

BLACK MEDICAID BENEFICIARIES EXPERIENCE BREAST CANCER TREATMENT DELAYS MORE FREQUENTLY THAN WHITES

Objective: Delays in treatment initiation may contribute to the poorer breast cancer survival among Black women compared with Whites. Lower socioeconomic status and lack of access to care are other reasons for the observed disparities. We, therefore, examined racial differences in treatment delays for early breast cancer in a similarly insured population of Medicaid beneficiaries.

Design and Setting: A retrospective cohort study using linked New Jersey Cancer Registry and Medicaid Research files using logistic regression models.

Patients: 237 Black and 485 White women aged 20–64 years diagnosed with early breast cancer between 1997 and 2001.

Main Outcome Measure: Delays in treatment initiation.

Results: Blacks experience adjuvant chemotherapy delays more often than Whites. Black women had two-fold odds (95% confidence interval, 1.04, 4.38) of ≥ 3 months delay in adjuvant chemotherapy than Whites. Blacks were also more likely to experience radiation treatment delays but this finding was not statistically significant (odds ratio 1.72, 95% CI .79, 3.77). No racial differences were observed for surgical and hormonal treatment delays.

Conclusion: Blacks experienced delays in initiating adjuvant chemotherapy more frequently than Whites. These differences were observed even in a population with similar socioeconomic status and insurance access, suggesting that cultural and psychosocial factors may contribute to the observed differences. (*Ethn Dis.* 2012;22[3]:288–294)

Key Words: Breast Cancer, Race, Disparities, Treatment Delays, Adjuvant Therapy, Medicaid

Bijal A. Balasubramanian, MBBS, PhD; Kitaw Demissie, MD, PhD;
Benjamin F. Crabtree, PhD; Pamela A. Ohman Strickland, PhD;
Karen Pawlish, ScD; George G. Rhoads, MD, MPH

INTRODUCTION

White women have higher incidences of breast cancer than do Black women. However, Black women have significantly higher mortality rates due to breast cancer than their White counterparts.^{1,2} The reason for this racial difference in the burden of the disease is likely multifactorial. Studies have identified factors such as more advanced stage at diagnosis,³ disadvantaged socioeconomic status,^{4,5} lack of access to care, non-optimal treatment,^{6–8} or a greater likelihood of being diagnosed with more aggressive tumors^{9,10} as potential contributors of the observed disparity.

Non-optimal treatment as manifested by delays in the initiation of recommended treatment after definitive diagnosis or surgery may contribute to the poorer survival among Blacks. Studies examining treatment delays have demonstrated that Black women were more likely to experience delays in initiating recommended treatment than Whites.^{11–14} However,

most of these studies were conducted in a heterogeneous population with respect to health insurance and socioeconomic status and although some adjusted for poverty and insurance status,^{11,12} residual racial differences may still exist. Furthermore, most studies have not fully explored racial variations in delays in receipt of adjuvant hormonal therapy and chemotherapy after definitive surgery. Although there is some evidence from the literature so far, relatively little is known about the role of racial disparity in treatment delays among breast cancer patients who are diagnosed at an early stage, when adjuvant hormonal therapy and chemotherapy are recommended, and who have access to the same type of medical insurance. We, therefore, conducted a study to examine racial differences in delays in surgical, adjuvant radiation after breast conserving surgery (BCS), adjuvant hormonal, and adjuvant chemotherapy treatment for early stage breast cancer in a similarly

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(KD, BC, PS, GR) and Department of Family Medicine, University of Medicine and Dentistry of New Jersey Robert Wood Johnson Medical School, Somerset (BC, PS) and Department of Biostatistics University of Medicine and Dentistry of New Jersey School of Public Health (PS) and Cancer Control Program, Cancer Epidemiology Services, New Jersey Department of Health and Senior Services, Trenton (KP).

Address correspondence to Bijal A. Balasubramanian, MBBS, PhD; Division of Epidemiology, Human Genetics, and Environmental Sciences; University of Texas School of Public Health; 5323 Harry Hines Blvd, V8.112; Dallas, TX 75390-9128; 214.648.1343; 214.648.1081 (fax); bijal.a.balasubramanian@uth.tmc.edu

From Division of Epidemiology, Human Genetics, and Environmental Sciences, University of Texas School of Public Health, Dallas (BB) and UT Southwestern - Harold C. Simmons Comprehensive Cancer Center, Dallas (BB) and Department of Epidemiology University of Medicine and Dentistry of New Jersey School of Public Health, Piscataway (KD, BC, GR) and Cancer Institute of New Jersey, New Brunswick

Table 1. Description of data available from the New Jersey State Medicaid files

Filename (description)	Variables Extracted
Personal summary file (patient-level)	Date of birth Date of death Sex Race/ethnicity County code Zip code Social security number
Inpatient file (claims-level)	Date of admission Primary and secondary diagnoses codes Procedure dates Procedure codes
Drug file (claims-level)	Type of drug Number of days supplied Date of prescription Date filled Quantity of drug National Drug Code (NDC) number
Other therapy file (claims-level)	Outpatient and emergency services Date of service Type of service Primary and secondary diagnoses codes Procedure code Drug codes for injections

insured population (ie, Medicaid beneficiaries).

METHODS

A retrospective cohort study was conducted using the linked New Jersey State Cancer Registry (NJSCR) and New Jersey Medicaid Research files. The NJSCR is a population-based registry that collects data on all cancer cases diagnosed and treated in New Jersey since October 1, 1978. The NJSCR serves the entire state of New Jersey and is a member of the National Cancer Institute’s SEER Program. The NJSCR database contains information on socio-demographic variables (age, race, marital status), tumor characteristics (histological type, grade or differentiation, and cancer stage), and surgical treatment for cancer.

The NJSCR database was linked to the New Jersey Medicaid files using a probabilistic record linkage methodology. A detailed description of the

Medicaid files and the linking algorithm have been described elsewhere.¹⁵ In brief, the New Jersey Medicaid research files include information on all medical encounter claims submitted by providers for the care of Medicaid enrollees. These data were compiled by the Centers for Medicare and Medicaid Services that checked the quality and completeness of data received. The Medicaid research data have four separate files: 1) the personal summary file, 2) the inpatient file, 3) the other therapy file, and 4) the drug file. Table 1 provides an overview of the types of information available in each of these files. Each file has a unique identifier for each Medicaid enrollee. This unique identifier was used to merge the four Medicaid data files.

Study Participants

Women aged 20–64 years who were diagnosed with early-stage breast cancer (SEER Summary Stage ‘localized’ or ‘regional spread to lymph nodes’) between January 1997 and December

2001 were included in this study. These SEER summary stages correspond to the American Joint Commission on Cancer stages I, IIA, IIB or IIIA.¹⁶ We restricted our study sample to early-stage breast cancer patients because adjuvant systemic treatment is recommended only for women diagnosed at these early stages.^{17,18} We also restricted the study sample to women whose race was recorded as either Black (African American, Black, or Negro) or White (White or Caucasian) in the NJSCR.¹⁹ The NJSCR uses either patient’s self-declared identification or the documentation in the medical record to assign race.¹⁹

Women who were diagnosed with other cancers, and whose breast cancer was not the primary cancer were excluded. Women who met the above criteria were identified from the NJSCR and linked with the New Jersey Medicaid Personal Summary File using AutoMatch™ probabilistic record linkage software. To accomplish the record linkage, duplicate records were first deleted. The linkage was then conducted in three phases. In the first phase, records that matched exactly on all linkage variables (social security number, date of birth, sex, race, and zip code of residence) were included as exact matches in the linked database. The second and third phases of the linkage algorithm identified records that linked on some but not all linkage variables. These records were evaluated manually to determine whether they matched in both databases. The final linked database included 722 women with early stage breast cancer (485 White and 237 Black).

Definitions of Treatment Delays

We examined the following three treatment delays: 1) surgical treatment delay, 2) adjuvant radiation treatment delay, and 3) adjuvant systemic treatment delay. Surgical treatment delay was defined as the time interval from biopsy-proven diagnosis to definitive

Table 2. Descriptive characteristics of the study sample by race

	Blacks (n=237)	Whites (n=485)	P
Patient Characteristics			
Age, years, n (%)			
<40	52 (21.9)	85 (17.5)	Not significant
40-44	40 (16.9)	84 (17.3)	
45-49	30 (12.7)	79 (16.3)	
50-54	33 (13.9)	84 (17.3)	
55-59	36 (15.2)	70 (14.4)	
60-64	46 (19.4)	83 (17.1)	
Marital status, n (%)			
Single	111 (46.8)	133 (27.4)	<.0001
Married	39 (16.5)	173 (35.7)	
Widowed/separated/divorced	73 (30.8)	158 (32.6)	
Unknown	14 (5.9)	21 (4.3)	
Charlson's comorbidity index, n (%)			
0	152 (64.1)	329 (67.8)	Not significant
1-2	59 (24.9)	114 (23.5)	
3 or greater	26 (11.0)	42 (8.7)	
Tumor characteristics			
SEER summary stage, n (%)			
Localized	126 (53.2)	275 (56.7)	Not significant
Regional spread to lymph nodes	111 (46.8)	210 (43.3)	
Receptor status, n (%)			
ER or PR positive	98 (42.2)	247 (51.6)	.02
ER and PR negative	63 (27.2)	81 (16.9)	
ER and PR not done	14 (6.0)	32 (6.7)	
ER and PR unknown	62 (24.6)	125 (24.8)	
Tumor grade, n (%)			
Well differentiated	16 (6.8)	45 (9.3)	.02
Moderately differentiated	61 (25.7)	146 (30.1)	
Poorly differentiated/anaplastic	132 (55.7)	211 (43.5)	
Unknown/unstaged	28 (11.8)	83 (17.1)	
Tumor histology, n (%)			
Infiltrating ductal	196 (82.7)	391 (80.6)	Not significant
Other	41 (17.3)	94 (19.4)	

ER, estrogen receptor; PR, progesterone receptor.

surgery (mastectomy or BCS). Adjuvant radiation treatment delay was defined as the time interval from BCS to initiation of adjuvant radiation therapy. Adjuvant systemic treatment delay was defined as the time interval from definitive surgery to initiation of adjuvant hormonal and/or chemotherapy treatment, as applicable. We categorized treatment delays into <1 month, 1 to <2 months, 2 to <3 months, 3 to <6 months, and ≥6 months. Because there were very few women who received adjuvant radiation therapy within one month of receiving BCS, we categorized adjuvant radiation treatment delay into <2 months, 2 to

<3 months, 3 to <6 months, and ≥6 months. These definitions of treatment delays confer with existing treatment guidelines^{17,18} and with other studies.¹¹⁻¹⁴

Dates of diagnosis, definitive surgery, and initiation of radiation therapy were obtained from the NJSCR files whereas dates of initiation of chemotherapy and hormonal therapy were ascertained from both the NJSCR file and the Medicaid drug and other therapy files. To ascertain the initiation of hormonal or chemotherapy treatments, we used the date of the first claim filed for these drugs in the New Jersey Medicaid files or the date of

initiation of these treatments from the NJSCR files, whichever was earlier.

The Medicaid drug and other therapy files provide National Drug Codes (NDC)²⁰ and Healthcare Common Procedure Coding Systems (HCPCS)²¹ J-codes for each drug prescribed to the Medicaid enrollee. J-codes are important for identifying chemotherapy infusions in physicians' offices whereas NDC codes capture hormonal and other therapies. We used the Lexicon database²² to ascertain the drug names associated with each code; this database includes several relational databases of drug names, drug product information, disease names and coding systems (eg, NDC, HCPCS, and others). Drugs can be identified from the database using drug name, brand description, or active ingredients. Each drug name is associated with a unique drug identifier, which was used to identify the relevant codes. We then, linked the codes identified from Lexicon to NDC and J-codes available in encounter records of the Medicaid files. This enabled us to identify all records from the Medicaid research files where adjuvant hormonal and chemotherapy treatment was prescribed. Medicaid enrollees who were prescribed cyclophosphamide, doxorubicin/ epirubicin, 5-fluorouracil, or a combination of these agents were considered to have received adjuvant chemotherapy. Hormonal therapy included any of the following most commonly prescribed drugs; tamoxifen or raloxifene, anastrozole or letrozole, and goserelin or leuprolide.

Patient's race was the main independent variable of interest. Race information was obtained from the NJSCR and patients were categorized into either Black or White. Information on potential confounding variables was obtained from either NJSCR records (age, marital status, stage, receptor status, grade, and histology) or from Medicaid files (diagnoses and procedure codes to calculate the Charlson's comorbidity index²³).

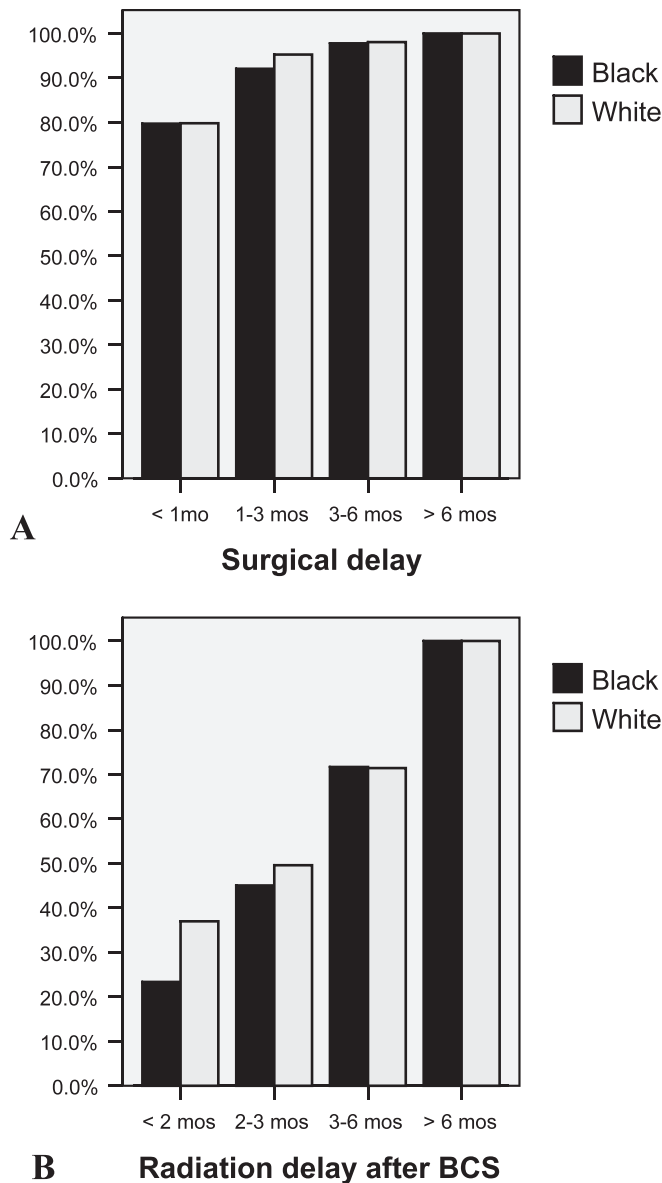


Fig 1. Cumulative percentages of Black and White women with surgical treatment delay after diagnosis and adjuvant radiation treatment delay after BCS

The Institutional Review Boards of the University of Medicine and Dentistry of New Jersey and the New Jersey Department of Health and Senior Services approved this study.

Statistical Analysis

We first compared the distribution of patient and tumor characteristics between Blacks and Whites and used the chi-square test to determine statistically

significant differences in these characteristics between races. We then examined the cumulative percentage of Black and White women who experienced <1 month, 1 to <2 months, 2 to <3 months, 3 to <6 months, and ≥6 months delay in surgical, radiation, and adjuvant hormonal treatment and chemotherapy. Finally, we estimated the odds of Black women experiencing delays in receipt of treatment compared to

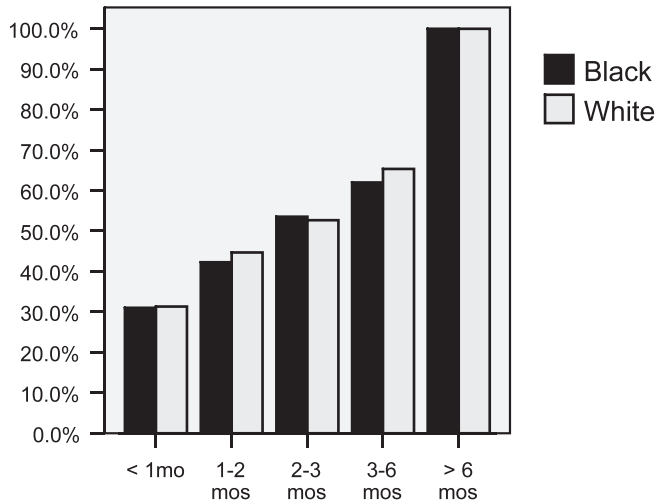
Whites using logistic regression models after adjusting for variables that differed significantly between the races. All analyses were completed with the use of SAS software, version 9.1 and statistical significance was assessed at the .05 level.

RESULTS

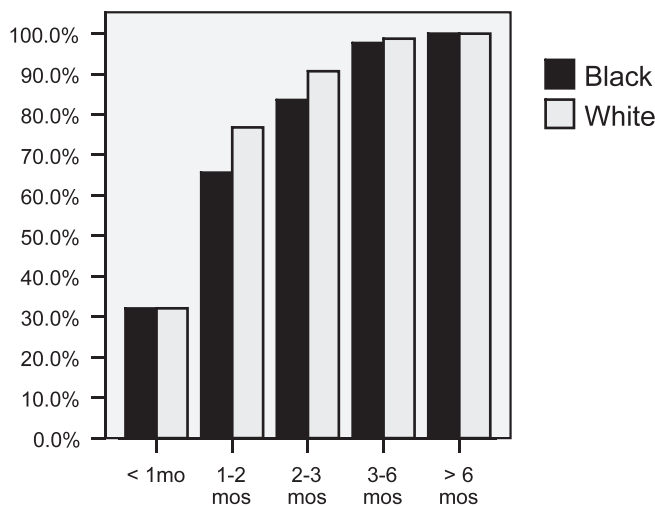
Table 2 provides the distribution of patient and tumor characteristics between Blacks and Whites. Blacks were more likely than Whites to have characteristics that indicate a poor prognosis; Blacks were younger, never married (single), and were diagnosed more frequently with tumors that had spread to lymph nodes, receptor negative, and poorly differentiated or anaplastic.

Figure 1A shows that most women, irrespective of race, received their surgical treatment within 3 months of diagnosis. The median time to receipt of surgical treatment after diagnosis for both Blacks and Whites was 7 days. With respect to adjuvant radiation treatment, overall, 32% of the women received it within 2 months and 71% within 6 months of their BCS. However, Blacks were more likely to experience delays in radiation therapy than Whites (see Figure 1B). Figure 2 shows the cumulative percentages of Black and White women who experienced delays in adjuvant hormonal and chemotherapy. Only 31% of women regardless of race received adjuvant hormonal or chemotherapy within one month of definitive surgery. There were no racial differences in adjuvant hormonal therapy delays. On the other hand, Black women were more likely to experience delays in initiation of adjuvant chemotherapy than White women (see Figure 2B).

Table 3 presents findings from the logistic regression modeling comparing breast cancer treatment delays between Black and White women. Black women had a two-fold increased odds (95% confidence interval 1.04, 4.38) of



A Adjuvant hormonal therapy delay



B Adjuvant chemotherapy delay

Fig 2. Cumulative percentages of Black and White women with adjuvant hormonal and chemotherapy treatment delays

experiencing delays of ≥ 3 months in initiation of adjuvant chemotherapy than Whites. Black women were also 70% more likely than White women to experience delays of ≥ 2 months in radiation therapy after BCS and 60% more likely to experience adjuvant chemotherapy delays of ≥ 2 months, but the results failed to achieve statistical significance. No racial differences

were observed for surgical and adjuvant hormonal treatment delays.

DISCUSSION

Our study demonstrated racial differences in delays in initiation of appropriate treatment after confirmed breast cancer diagnosis as well as after

Our study demonstrated racial differences in delays in initiation of appropriate treatment after confirmed breast cancer diagnosis as well as after definitive surgery.

definitive surgery. Blacks were more likely than Whites to experience delays of ≥ 3 months in initiation of adjuvant chemotherapy after definitive surgery. Also, Blacks were more likely to have delays in initiation of adjuvant radiation therapy after BCS.

Previous studies examining delays in breast cancer treatment initiation have focused solely on receipt of initial treatment after biopsy-proven diagnosis, which typically included only surgical treatment delays.^{11,12,14} These studies reported that Blacks were more likely than Whites to experience delays in initiation of breast cancer treatment after definitive diagnosis. However, the specific treatments that contributed to the racial difference in delays were not apparent from those studies. By reporting racial differences in delays in adjuvant radiation, hormonal, and chemotherapy separately, our study advances what we know so far about this issue. A particular strength of our study was that we utilized information on adjuvant systemic treatment that was readily available in Medicaid files. Adjuvant hormonal therapy and chemotherapy is often provided to patients in the outpatient setting and is not routinely available in cancer registry files. This information can only be obtained through medical record review, which is labor intensive. Linking the cancer registry data to Medicaid prescription records enabled us to obtain this information in a fairly efficient manner. Our study also had some limitations. The study population

Table 3. Surgical, adjuvant radiation, and adjuvant systemic treatment delays in Black as compared to White women with early breast cancer

	Blacks n (%)	Whites n (%)	OR (95% CI) ^a
Surgical treatment delay ^b (n=693)			
≥1 month	46 (20.3)	94 (20.2)	1.02 (.67, 1.54)
<1 month	181 (79.7)	372 (79.8)	
Adjuvant radiation treatment delay ^c (n=179)			
≥2 months	46 (76.7)	75 (63.0)	1.72 (.79, 3.77)
<2 months	14 (23.3)	44 (37.0)	
≥3 months	33 (55.0)	60 (50.4)	.94 (.46, 1.91)
<3 months	27 (45.0)	59 (49.6)	
Adjuvant hormonal treatment delay ^d (n=221)			
≥1 month	49 (69.0)	103 (68.7)	.98 (.51, 1.89)
<1 month	22 (31.0)	47 (31.3)	
≥2 months	41 (57.8)	83 (55.3)	1.14 (.62, 2.10)
<2 months	30 (42.2)	67 (44.7)	
≥3 months	33 (46.5)	71 (47.3)	0.98 (.53, 1.81)
<3 months	38 (53.5)	79 (52.7)	
Adjuvant chemotherapy delay ^e (n=365)			
≥1 month	87 (68.0)	161 (67.9)	1.08 (.66, 1.78)
<1 month	41 (32.0)	76 (32.1)	
≥2 months	44 (34.4)	55 (23.2)	1.61 (.96, 2.70)
<2 months	84 (65.6)	182 (76.8)	
≥3 months	21 (16.4)	22 (9.3)	2.14 (1.04, 4.38)
<3 months	107 (83.6)	215 (90.7)	

^a OR (95% CI), odds ratio (95 Confidence Interval) for Black compared to White women. OR adjusted for marital status, grade of tumor, and receptor status.

^b Surgical treatment delay was defined as the time interval from biopsy-proven diagnosis to definitive surgery.

^c Adjuvant radiation treatment delay was defined as the time interval from definitive surgery after diagnosis to initiation of adjuvant radiation therapy among those who received breast conserving surgery.

^d Adjuvant hormonal treatment delay was defined as the time interval from definitive surgery after diagnosis to initiation of adjuvant hormonal therapy.

^e Adjuvant chemotherapy treatment delay was defined as the time interval from definitive surgery after diagnosis to initiation of adjuvant chemotherapy.

was from a single state in northeastern United States and our findings may not be generalizable to other states. Also, there are inherent limitations in the use of medical administrative databases such as Medicaid claims data. These may include incomplete data, coding inaccuracies and errors. However, these limitations were minimized by combining the administrative data with the cancer registry data.

Socioeconomic factors are important in explaining part of the racial difference in treatment delays. In our study, the effect of this factor was minimized by focusing on Medicaid patients who are similar with respect to socioeconomic status. Despite these similarities, patient factors may still contribute to the observed differences in treatment delays.

For example, patient's age at diagnosis,²⁴ marital status²⁵⁻²⁷ and number of comorbid conditions²⁸ may be related to treatment delays. Studies have shown that married women are less likely to have delays.²⁵ Few studies have examined the effect of comorbidity on breast cancer treatment delays. However, research from other cancers shows that patients with a higher comorbid disease burden are more likely to have delays.²⁸ In our study, we did not find age and comorbidity to differ significantly between the races. Marital status was significantly different between Blacks and Whites. However, even after adjusting for this difference in the multivariate regression model, Black women had higher odds of chemotherapy delays than White women.

In our study, Blacks were more likely to experience delays in receiving adjuvant radiation and chemotherapy but not for hormonal therapy. Both radiation and chemotherapy require frequent visits to a care facility over a period of time. For example, a typical adjuvant radiation therapy course is delivered over the course of 3 to 6 weeks in a once-daily manner 5 days a week.¹⁸ Therefore, factors such as availability of transportation, distance from care facility, and support from family members can influence decisions to receive and complete these intensive treatments. In fact, recent work by Bickell et al showed that minority women were much more likely to experience system failures when seeking care for their breast cancers and often their physicians were unaware of their patients' financial, emotional, or social support needs.²⁹ Other factors such as a sense of fatalism, perception that surgery and medicines are not effective, certain religious and folk beliefs, body image, and social norms may also contribute to delays in treatment initiation.³⁰

Racial differences in delays in treatment initiation observed in this study are important because such delays have been shown to be associated with an increased risk of death from breast cancer. A systematic review of studies has shown reduced survival among women who experienced delays in diagnosis after presentation of symptoms.³¹ A recent study that examined the impact of radiation delays after lumpectomy on survival also reported that a delay of ≥ 3 months was associated with poorer survival.³²

In conclusion, this study found that Blacks as compared to Whites experienced delays in initiation of adjuvant radiation and chemotherapy for breast cancer. The mechanisms for such racial difference in treatment delays remain to be determined.

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AUTHOR CONTRIBUTIONS

Design and concept of study: Balasubramanian, Demissie, Crabtree, Ohman Strickland, Rhoads

Acquisition of data: Balasubramanian, Demissie, Pawlish

Data analysis and interpretation: Balasubramanian, Demissie, Crabtree, Ohman Strickland, Rhoads

Manuscript draft: Balasubramanian, Crabtree, Pawlish

Statistical expertise: Demissie, Ohman Strickland

Acquisition of funding: Demissie

Administrative: Demissie

Supervision: Demissie, Crabtree, Rhoads