

Fragmentation of Care Among Black Women With Breast Cancer and Comorbidities: The Role of Health Systems

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QUESTION ASKED: What is the prevalence of care fragmentation experienced by Black women who have a comorbidity at breast cancer diagnosis?

SUMMARY ANSWER: Care fragmentation was experienced by 78.5% of Black women.

WHAT WE DID: We abstracted practice-level information from medical records for the first primary care visit and primary breast surgery. After matching practices to their respective health system, we assessed whether primary care and surgical care facilities were part of the same health system. We then explored whether individual-level factors were associated with care fragmentation.

WHAT WE FOUND: Many Black women received primary care from diverse practice settings that were not associated with the health system where they received their breast surgery. Individual-level factors including

age, health insurance, cancer stage, and comorbidity count were not associated with care fragmentation ($P > .05$).

BIAS, CONFOUNDING FACTOR(S), AND REAL-LIFE IMPLICATIONS:

Although this study could not examine the relationship between care fragmentation and care outcomes at this time, we provide foundational steps for advancing our understanding of care fragmentation at the health system level in a population simultaneously navigating both cancer and other chronic conditions. Fragmentation of primary care and cancer care across health systems is prevalent among Black women and may drive inequities in care outcomes. The health care organizational context has important implications for care coordination and health care delivery beyond individual patient factors and should be addressed in future studies.

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PURPOSE Black women are disproportionately burdened by comorbidities and breast cancer. The complexities of coordinating care for multiple health conditions can lead to adverse consequences. Care coordination may be exacerbated when care is received outside the same health system, defined as care fragmentation. We examine types of practice setting for primary and breast cancer care to assess care fragmentation.

MATERIALS AND METHODS We analyzed data from a prospective cohort of Black women diagnosed with breast cancer in New Jersey who also had a prior diagnosis of diabetes and/or hypertension (N = 228). Following breast cancer diagnosis, we examined types of practice setting for first primary care visit and primary breast surgery, through medical chart abstraction, and identified whether care was used within or outside the same health system. We used multivariable logistic regression to explore sociodemographic and clinical factors associated with care fragmentation.

RESULTS Diverse primary care settings were used: medical groups (32.0%), health systems (29.4%), solo practices (23.7%), Federally Qualified Health Centers (8.3%), and independent hospitals (6.1%). Surgical care predominately occurred in health systems (79.8%), with most hospitals being Commission on Cancer-accredited. Care fragmentation was experienced by 78.5% of Black women, and individual-level factors (age, health insurance, cancer stage, and comorbidity count) were not associated with care fragmentation ($P > .05$).

CONCLUSION The majority of Black breast cancer survivors with comorbidities received primary care and surgical care in different health systems, illustrating care fragmentation. Strategies for care coordination and health care delivery across health systems and practice settings are needed for health equity.

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INTRODUCTION

Black women diagnosed with breast cancer face the failing trifecta of the US health care delivery system—unequal access to care, fragmented care, and high-cost care. For the 33,840 Black women diagnosed with breast cancer in 2019, an estimated 6,540 died due in part to the prevalent coexistence of a comorbidity at cancer diagnosis.¹⁻⁴ Black women diagnosed with cancer are disproportionately burdened by the presence of other comorbidities such as hypertension and diabetes, which are two of the most common comorbidities at breast cancer diagnosis.⁵ Having a comorbidity at cancer diagnosis challenges the health care system to facilitate coordination of both cancer care and comorbid care across multiple care teams and health care settings.⁶⁻⁸ For example, clinicians in different health systems are less likely to interact with

each other through face-to-face or virtual encounters (eg, tumor boards) or asynchronously in patient notes and electronic communication via an interoperable electronic health record system.⁹ This fragmentation can lead to suboptimal disease-specific care management and poor handoffs or care delivery transitions from outpatient to inpatient care and from oncology to primary care. Effective care coordination represents an opportunity for health systems to improve outcomes for Black women diagnosed with breast cancer.

In the United States, there are 637 health systems, which are defined as “organizations that include at least one hospital and at least one group of physicians that provide comprehensive care (including primary and specialty care) who are connected with each other and with the hospital through common ownership or joint management.”¹⁰ Health systems can provide

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negotiation power with insurance companies and potentially make capital available for investment in care coordination infrastructure, such as health information technology (health IT), population health monitoring, and care management.^{11,12} Health care delivered within the same organized health system may also reduce care fragmentation—defined as the lack of coordination of patient care activities with misaligned payment incentives and maldistribution of resources.¹³⁻¹⁵ Health care delivery systems can promote and enhance care coordination activities to prevent adverse clinical outcomes.⁸ Current literature highlights that fragmented care can lead to poor quality of care and health outcomes, including avoidable medical errors, duplicative health care services, increased health care costs, preventable deaths, and ultimately, the exacerbation of disparities in care and outcomes across racial or ethnic groups.^{13,16-25} Few studies have focused on care fragmentation experienced by racial or ethnic minority patients with cancer.

Understanding the role of health systems is a critical step toward addressing disparities in cancer care for Black people at the health system level. Prior studies have examined cancer care received at one or multiple hospitals or within an integrated health system, yet these studies did not describe the type of practice settings or examine health systems associated with primary care.²⁶⁻³¹ Furthermore, little is known about the health system settings in which Black women receive primary care and surgical care when diagnosed with breast cancer and managing other comorbidities. There is also a paucity of research available about factors associated with care fragmentation among this population.

To address these gaps in the literature, we used a population-based cohort to describe the types of practice settings where Black breast cancer survivors with comorbidities receive primary care for comorbidity management and cancer care for primary breast surgery. We also examine sociodemographic characteristics and clinical factors that may be associated with care fragmentation.

MATERIALS AND METHODS

Data Source and Study Population

We used data from the Women's Circle of Health Study and Women's Circle of Health Follow-Up Study (WCHFS), which were used to form one of the largest population-based cohort studies of self-identified African American or Black women diagnosed with breast cancer. The study protocol, including recruitment, procedures, and data abstraction, is described in detail elsewhere.^{32,33} Briefly, eligible participants were identified by the New Jersey State Cancer Registry from 10 New Jersey counties and once recruited were contacted by the study team to schedule an in-person interview. Written informed consent was collected at the time of interview along with releases of medical

and pharmacy records and contact information for all clinicians seen 12 months prior to cancer diagnosis through the interview date, which occurred approximately 9-12 months after diagnosis. Once medical records were received, trained medical abstractors collected information on the breast cancer diagnosis workup, treatments recommended and received, comorbidity type and their management, and vital status.³² Eligibility for this analysis included the following: (1) clinical diagnosis of type 2 diabetes mellitus or hypertension at least 12 months prior to the primary, histologically confirmed diagnosis of noninvasive ductal carcinoma in situ or invasive breast cancer, (2) at least one primary care visit within the 12 months following cancer diagnosis, (3) medical records received and abstracted from all contacted clinicians, and (4) practice information available for both primary care and surgical care. Although the larger WCHFS study is ongoing, this analysis examined the first 228 cases that met all inclusion criteria and where data abstraction was complete for both breast cancer and comorbidity management for diabetes and hypertension as of July 2018. Institutional review boards of all participating institutions approved this study, and written informed consent was obtained from all study participants.

Measures

Practice settings for primary care and surgical care. We abstracted practice-level information from medical records including name, city, and state of the primary care facility where the participant had her first primary care visit following breast cancer diagnosis and the surgical facility where the first primary breast surgery occurred. On the basis of the name of the facility and verification from facility's website when necessary, each primary care facility was categorized into one of five practice types^{10,12,34-36}:

1. Health system—an organization with at least one hospital and at least one physician practice
2. Independent hospital—hospital not under common control with another hospital or physician practice
3. Medical group—a physician practice with more than one practitioner at one or more practices not affiliated with a hospital
4. Federally Qualified Health Center—federally designated community-based health center
5. Solo practice—one clinician in a single practice unaffiliated with a health system or medical group

We also used the New Jersey Hospital Association (NJHA) website to determine whether the primary care practice was part of a health system or independent hospital.³⁴

Surgical care facilities were categorized into two practice types on the basis of the NJHA designation as a health system or an independent hospital.³⁴ We also matched the accreditation type of the surgical facility where the primary breast surgery occurred using the 2017 American College of Surgeons Commission on Cancer (CoC)—accredited cancer programs.³⁷ The following designations were assigned:

1. National Cancer Institute–designated Comprehensive Cancer Center Program
2. Academic Comprehensive Cancer Program
3. Comprehensive Community Cancer Program
4. Community Cancer Program
5. Not a CoC-accredited cancer program

Care fragmentation. We assessed whether primary care and surgical care facilities were part of the same health system as designated by the NJHA.³⁴ If either primary care or surgical care was not part of the same health system or independent hospital, then the participant was considered to have fragmented care. We also accounted for temporal health system changes (ie, mergers or acquisitions of hospitals and/or physician practices) using web archives of NJHA (via ref. 38) to align with the time period of each participant's primary care and surgical care encounters.

Sociodemographic and clinical characteristics. We examined age at diagnosis, health insurance type, American Joint Committee on Cancer cancer stage, and comorbidity count. Health insurance status at diagnosis was abstracted from medical records, and when not available, we used the health insurance status 12 months prior to cancer diagnosis as reported during the interview. Cancer stage included noninvasive ductal carcinoma in situ and invasive breast cancer stages I, II, and III. Comorbidity count included type 2 diabetes mellitus, hypertension, chronic liver disease, chronic renal disease, HIV and AIDS, congestive heart failure, myocardial infarction, angina, other cancer, and chronic obstructive pulmonary disease, which were abstracted from medical records.

Statistical Analysis

We generated summary statistics to describe this study population and the practice settings for primary care and surgical care. We examined the frequency of care fragmentation and then used multivariable logistic regression to examine sociodemographic and clinical characteristics associated with care fragmentation. We reported unadjusted and adjusted odds ratios and 95% CIs. *P* values < 0.05 significance level (two-sided) were considered statistically significant. All analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC).

RESULTS

This cohort included 228 Black women with a co-diagnosis of diabetes (37.7%) and a co-diagnosis of hypertension (97.8%) at the time of their breast cancer diagnosis (2012–2016) and at least one primary care visit within the 12 months following the breast cancer diagnosis. Two-thirds had two or more comorbidities. The mean age at diagnosis was 59 years with three-fourths diagnosed with invasive breast cancer (Table 1). Almost half (47.8%) had private health insurance at breast cancer diagnosis followed by 30.7% enrolled in Medicare.

TABLE 1. Characteristics of Study Population (N = 228)

Characteristic	No. (%)
Age at diagnosis, years (mean ± SD)	58.7 ± 8.7
< 55	77 (33.77)
55–64	79 (34.65)
65–75	72 (31.58)
Health insurance	
Private	109 (47.81)
Medicare	70 (30.70)
Medicaid, charity, or unknown	49 (21.49)
AJCC stage	
0 (DCIS)	57 (25.00)
I	72 (31.58)
II	78 (34.21)
III	21 (9.21)
Count of comorbidities	
1	78 (34.21)
2	78 (34.21)
3+	72 (31.58)

Abbreviations: AJCC, American Joint Committee on Cancer; DCIS, ductal carcinoma in situ; SD, standard deviation.

Table 2 shows that primary care was received at a variety of practice settings, including within medical groups (32.0%), health systems (29.4%), solo practices (23.7%), Federally Qualified Health Centers (8.3%), and independent

TABLE 2. Characteristics of Practice Settings for Primary Care and Surgical Care (N = 228)

Practice Characteristic	No. (%)
Primary care	
Type of primary care practice	
Health system	67 (29.39)
Independent hospital	14 (6.14)
Medical group	73 (32.02)
Federally Qualified Health Center	19 (8.33)
Solo practice	54 (23.68)
Surgical care	
Type of surgical care practice	
Hospital associated with health system	182 (79.82)
Independent hospital	46 (20.18)
Accreditation type of cancer program	
NCI-Designated Comprehensive Cancer Program	23 (10.09)
Academic Comprehensive Cancer Program	97 (42.54)
Comprehensive Community Cancer Program	71 (31.14)
Community Cancer Program	13 (5.70)
Not a CoC-accredited cancer program	24 (10.53)

Abbreviations: CoC, Commission on Cancer; NCI, National Cancer Institute.

hospitals (6.1%). First primary breast surgery occurred for 79.8% at a hospital affiliated with a health system and 20.2% at an independent hospital. The majority (89.5%) of these hospitals were CoC-accredited cancer programs.

For 78.5% of the women, first primary care visit and first primary breast surgery after breast cancer diagnosis occurred at multiple practice settings not within the same health system. Specifically, 14.5% received primary care and surgical care from two different health systems or independent hospitals and 64.0% had their primary care visit at a practice not affiliated with a health system. Only 21.5% received both primary care and surgical care within the same health system or independent hospital. Table 3 shows that care fragmentation was not associated with age and health insurance at diagnosis, cancer stage, or comorbidity count (all unadjusted and adjusted *P* values > .05).

DISCUSSION

Our study found that care fragmentation was prevalent among a population-based cohort of Black women with an existing diagnosis of diabetes and/or hypertension at breast cancer diagnosis. Specifically, 78.5% of women received primary care for the management of one or more comorbidities during breast cancer treatment at a variety of practice settings not affiliated with the health system where their primary breast surgery was performed. Other studies have found that, in comparison with their White

counterparts, Black women were more likely to receive all their breast cancer care within the same Northern California hospital system or integrated health system.^{26,27} Another study, using SEER-Medicare data, found that Black patients with colon cancer were less likely to receive primary care and surgical care within the same hospital compared with White patients (47% v 53%).³¹ To our knowledge, the fragmentation of primary care and breast cancer care has not been previously studied, especially among Black women given that they are disproportionately burdened by comorbidities and experience higher mortality from breast cancer.

Sociodemographic characteristics and clinical factors were not associated with care fragmentation in our study. Hussain et al³¹ reported similar results in their study, which found that individual-level factors were not associated with receiving primary care and surgical care in the same hospital among patients with colon cancer with Medicare. There is also a growing body of literature on how health system-level factors influence the delivery of quality cancer care and patient outcomes. For example, previous research found that institution variables (ie, supply of subspecialty care and wait time to surgery) explained more of the variation between breast-conserving surgery and mastectomy than individual-level factors (except for age).³⁹ In another study, breast surgery at a high-quality hospital attenuated the racial disparities in the receipt of mastectomy or breast-conserving surgery with radiation,

TABLE 3. Individual-Level Factors Associated With Care Fragmentation (N = 228)

Factor	n = 179 No. (%)	Fragmented Care	
		Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age at diagnosis, years			
65-75	58 (32.40)	1.00 (Ref.)	1.00 (Ref.)
55-64	62 (34.64)	0.88 (0.40 to 1.95)	1.06 (0.38 to 2.51)
< 55	59 (32.96)	0.79 (0.36 to 1.74)	0.98 (0.42 to 2.64)
Health insurance			
Private	82 (45.81)	1.00 (Ref.)	1.00 (Ref.)
Medicare	57 (31.84)	1.44 (0.69 to 3.04)	1.39 (0.56 to 3.47)
Medicaid, charity, or unknown	40 (22.35)	1.46 (0.63 to 3.40)	1.39 (0.59 to 3.27)
AJCC stage			
0 (DCIS)	44 (24.58)	1.00 (Ref.)	1.00 (Ref.)
I	58 (32.40)	1.22 (0.52 to 2.87)	1.28 (0.53 to 3.07)
II-III	77 (43.02)	1.03 (0.47 to 2.25)	1.06 (0.47 to 2.36)
Comorbidity count			
1	98 (54.75)	1.00 (Ref.)	1.00 (Ref.)
2	57 (31.84)	1.29 (0.63 to 2.62)	1.19 (0.56 to 2.55)
3+	24 (13.41)	1.90 (0.61 to 5.89)	1.71 (0.53 to 5.46)

Abbreviations: AJCC, American Joint Committee on Cancer; DCIS, ductal carcinoma in situ; OR, odds ratio.

demonstrating that Black women are more likely to be treated at low-quality hospitals, which may lead to poorer quality of care.⁴⁰ Furthermore, Breslin et al⁴¹ found that hospital factors (ie, hospital patient volume and hospital racial mix) explained 36% of the excess overall mortality experienced by Black women with breast cancer compared with White women. These studies demonstrate that variation in the quality of care is driven by health system factors beyond individual-level factors and Black breast cancer survivors continue to be disproportionately affected. Although better care coordination and higher quality of care were promised with health systems, current evidence is mixed in general and remains to be examined in this population.^{11,42,43}

Nearly all women in this study received their surgical care at a CoC-accredited cancer program, whose cancer care standards support care coordination with primary care to deliver high-quality care.⁴⁴ There is a strong perception among leaders at CoC-accredited cancer programs that receiving cancer treatment at a CoC-accredited facility improves patients' cancer care and outcomes.⁴⁵ Yet, cancer is not the only health condition affecting patients. This is particularly important for Black women, who are disproportionately affected by obesity and obesity-related comorbidities compared with all other racial or ethnic groups in the United States.⁴⁶ Obesity has a major impact across the breast cancer continuum as it has been associated with increased risk of postmenopausal breast cancer, worse health-related quality of life, more difficult clinical management, and worse survival.⁴⁷⁻⁴⁹ The high prevalence of obesity also places them at higher risk of developing cardiovascular disease within 12 months of breast cancer diagnosis and also experience higher mortality from cardiovascular disease or renal disease within 1-5 years of cancer diagnosis.² Health systems can provide the organizational structure (eg, health IT, financial structure, staffing, and accreditation) and facilitate organizational processes (eg, referral pathways, care management, and disease-specific protocols) needed to deliver timely, quality, and affordable health care for both cancer and comorbidity.^{50,51} A comparative case study demonstrated that formal primary care-oncology relationships embedded within health systems were facilitated by established referral pathways and sharing of patient information through health IT infrastructure.⁵² Important considerations missing from the literature is how to address the complexities of care coordination across the cancer care continuum, including transitions of care, and across practice settings with separate or no health IT infrastructure to share medical notes or patient laboratory or scan results. Understanding and characterizing care fragmentation can also provide opportunities for cancer programs to integrate primary care and further health equity.

Our findings should be interpreted in the context of the study's limitations. We could not examine the relationship between care fragmentation and care outcomes at this time. However, this study is a critical first step describing care fragmentation at the health system level in a population simultaneously navigating both cancer and other chronic conditions. We only examined whether the participant's first primary care visit following breast cancer diagnosis and their primary breast surgical facility were part of the same health system. Participants may have received some comorbidity care from a medical subspecialist, which we did not examine. In addition, we only explored the surgical facility, which represents one oncology care setting along the cancer care continuum. We also acknowledge that health systems vary in their level of integration from fully integrated delivery systems to loosely associated practices, which warrants further investigation. The proportion of participants enrolled in the Medicaid program and uninsured was low, and care fragmentation in this population should be further explored. In addition, CoC accreditation status may have changed from 2012 to 2017, when accreditation status was assigned in this study. Although it is difficult to study patterns of care across various practice settings, the strength of our study is that we collected information from a population-based sample of Black women receiving both primary care and cancer care across a large geographical area including multiple practice settings. We also accounted for health system mergers and acquisitions of hospitals or medical groups over time. These strengths enhance the external validity of the study to similar populations and health care markets.

Our study demonstrates that there is fragmentation of primary care and cancer care across health systems and practice settings, which has important implications for care coordination and health care delivery. The additional care demands placed on Black people during cancer treatments to coordinate and communicate their own care to multiple clinicians and care teams across organizational boundaries is not patient-centered care and may fuel inequities in health care. Research is still needed to understand how health system-level characteristics affect care outcomes and to develop strategies for managing and delivering both cancer and comorbid care within and across health systems. These efforts may include examining health policies that create financial incentives and shape the organizational structures of care delivery systems and implementing organizational processes that strengthen team-based care between primary care and oncology. This work should be done through a health equity lens to ensure that Black breast cancer survivors benefit equitably from access to quality care within and across health systems.

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DISCLAIMER

This article was prepared as part of author's (J.I.S.) official duties as an employee of the US Federal Government. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the National Cancer Institute.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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