
Direct to silicone implant	48 (19.8%)
Autologous reconstruction*	
Not yet performed	6 (2.5%)
No	179 (73.7%)
Yes	58 (23.9%)
Autologous reconstruction type*	
Implant and autologous tissue†	22 (9.0%)
DIEP	35 (14.4%)
TRAM	4 (1.6%)
LD	19 (7.8%)
SGAP	1 (0.4%)
None	184 (75.7%)

*Denotes outcomes reported as total number (percentage).
†Denotes percentage of total reconstructed population (n = 243).
DIEP, deep inferior epigastric perforator; LD, latissimus dorsi; TRAM, transverse rectus abdominis muscle; SGAP, superior gluteal artery perforator.

Subgroup analysis was performed to compare the distance traveled by reconstructed and nonreconstructed

Table 3. Travel Distance and MHI Comparisons

	Distance Traveled (mi)	*P*	MHI (US Dollars)	*P*
Reconstruction				
Yes	16.6 mi.		$55,316.00	
No	16.7 mi.	0.94	$51,629.00	**0.047**
Timing of reconstruction				
Immediate	16.6 mi.		$54,476.00	
Delayed	17.1 mi.	0.69	$55,316.00	0.45
Autologous versus allogenic				
Allogenic	16.6 mi.		$55,329.50	
Autologous	16.7 mi.	0.86	$51,629.00	0.15
Allogenic reconstruction type				
Tissue expanders	16.6 mi.		$55,448.00	
Direct to saline implant	16.6 mi.		$44,876.00	
Direct to silicone implant	16.7 mi.	0.82	$55,404.50	0.31
Autologous reconstruction type				
Implant and autologous tissue	18.9 mi.		$53,388.50	
DIEP	23.0 mi.		$49,267.00	
LD	16.6 mi.		$51,629.00	
TRAM	8.2 mi.	—	$52,844.00	—
Complications within reconstructed patients				
Yes	16.7 mi.		$55,448.00	
No	16.7 mi.	0.77	$51,629.00	0.28

Values are represented as medians (50th percentile). Bold indicates statistical significance at $P < 0.05$.

Table 4. Reconstruction Frequency for Travel Distance from Hospital and Median Income Groups

	Reconstructed Patients	Nonreconstructed Patients	*P*
0–10 miles from hospital*	58 (48.7%)	61 (51.3%)	
11–30 miles from hospital*	114 (57.6%)	84 (42.4%)	
30+ miles from hospital*	56 (47.9%)	61 (52.1%)	0.16
$0–$45,000*	67 (47.5%)	74 (52.5%)	
$45,001–1$65,000*	120 (51.5%)	113 (48.5%)	
$65,000+*	56 (63.6%)	32 (36.4%)	**0.024**

Values in bold indicate statistically significance at $P < 0.05$.
*Denotes outcomes reported as total number (percentage) within groups.

patients at distance intervals of 0–10, 11–30, and greater than 30 miles from the hospital (Table 4). There was no significant association with rates of reconstruction between these groups ($P = 0.16$). Most patients (198) traveled a distance between 11 and 30 miles to the hospital for their care (Figure 1). Subgroup analysis was also performed to compare the average MHI of patients who underwent reconstruction and those who did not with MHI groups of $0–$45,000, $45,001–$65,000, and greater than $65,000 (Table 4). Significantly more patients (63.6%) underwent reconstruction when MHI was $65,000 and higher, compared with the other groups ($P = 0.024$). Most patients (233) had an average MHI of $45,001 to $65,000 (Figure 2). The distribution of all patients by county, utilizing ZIP codes reported at the time of diagnosis, is demonstrated in Figure 3.

Multivariable logistic regression analysis was performed utilizing all variables contained in Table 1, travel distance, and MHI to predict the relationships with patients undergoing reconstruction (Table 5). This demonstrated that age at diagnosis (AOR = 0.93 [95% CI, 0.90–0.95]; $P < 0.001$), diabetes mellitus (AOR = 0.49 [95% CI, 0.25–0.95]; $P = 0.03$), and active tobacco use (AOR = 0.46 [95% CI 0.24–0.86]; $P = 0.02$) were significant predictors of reconstruction. Travel distance (AOR = 1.00 [95% CI 0.99–1.01]; $P = 0.85$) and MHI (AOR=1.00 [95% CI 1.00–1.00]; $P = 0.58$) were not significant predictors of reconstruction.

The impact of patients' insurance status on rate and type of reconstruction was also examined (**See table 2, Supplemental Digital Content 2**, which lists insurance status of patients. **http://links.lww.com/PRSGO/C389**). Patients who underwent reconstruction had significantly higher rates of private insurance and non-Medicare/Medicaid public insurance. Patients without reconstruction had significantly higher rates of Medicare coverage. Patients who underwent bilateral reconstruction had higher rates of non-Medicare/Medicaid public insurance and lower rates of Medicare or Medicaid. Patients who underwent allogenic or autologous reconstruction individually had significantly higher rates of non-Medicare/Medicaid public insurance, and significantly lower rate of Medicare coverage. Insurance status was not significantly associated with reconstructive timing or implant type.

DISCUSSION

Breast reconstruction after mastectomy has demonstrated a positive physical and psychosocial benefit compared with mastectomy alone. Factors that impact breast reconstruction have been studied through multiple national and statewide databases previously,[4–7,14] but their findings may not be applicable at a regional level, especially in rural populations. The impact of breast cancer diagnosis and management on patients is not uniform across the country, as certain populations may face increased challenges in terms of awareness, education, socioeconomics, access to care, and culture.[1,8,14] This is especially

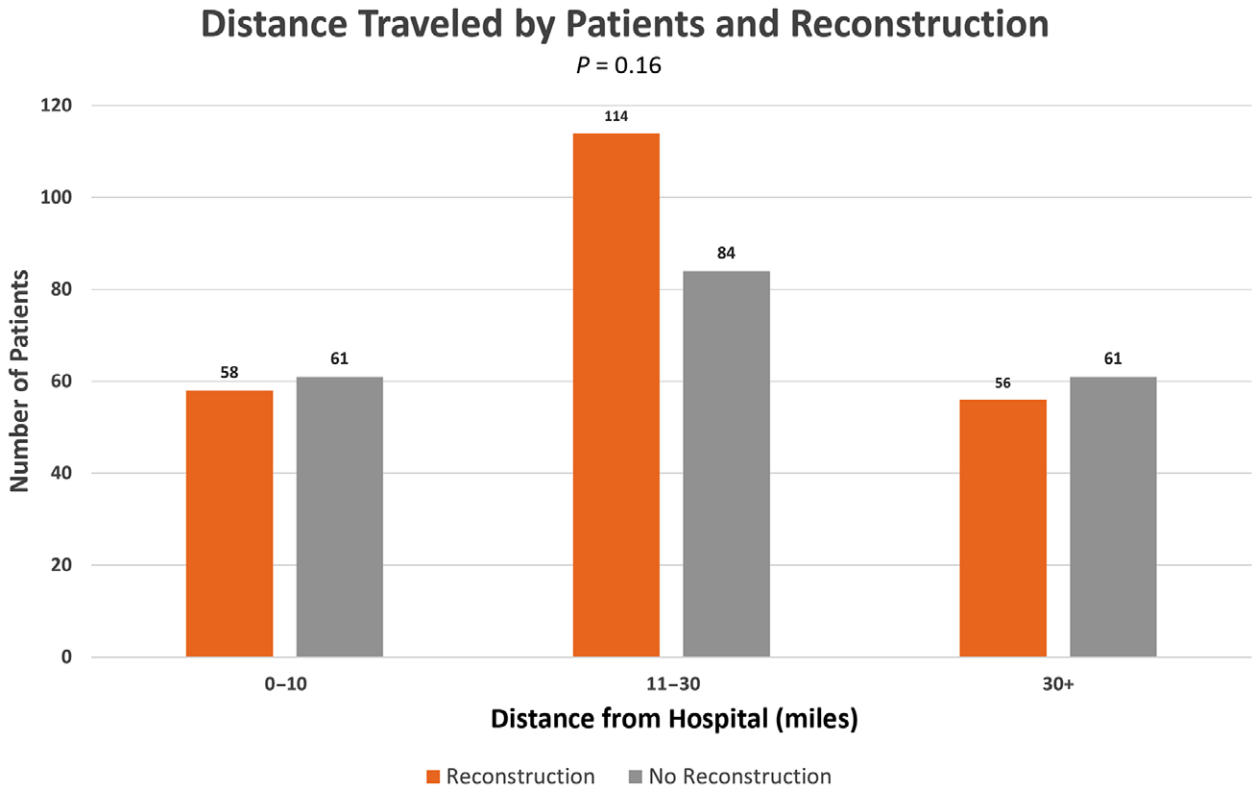

Fig. 1. Graph showing the distribution of patients by distance traveled to the hospital (miles) and if they underwent postmastectomy breast reconstruction.

pronounced in women from a rural population,[8–10] and deserves further investigation to identify the most impactful factors that affect breast reconstruction. A study published in 2019 demonstrated that in the state of Tennessee, lower income is associated with significantly worse health outcomes and life expectancy, reinforcing the importance of identifying and addressing specific social determinants of health.[15] The same study also found that Tennessee was identified as one of five states among the 2% of wealthiest and poorest counties in the United States, meaning that it is one of the most diverse states as to economic differences between counties, with three counties among the poorest and one among the wealthiest in the United States.[15] We sought to determine if the distance traveled by patients, or the average median household income (MHI) of patients impacted the rates of reconstruction in our rural patient population.

The University of Tennessee Medical Center is an academic medical center located in Knoxville, which serves a largely rural population in Tennessee and surrounding states, including over 40 counties of eastern Tennessee. This includes some of the counties with the lowest median household incomes and health disparities in Tennessee.[15] We offer comprehensive breast cancer management, including surgical oncology and breast surgery, plastic surgery services, medical oncology, and radiation oncology services with a multidisciplinary tumor board for individualized patient care with survivorship support. The plastic surgery faculty includes microsurgery fellowship-trained surgeons, and the center offers all autologous and allogenic breast reconstruction options.

Our largely rural patient population identifies disproportionately as White (96.1%) when compared with national populations,[16] but this did not have a significant association with rates of reconstruction. Our population had similar other patient demographics, oncologic characteristics, and surgical resection type compared with previous studies.[16–18] Interestingly, 65.1% of our patients underwent bilateral mastectomy, which is higher than the national average. The increasing rate of bilateral mastectomy is consistent with recent trends of increasing contralateral prophylactic mastectomy.[16,19–21] Decreased access to surveillance imaging, socioeconomic factors, and cultural differences may further explain this observation,[8] and this finding is undergoing further study at our institution to determine other possible influences. Approximately half (52.6%) of all mastectomy patients underwent breast reconstruction, which is comparable to previous literature demonstrating a postmastectomy reconstruction rate of 40%.[4,21–24] Most of the patients who underwent reconstruction had immediate two-stage allogenic reconstruction, with 23.9% of patients undergoing autologous reconstruction. The previously reported rates of postmastectomy reconstruction in the United States have been

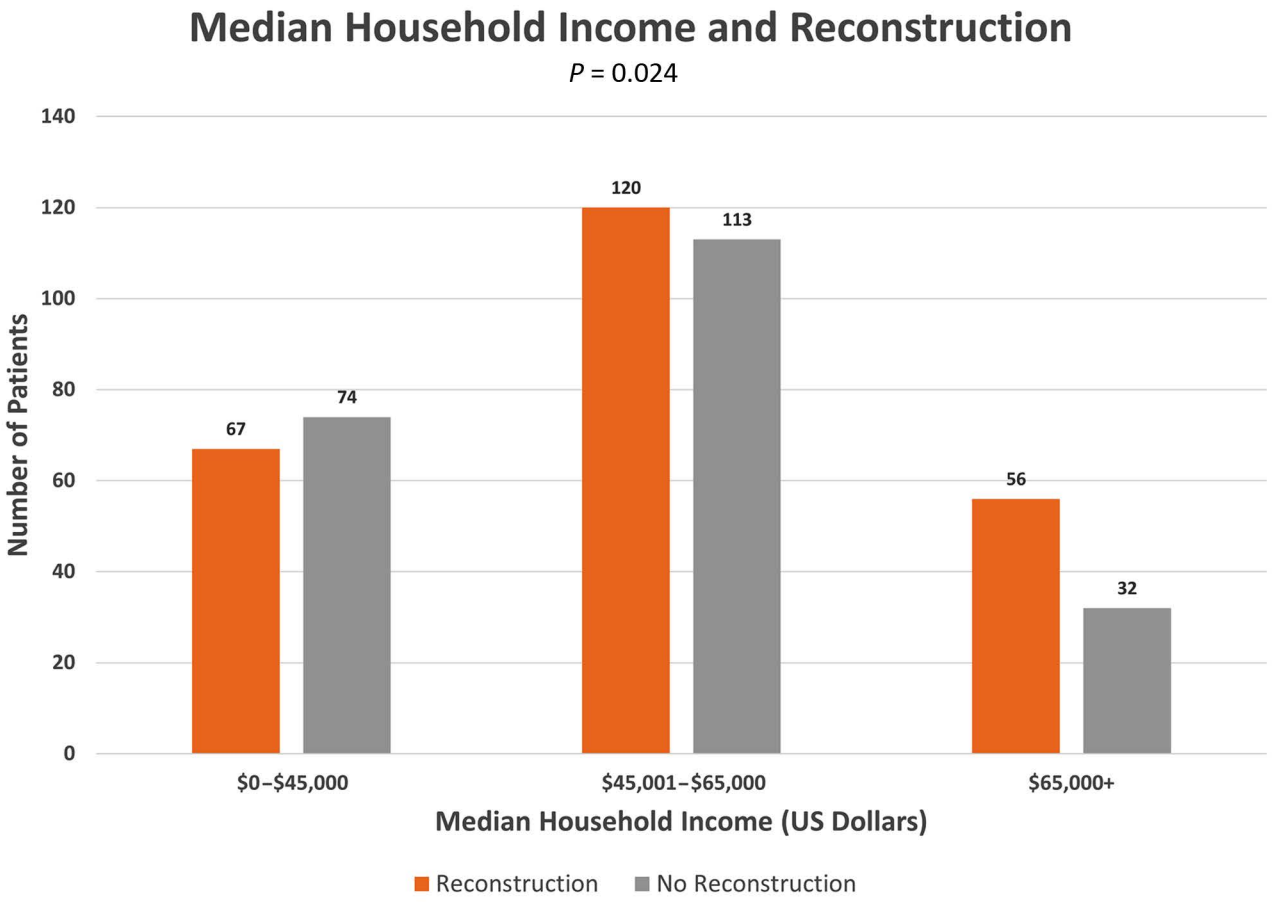

Fig. 2. Graph showing the distribution of patients by median household income (US dollars) and if they underwent postmastectomy breast reconstruction.

19% autologous and 81% implant-based reconstruction, with 68% undergoing two-stage allogenic reconstruction, and 13% undergoing one-stage (direct-to-implant) reconstruction, which is comparable to our data.[24] Overall rates of complications were also similar to previous studies of breast reconstruction after mastectomy.[17,18,25]

National and statewide studies had previously demonstrated that greater travel distance had a negative impact on the rate of breast reconstruction after mastectomy, with patients who underwent reconstruction traveling father than those who did not, especially to academic institutions.[4,6] In our patient population, the distance traveled by patients was not significantly associated with reconstruction rates on univariable or multivariable analysis. Most of our patient population traveled between 11 and 30 miles for their breast cancer treatment, but 27.0% of patients traveled more than 30 miles, with approximately half of those patients undergoing reconstruction (47.9% versus 52.1%). These findings contrast with the previous studies that demonstrated a significant association with greater travel distance and reconstruction rates.[4,6,8] A review of over one million patients in the American College of Surgeons National Cancer Database published in 2016, demonstrated a linear correlation between travel distance and reconstruction rates, with patients traveling farther for autologous compared with prosthetic reconstruction.[4] The average distance traveled by patients who underwent reconstruction was 10.3, 19.9, and 26.2 miles respectively, at community, comprehensive community, and academic programs.[4] Our study found no significant association with type of breast reconstruction, timing of breast reconstruction or complications within reconstructed patients. The distance traveled by our patient population is similar to previously published data. These conflicting findings may be explained by the potential discrepancy between actual travel time, positioning of our catchment area, concentrated efforts by our institution on regional awareness, multidisciplinary care, and resource allocation.

The financial burden of breast cancer has been extensively studied, with the socioeconomic status of patients affecting the rate of reconstruction after mastectomy on a national and statewide level, despite the passage of federal health coverage mandates.[1,2,5,26] In conjunction with these findings, out-of-pocket costs of breast cancer can affect women disproportionately,[8,10,26] which affects overall access to breast reconstruction, and is particularly important to study in the highest risk populations of rural women and those with lower socioeconomic status. Rosson et al analyzed the impact of community and patient factors on access to immediate breast reconstruction following mastectomy.

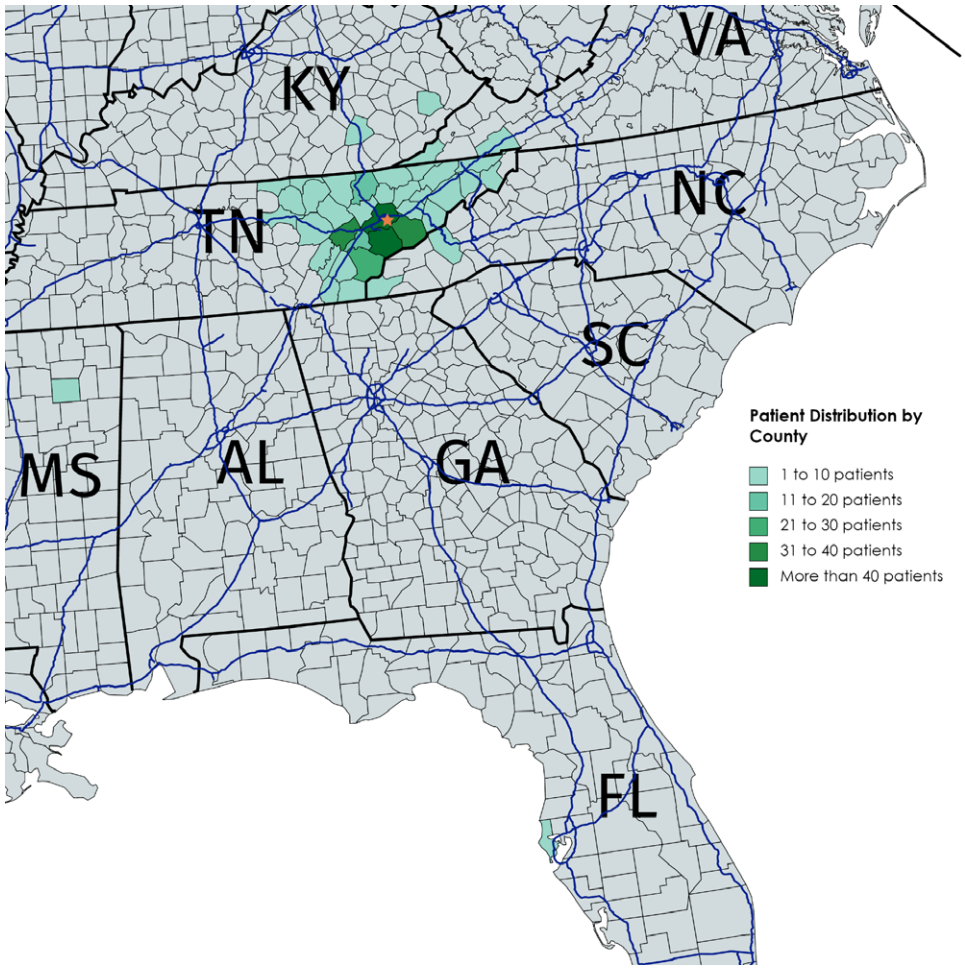

Fig. 3. Map showing the distribution of patients by county determined by reported ZIP code. The star denotes the location of our hospital, and major highways are denoted in blue (created using MapChart.net).

Table 5. Multivariable Logistic Regression Analysis for Predictors of Reconstruction

	Regression Coefficient	Standard Error	95% CI (Lower–Upper)	Adjusted Odds Ratio (AOR)	*P*
Distance traveled	0.00	0.01	0.99–1.01	1.00	0.85
Median household income	0.00	0.00	1.00–1.00	1.00	0.58
Age at diagnosis	−0.08	0.01	0.90–0.95	0.93	**<0.001**
BMI (kg/m^2)	−0.01	0.01	0.97–1.02	0.99	0.48
Insurance status					
Private insurance	1.48	1.51	0.23–84.52	4.38	0.33
Other public insurance	−0.17	1.00	0.12–5.95	0.84	0.86
Medicare	−0.24	1.01	0.11–5.64	0.78	0.81
Medicaid	−0.49	1.07	0.08–5.02	0.61	0.65
Diabetes mellitus					
Yes	−0.72	0.34	0.25–0.95	0.49	**0.03**
Tobacco use					
Yes	−0.78	0.32	0.24–0.86	0.46	**0.02**
Former	−0.41	0.26	0.40–1.12	0.66	0.12

All adjusted odds ratios expressed as predictors of undergoing reconstruction. Bold indicates statistical significance at $P < 0.05$.

Their findings demonstrated that increased income was significantly associated with higher rates of immediate reconstruction.[7] Our results are consistent with available literature. Patients who underwent reconstruction had a significantly higher MHI than those who did not ($55,316.00 versus $51,629.00). On further analysis, patients in the highest MHI group of greater than $65,000 had significantly higher rates of reconstruction than those in the lower MHI groups. There was no significant association between MHI and timing of reconstruction, type of reconstruction, or rate of complications. The significant effect of MHI on reconstruction was not demonstrated on multivariable logistic

regression analysis when controlling for other variables such as insurance status, BMI, age at diagnosis, diabetes mellitus, and tobacco use. This demonstrated significantly decreased odds of undergoing reconstruction with increasing age at diagnosis, diabetes mellitus, and tobacco use. The loss of the significant effect of MHI after controlling for these variables may reflect larger socioeconomic determinants of health in our population in addition to these known factors that decrease reconstruction rates.

The insurance status of patients has been previously found to be associated with the rate of breast reconstruction, with uninsured women and those with public coverage less likely to undergo reconstruction than those who are privately insured.[1] Among reconstructed patients in our population, there was a significantly higher rate of private insurance (2.9% versus 0.4%). Our population differed from the previous literature as there were significantly higher rates of non-Medicare/Medicaid public insurance among those who underwent reconstruction (63.8% versus 35.2%). Similar findings were found in patients who underwent bilateral reconstruction, with significantly decreased rates of Medicare and Medicaid (19.6% versus 45.5%, 5.2% versus 16.4%). We found no significant differences in insurance status with timing of reconstruction or types of implants.

This study has several limitations, including its retrospective nature. Our population is predominantly White, which means that other races/ethnicities are heavily underrepresented. Furthermore, the travel distance calculations were performed based on patient reported ZIP codes at the time of diagnosis, so the authors are unable to account for variability in travel distance among patients within the same ZIP code. The utilization of ZIP codes to calculate Euclidian distance was chosen as the basis of our study to allow us to compare our findings directly with the landmark study published in 2016[4] from which our initial hypothesis was driven and thus, similar methods were used. The calculated Euclidian distance does not always correlate with distance or time traveled, factors that may have a more important impact on patients' access to the hospital. Use of the exact address of patient's residency to calculate the distance from the hospital more accurately, and examination of traveled time or traveled distance instead of Euclidian distance, may provide more valuable information in future studies. Finally, MHI was calculated based on estimated data per ZIP code by the US Census Bureau, and not based on actual patient reported annual household income, which would provide more accurate information regarding the patients' socioeconomical status.

CONCLUSIONS

Although the factors that impact access to breast reconstruction after mastectomy have been studied extensively utilizing national and statewide databases, analysis has not been performed at a regional level or single academic institute serving a largely rural population, that may be disproportionately affected. Our population is most negatively impacted by socioeconomic status represented by median household income, with significantly lower rates of reconstruction in the lowest income patients on univariable analysis, and in uninsured or Medicare/Medicaid patients. The distance traveled by our patients did not affect the rates of reconstruction on univariable or multivariable analysis, which contrasts with the findings of previous nationwide studies. This highlights the importance of smaller-scale studies at an institutional or regional level. Our findings may be explained by the focused efforts from our institution on patient education, collaboration with community health care providers, and a region-first approach to care and resource allocation. With identification of these critical barriers, these efforts can be directed to further increase access within our population and may be more applicable to other similar populations across the country. The impact of rurality on breast cancer treatment deserves continued study, as national database review may be inadequate to accurately represent the cultural and regional impact many of these factors have on underrepresented populations such as ours.

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