Correlations between Race and Area Deprivation Index on Treatment and Outcomes in Metastatic Triple Negative Breast Cancer

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San Antonio Breast Cancer Symposium
Presentation ID: PS-12-07
December 11th, 2025

BACKGROUND

Breast cancer incidence increased in African American women while remaining stable in other ethnicities. Mortality due to breast cancer is higher in African American women than in other ethnicities. African American women are more likely to be diagnosed with high-grade, aggressive tumors at an earlier age than white women.[1-10]

Socioeconomic factors such as lower educational attainment, lack of insurance, and poverty are associated with more poor prognostic factors, higher stage of disease, and decreased survival.[11-12] In the absence of individual-level socioeconomic status (SES) information, area level data can be useful in determining patterns of disparity in breast cancer within the population. The area deprivation index (ADI) from the University of Wisconsin is a validated measure of the adverse social exposome that can be used to evaluate the correlations with disease states and outcomes.[11]

Triple negative breast cancer (TNBC) is disproportionately seen in younger black women, particularly of West African ancestry. However, independent of genetic ancestry, there has been found to be an inverse relationship between higher neighborhood-level SES and the incidence of TNBC.[12-13] There is limited information focusing particularly on ADI and racial associations in treatment patterns and outcomes in the metastatic triple negative breast cancer population.

OBJECTIVES

To determine associations between survival stratified by race and ADI, and to determine treatment patterns in patients stratified by race and ADI in patients with metastatic triple negative breast cancer treated at UPMC Magee-Womens Hospital.

METHODS

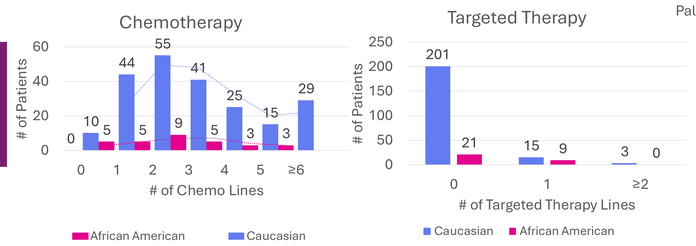
- This is a retrospective review of Caucasian and African American patients who were diagnosed with metastatic triple negative breast cancer and treated at the University of Pittsburgh Magee-Women's Hospital between 1996-2002.
- Information obtained from individual patient charts included:
  - Demographics (patient race, age at diagnosis of metastatic disease)
  - Disease characteristics (whether patient was diagnosed with de novo metastatic disease, months from diagnosis to first progression, number of days between metastatic diagnosis and start of metastatic chemotherapy, time to death or last follow up from diagnosis of metastatic disease)
  - Treatment (number of lines of chemotherapy and targeted therapies)
- ADI was determined correlating patient addresses to the Neighborhood Atlas Interactive Tool from the University of Wisconsin School of Medicine and Public Health.[11]
  - ADI is a percentile ranking from 1-100 where higher numbers indicate greater disadvantage.
  - The ADI has been developed using American census data using 17 factors with different weights. The measure weighs poverty, income and education have the largest relative weights amongst all of the 17 variables.
- Statistical analysis was conducted with both univariate and multivariate analysis using chi-square testing and Cox-Proportional models.

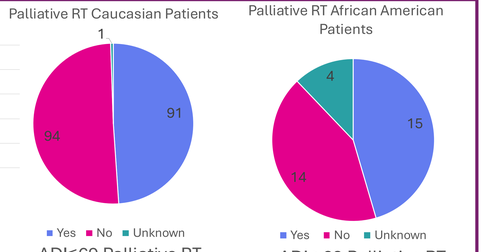
DEMOGRAPHICS STRATIFIED BY RACE

		Caucasian (N=237)	African American (N=33)	Total (N=270)
Age at diagnosis of metastatic TNBC (mean)		52	54	
# of patients diagnosed with metastatic disease <40 y.o. (N=59)		49 (20.7%)	10 (30.3%)	59 (21.9%)
BRCA Mutation	Yes	28 (11.9%)	2 (6%)	29 (12.2%)
	No	85 (36%)	12 (36.4%)	97 (40.9%)
	Unknown	124 (52.3%)	19 (57.6%)	143 (60.3%)
De novo metastatic diagnosis		41 (17.3%)	5 (15.2%)	46 (17%)
Histology	Ductal	188 (79.3%)	27 (81.8%)	215 (79.6%)
	Lobular	12 (5.1%)	2 (6.1%)	14 (5.2%)
	Inflammatory	4 (1.7%)	1 (3.0%)	5 (1.9%)
	Metaplastic	10 (4.2%)	0 (0%)	10 (3.7%)
	Other/Unknown	23 (9.7%)	3 9.1%	17 (6.3%)
ADI	≤69	120 (50.6%)	10 (30.3%)	130 (48.1%)
	>69	108 (45.6%)	20 (60.1%)	128 (47.4%)
	Unknown	9 (3.8%)	3 (9.1%)	12 (4.4%)
CNS Metastases	Yes	110 (46.4%)	18 (54.5%)	128 (47.4%)
	No	127 (53.6)	15 (45.5%)	142 (52%)

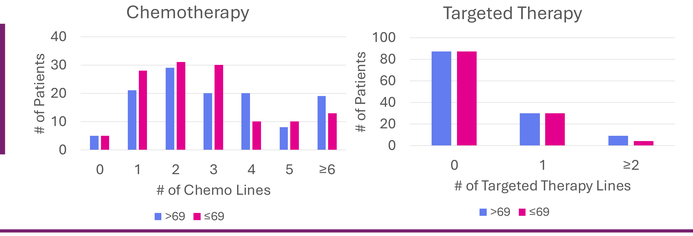
TREATMENT ASSOCIATIONS

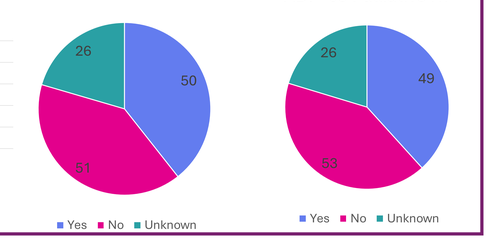
Stratified by Race





Stratified by ADI



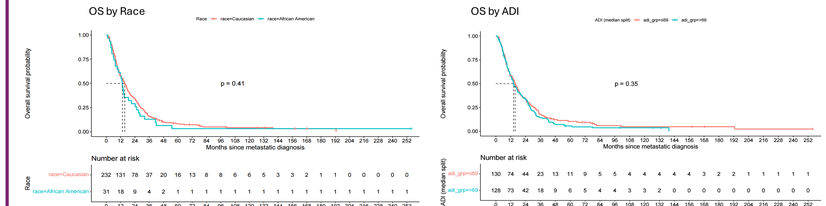


MULTIVARIATE ANALYSIS

Adjusting for race, number of lines of chemotherapy, targeted therapy, and time to start of systemictherapy, it was found that **patients in higher ADI areas (ADI >69) had a 34% higher hazard of death** compared to lower ADI areas (HR=1.34, p=0.037).

There was no significant difference in survival by race after adjustment. Each additional line of chemotherapy is associated with approximately a 15% lower hazard of death. Each additional line of targeted therapy is associated with a 36% lower hazard of death. Or, that patients who live longer are able to have more lines of therapy.

OVERALL SURVIVAL



There was no significant difference in overall survival when stratified by race or ADI upon univariate analysis.

CONCLUSIONS

Treatment patterns appear similar between patients stratified by race and ADI, including measures such as time to start systemic therapy, number of chemotherapy lines, and proportion of patients receiving targeted therapy in patients treated for metastatic triple negative breast cancer at UPMC Magee-Women's Hospital.

Upon multivariate analysis, there is an increased risk of death in patients living in areas of higher ADI (>69), when controlling for race and treatment variables (time to start systemic therapy, number of chemotherapy lines, number of targeted therapy lines). There was no significant difference in survival on multivariate analysis when stratified by race.

Limitations of this study include limited sample size and treatment at a single center. Further studies with larger sample sizes, across multiple health systems would be able to assess generalizability of these results.

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