Comorbidity Management in Black Women Diagnosed with Breast Cancer: the Role of Primary Care in Shared Care

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BACKGROUND: Black women are more likely to have comorbidity at breast cancer diagnosis compared with White women, which may account for half of the Black-White survivor disparity. Comprehensive disease management requires a coordinated team of healthcare professionals including primary care practitioners, but few studies have examined shared care in the management of comorbidities during cancer care, especially among racial/ethnic minorities.

OBJECTIVE: To examine whether the type of medical team composition is associated with optimal clinical care management of comorbidities.

DESIGN: We used the Women's Circle of Health Follow-up Study, a population-based cohort of Black women diagnosed with breast cancer. The likelihood of receiving optimal comorbidity management after breast cancer diagnosis was compared by type of medical team composition (shared care versus cancer specialists only) using binomial regression.

PARTICIPANTS: Black women with a co-diagnosis of diabetes and/or hypertension at breast cancer diagnosis between 2012 and 2016 ($N = 274$).

MAIN MEASURES: Outcome—optimal clinical care management of diabetes (i.e., A1C test, LDL-C test, and medical attention for nephropathy) and hypertension (i.e., lipid screening and prescription for hypertension medication). Main predictor—shared care, whether the patient received care from both a cancer specialist and a primary care provider and/or a medical specialist within the 12 months following a breast cancer diagnosis.

KEY RESULTS: Primary care providers were the main providers involved in managing comorbidities and 90% of patients received shared care during breast cancer care. Only 54% had optimal comorbidity management. Patients with shared care were five times (aRR: 4.62; 95% CI: 1.66, 12.84) more likely to have optimal comorbidity management compared with patients who only saw cancer specialists.

CONCLUSIONS: Suboptimal management of comorbidities during breast cancer care exists for Black women. However, our findings suggest that shared care is more beneficial at achieving optimal clinical care management for diabetes and hypertension than cancer specialists alone.

KEY WORDS: shared care; breast cancer; comorbidity; patient care; practice guideline.

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INTRODUCTION

In 2020, an estimated 276,480 women will be diagnosed with breast cancer, of which 32% will have comorbidity at diagnosis.[1–3] Two of the most common comorbidities that affect this population are type 2 diabetes mellitus (affecting 16–20%) and hypertension (32%).[4] Women with a comorbidity at breast cancer diagnosis are more likely to be Black.[5–7] This may be due to the fact that the prevalence of diabetes and hypertension in the US population is higher among Black women (13% and 40%) compared with non-Hispanic White women (7% and 26%).[8, 9] Having a comorbidity can limit breast cancer treatment options and breast cancer treatment can exacerbate underlying health conditions.[10, 11] For example, having diabetes during breast cancer treatment increases the risk for infection, hospitalization, poor physical function, and mortality.[12–15] It is critical to manage and control patients' comorbidities because breast cancer survivors are more likely to die from competing causes than from breast cancer.[4, 16–19]

Co-managing both breast cancer and comorbidities requires a comprehensive, coordinated team of healthcare professionals, with the patient at the center of treatment decisions. This team

of two or more healthcare professionals jointly participating in patient's care is defined as shared care as well as team-based care, multidisciplinary team care, and collaborative care.[20–24] The team may include cancer specialists, primary care providers, and other medical subspecialists that share the patient's care. Two studies found that 30–50% of breast cancer patients had shared care during cancer care.[25, 26] Limited studies of shared care have demonstrated improved symptom management, treatment initiation, adherence, and quality cancer care.[21, 23, 27, 28]

The importance of shared care is recognized by national cancer organizations as a key component for the delivery of high-quality care. The *Ensuring Quality Cancer Care* report (1999) highlighted the important role of multidisciplinary teams in cancer care.[29] The *Lost in Transition* report (2006) promoted shared care for cancer survivorship.[30] The Commission on Cancer accredits cancer programs on the provision of "coordination of care among many medical disciplines.[31]" The American Society of Clinical Oncology also states that team-based care is a "cornerstone of quality care." [32] Despite the focus on the importance of shared care, there is a lack of empirical studies that assess the quality of comorbid care by medical team composition.

Given that diabetes and hypertension are two common comorbidities that affect breast cancer population and Black women, contribute to the Black-White breast cancer survival disparity, and have well-established clinical guidelines, we sought to examine the types of medical providers involved in diabetes and hypertension clinical care management among cancer patients and whether medical team composition was associated with receipt of optimal clinical care management. We hypothesized that patients who have shared care after breast cancer diagnosis are more likely to receive optimal clinical care management for diabetes and hypertension compared with patients who only see cancer specialists, after controlling for patient-level factors.

MATERIALS AND METHODS

Data Source and Study Population

The Women's Circle of Health Follow-up Study (WCHFS) is an ongoing, longitudinal study of self-identified African American/Black breast cancer survivors (referred to hereafter as Black) in ten counties in New Jersey. The study has been described in detail elsewhere.[33] In brief, eligible patients are first identified through the New Jersey State Cancer Registry using rapid case ascertainment methodology (i.e., cases identified via pathology report within 2 months of cancer diagnosis).[34] Once recruited, a WCHFS research member conducts an in-person interview with each participant at approximately 9–12 months after her cancer diagnosis. At this interview, written informed consent, medical and pharmacy records releases, and contact information for all medical providers are collected. Participants are asked to identify all providers involved in breast cancer care and comorbid care in the 12 months prior to the breast cancer diagnosis through the day she consents for medical release. Additionally, medical and sociodemographic questionnaires are administered, and anthropometric measurements are collected during this interview. The medical records are then requested from surgical, medical, and radiation oncologists; primary care; subspecialists; and hospitals where surgeries and treatments were performed. All medical records are then abstracted and entered into a database by trained abstractors. Information abstracted include breast cancer diagnosis workup, breast cancer treatments recommended and received, comorbidity type and their management, and vital status.[33]

For this analysis, breast cancer patients had a medical documentation of diabetes or hypertension at least 12 months prior to breast cancer diagnosis and had their medical records abstracted for breast cancer information through July 2018. These women were diagnosed with breast cancer between 2012 and 2016. Inclusion criteria are as follows: primary, histologically confirmed non-invasive ductal carcinoma in situ (DCIS) or invasive breast cancer; self-identified as African American/Black; 20–75 years old; and able to understand and read English. Exclusion criteria are the following: metastatic breast cancer, death within 12 months of cancer diagnosis; or any provider refused to send medical records. This study was approved by the institutional review boards of all participating institutions and written informed consent was obtained from all study participants.

Measures

Outcome Measure—Optimal Management. Although there are no specific guidelines for the management of diabetes and hypertension during breast cancer, there are evidence-based clinical practice guidelines for the management of diabetes and hypertension for the general non-cancer population. Diabetes clinical care management measures selected for this analysis included: glycosylated hemoglobin (A1c) test, low-density lipoprotein-cholesterol (LDL-C) test, and medical attention for nephropathy (i.e., urine albumin/microalbuminuria test, documentation of treatment for nephropathy, or prescription for angiotensin-converting enzyme (ACE) inhibitor or angiotensin receptor blocker (ARB) therapy).[35–42] Hypertension clinical care management measures selected for this analysis included: lipid screening and prescription for hypertension medication—thiazide-type diuretic, calcium channel blocker, ACE inhibitor, ARB therapy, a vasodilator (e.g., hydralazine), and others (e.g., aliskiren, minoxidil).[36, 43–47] Two abstractors collected additional information from medical and pharmacy records: date of visit or test/prescription ordered, name of ordering provider, facility name, and type/result of test or medication ordered. We then constructed a binary outcome measure for receipt of optimal clinical care management (referred to hereafter as optimal management) using the *All-or-None* measurement approach. If the patient's provider(s) ordered all clinical care management measures (i.e., 3 measures for diabetes and 2 measures for hypertension)

within the 12 months following the date of diagnosis (i.e., date of biopsy), then the patient was categorized as receiving optimal management (value = 1). When at least one measure was not ordered, then the patient was categorized as not receiving optimal management (reference; value = 0). This *All-or-None* measurement approach has been used in other studies to examine care quality and for quality monitoring by health plans. [48]

Main Predictor—Shared Care. Types of health professionals seen included cancer specialists (i.e., medical, radiation, and surgical oncologists), primary care providers (i.e., internal medicine, family medicine), and medical specialists related to diabetes or hypertension (i.e., endocrinologist, cardiologist, and nephrologist). In this study, if a patient had a visit with any cancer specialist, primary care provider, or medical specialist, then that provider was considered involved in care. We then dichotomized the types of medical team composition into two categories: (1) shared care, where the patient received care from both a cancer specialist and a primary care provider and/or medical subspecialists within the 12 months following a breast cancer diagnosis and (2) cancer specialists only, where the patient received care from only cancer specialists.

Covariates. We used the Taplin's Quality of Cancer Care Model, Anderson's Behavioral Model of Health Services Utilization, and Donabedian Quality-of-Care Model to inform the analytic framework.[49–52] Covariates selected for this analysis included disease severity of the cancer and comorbidity and health insurance status, which are known confounders for disease management, as well as age and comorbidity type. Age and health insurance at diagnosis, American Joint Committee on Cancer (AJCC) cancer stage, and comorbidities including type, severity, and year of onset were abstracted from medical records. When health insurance status at diagnosis could not be ascertained from medical records, we used the health insurance status 1 year prior to diagnosis collected from the home interview. Diabetes and hypertension-related disease severity was abstracted from medical records, including any eye, foot, diabetic heart or kidney disease, or congestive heart failure. Then, we constructed a binary variable: organ damage versus none. Missing data were coded as unknown.

Statistical Analysis

Descriptive statistics were generated for patient and provider characteristics by comorbidity. Comorbidities included patients with diabetes and hypertension ($n = 102$; including eight patients with diabetes only) and patients with hypertension only ($n = 172$). Each of diabetes and hypertension clinical care management measure was reported by type of provider who ordered the first test, days from cancer diagnosis of when the test was ordered, and as an *All-or-None* measure of optimal management. The likelihood of receiving optimal management after a breast cancer diagnosis was compared by medical

Table 1 Sociodemographics and Clinical Characteristics of Black Women with Diabetes and/or Hypertension in the Women's Circle of Health Follow-up Study, Diagnosed with Breast Cancer 2012–2016 ($N = 274$)

	Patients with diabetes and hypertension† ($n = 102$)	Patients with hypertension only ($n = 172$)	Total population ($N = 274$)
	No. (%)	No. (%)	No. (%)
Sociodemographics			
Age at diagnosis, years (mean ± SD)	60.9 ± 8.2	57.0 ± 9.1	58.5 ± 9.0
< 55	24 (23.5)	72 (41.9)	96 (35.0)
55–64	36 (35.3)	58 (33.7)	94 (34.3)
65–75	42 (41.2)	42 (24.4)	84 (30.7)
Marital status			
Married	34 (33.3)	63 (36.6)	97 (35.4)
Not married	68 (66.7)	109 (63.4)	177 (64.6)
Education			
≤ High school	44 (43.1)	69 (40.1)	113 (41.2)
> High school	58 (56.9)	103 (59.9)	161 (58.8)
Annual household income			
Less than $70,000/ unknown	83 (81.4)	118 (68.6)	136 (49.6)
$70,000 or more	19 (18.6)	54 (31.4)	73 (26.6)
Health insurance at breast diagnosis			
Medicaid	23 (22.5)	25 (14.5)	48 (17.5)
Medicare	39 (38.2)	38 (22.1)	77 (28.1)
Private	38 (37.3)	97 (56.4)	135 (49.3)
None/ charity/ unknown	2 (2.0)	12 (7.0)	14 (5.1)
Tumor and comorbid characteristics			
AJCC stage			
0 (DCIS)	27 (26.5)	41 (23.8)	68 (24.8)
I	34 (33.3)	53 (30.8)	87 (31.8)
II	32 (31.4)	60 (34.9)	92 (33.6)
III	9 (8.8)	18 (10.5)	27 (9.9)
Duration of diabetes, years (mean ± SD)	11.4 ± 8.7	–	–
Duration of hypertension, years (mean ± SD)	16.1 ± 12.7	13.0 ± 11.8	14.1 ± 12.2
Disease severity			
No organ damage	70 (68.6)	170 (98.8)	240 (87.6)
Organ damage	32 (31.4)	2 (1.2)	34 (12.4)
Count of comorbidity*			
1	4 (3.9)	96 (55.8)	100 (36.5)
2	40 (39.2)	51 (29.7)	91 (33.2)
≥ 3	58 (56.9)	25 (14.5)	83 (30.3)
Body mass index, kg/m^2 (mean ± SD)	34.0 ± 6.9	32.8 ± 6.9	33.3 ± 6.9

SD, standard deviation; AJCC, American Joint Committee on Cancer
**Comorbidities presented at or before breast cancer diagnosis include: HIV/AIDS, arthritis, asthma, congestive heart failure, diabetes, chronic liver disease, ascites, hepatic encephalopathy, hypertension, myocardial infarction, angina, premature ventricular contractions, chronic renal disease, osteoporosis, chronic obstructive pulmonary disease (count excludes breast cancer diagnosis)*
†Includes 8 patients with diabetes only

Table 2 Provider Characteristics Among Black Women with Diabetes and/or Hypertension in the Women's Circle of Health Follow-up Study, Diagnosed with Breast Cancer 2012–2016 ($N = 274$)

	Patients with diabetes and hypertension ($n = 102$)	Patients with hypertension only ($n = 172$)	Total Population ($N = 274$)
	No. (%)	No. (%)	No. (%)
Before breast cancer diagnosis			
Medical provider seen*			
Primary care provider	87 (85.3)	140 (81.4)	227 (82.9)
Endocrinologist	16 (15.7)	–	–
Cardiologist	23 (22.5)	22 (12.8)	45 (16.4)
Nephrologist	3 (2.9)	6 (3.5)	9 (3.3)
Median days to last provider visit			
Primary care provider	42	39	40
Endocrinologist	63	–	–
Cardiologist	112	111	112
Nephrologist	116	33	47
Number of providers seen†			
0	6 (5.9)	27 (15.7)	33 (12.0)
1	53 (52.0)	123 (71.5)	176 (64.2)
2 or more	43 (42.2)	22 (12.8)	65 (23.7)
Medical team composition‡			
None	8 (7.8)	27 (15.7)	35 (12.8)
Primary care provider only	57 (55.9)	118 (68.6)	175 (63.9)
Medical specialist(s) only	7 (6.9)	5 (2.9)	12 (4.4)
Primary care provider and medical specialist(s)	30 (29.4)	22 (12.8)	52 (19.0)
After breast cancer diagnosis			
Medical provider seen*			
Breast surgeon	102 (100.0)	172 (100.0)	274 (100.0)
Medical oncologist	95 (93.1)	163 (94.8)	258 (94.2)
Radiation oncologist	75 (73.5)	135 (78.5)	210 (76.6)
Primary care provider	88 (86.3)	148 (86.1)	236 (86.1)
Endocrinologist	22 (21.6)	–	–
Cardiologist	26 (25.5)	27 (15.7)	53 (19.3)
Nephrologist	9 (8.8)	5 (2.9)	14 (5.1)
Median days to first provider visit			
Primary care provider	38	44	42
Endocrinologist	58	–	–
Cardiologist	52	151	63
Nephrologist	149	176	163
Number of providers seen†			
1	0 (0.0)	0 (0.0)	0 (0.0)
2	4 (3.9)	12 (7.0)	16 (5.8)
3	16 (15.7)	40 (23.3)	56 (20.4)
4	42 (41.2)	96 55.8 ()	138 (50.4)
5 or more	40 (39.2)	24 (14.0)	64 (23.4)
Medical team composition‡			
Cancer specialists only	5 (4.9)	22 (12.8)	27 (9.9)
Primary care provider and cancer specialists	51 (50.0)	120 (69.8)	171 (62.4)
Medical and cancer specialists	9 (8.8)	2 (1.2)	11 (4.0)
Primary care provider, medical, and cancer specialists	37 (36.3)	28 (16.3)	65 (23.7)

At least one visit with a provider within 12 months from date of diagnosis
†Number of providers includes primary care provider, endocrinologist, cardiologist, and nephrologist, and after cancer diagnosis includes medical, radiation, and surgical oncologists
‡Cancer specialist includes medical, radiation, and surgical oncologist. Medical specialist includes endocrinologist, cardiologist, and nephrologist

team composition (shared care versus cancer specialists only) using unadjusted and adjusted binomial regression models. The adjusted model controlled for age, health insurance, cancer stage, and comorbidity type and severity. When the binomial regression failed to converge, the modified Poisson regression was used to approximate a binomial regression for all models.[53] Unadjusted and adjusted relative risks (aRR) and 95% confidence intervals (CIs) were reported. P values less than the 0.05 significance level (two-sided) were considered statistically significant. All analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC).

RESULTS

Among this study population of 274 Black breast cancer survivors with diabetes and/or hypertension, the mean age at breast cancer diagnosis was 59 years, half were privately insured, and three-fourths had invasive breast cancer (Table 1). Among patients with diabetes, the mean duration of diabetes and hypertension was 11 years and 16 years, and 31% had diabetes-related organ damage. Among patients with hypertension only, the mean duration of hypertension was 13 years, and 99% did not have hypertension-related organ damage. Most patients saw a primary care provider at least

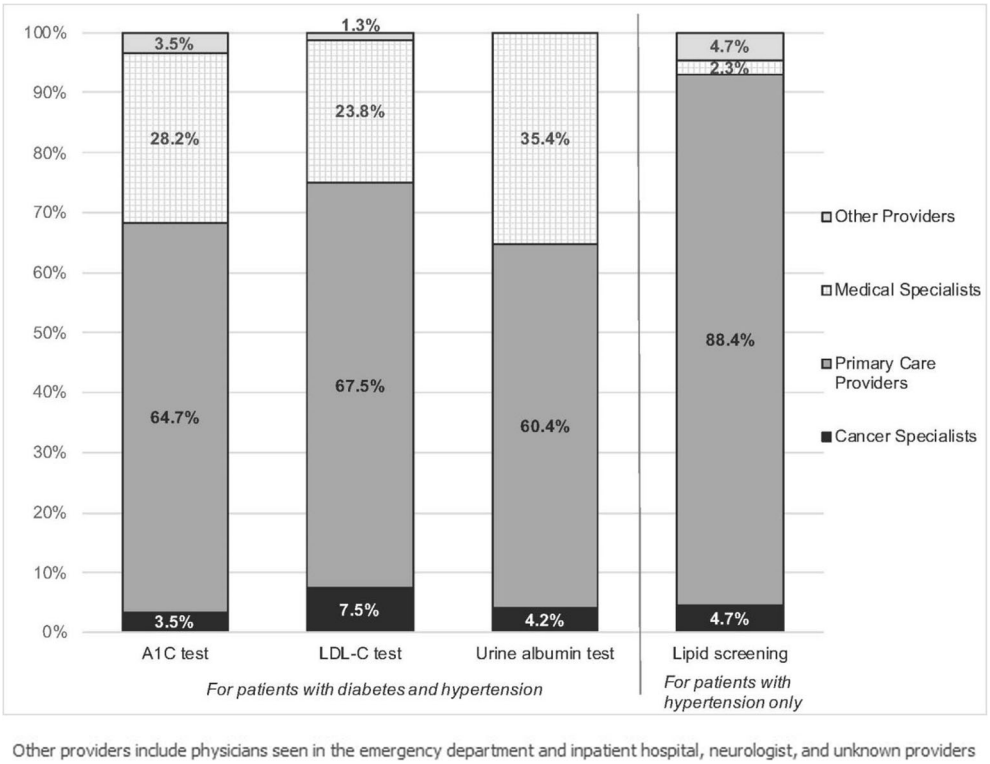

Figure 1 Medical providers who managed diabetes and hypertension clinical care

once in the 12 months before and after cancer diagnosis (83% and 86%) while only 20% saw a medical specialist (Table 2). The median days from diagnosis to the first primary care visit were 42 days. The majority of patients (90%) had shared care with the most common medical team composition being cancer specialists and primary care providers (62%).

Table 3 Regression Models of the Association Between Medical Team Composition and Optimal Management of Diabetes and/or Hypertension (N = 274)

	Optimal management	
	Unadjusted	Adjusted
	RR (95% CI)	RR (95% CI)
Medical team composition		
Cancer specialists only	1.00 (referent)	1.00 (referent)
Shared care	*5.24 (1.80–15.33)*	*4.62 (1.66–12.84)*
Age at diagnosis, years		
65–75	1.00 (referent)	1.00 (referent)
55–64	0.88 (0.69–1.11)	0.94 (0.74–1.19)
< 55	*0.65 (0.49–0.86)*	0.75 (0.56–1.00)
Health insurance at diagnosis		
Private	1.00 (referent)	1.00 (referent)
Medicaid	1.16 (0.86–1.55)	1.04 (0.79–1.37)
Medicare	1.21 (0.95–1.55)	0.96 (0.75–1.23)
None/charity/unknown	0.57 (0.24–1.32)	0.64 (0.28–1.44)
AJCC stage		
0 (DCIS)	1.00 (referent)	1.00 (referent)
I	0.99 (0.74–1.31)	1.04 (0.80–1.36)
II–III	0.92 (0.70–1.21)	1.00 (0.78–1.28)
Comorbidity type		
Hypertension only	1.00 (referent)	1.00 (referent)
Diabetes and hypertension	*1.71 (1.38–2.11)*	*1.61 (1.29–2.00)*
Disease severity		
No organ damage	1.00 (referent)	1.00 (referent)
Organ damage	1.18 (0.88–1.57)	0.80 (0.60–1.06)

AJCC, American Joint Committee on Cancer

Overall, 54% of this population had optimal comorbidity management. Among patients with diabetes, optimal management was achieved for 73% including 83% who had an HbA1c ordered, 78% who had an LDL-C test ordered, and 94% who received medical attention for nephropathy. Among patients with hypertension only, optimal management was achieved for 42%, including 50% who had a lipid screening ordered and 83% who received at least one prescription for hypertension medication. Primary care providers were the main medical provider involved in managing the comorbidities during cancer care followed by medical specialists (Fig. 1). For diabetes care, 65% of the first A1C tests, 68% of LDL-C tests, and 60% of urine albumin tests were ordered by a primary care provider. Cancer specialists were mostly involved in ordering the first lipid test. When we examined all tests ordered within the 12 months from diagnosis, the findings did not change.

More than half of patients with shared care had optimal management of diabetes and hypertension (58%) compared with only 11% of patients who saw cancer specialists only. Table 3 shows the association between shared care and optimal management after a breast cancer diagnosis. In the adjusted regression model, patients with shared care were almost five times more likely to have optimal management compared with patients who only saw cancer specialists (aRR: 4.62; 95% CI: 1.66, 12.84), controlling for patients' age and health insurance at diagnosis, AJCC stage, and comorbidity type and severity.

DISCUSSION

In our study, 90% of patients had shared care during breast cancer care (i.e., care provided by cancer specialists, primary care providers, and/or medical specialists within 12 months of cancer diagnosis). This was found to be associated with an increased likelihood of having optimal management for diabetes and hypertension. This is the first study to our knowledge to examine the relationship between shared care and chronic disease management among minority breast cancer patients. This is important given that the Black-White breast cancer survival disparity may be due in large part to the higher prevalence of comorbidities and disparate access to comorbid care and treatment experienced by Black women.[4, 54]

Another key finding from this research was the suboptimal management of comorbidities for Black breast cancer survivors. It is concerning that only 54% of patients had optimal comorbidity management, including only 58% of patients with shared care. This warrants further exploration of whether competing care demands or the lack of role delineation and communication between providers is leading to poor comorbidity management during cancer care. In addition, the proportion of patients with shared care was higher (90%) in our study population compared with two previous studies (66% and 62%).[25, 26] The difference may be due to the fact that these two studies used patient-reported data with different demographic and cancer populations. Prior studies have not focused on racial/ethnic minorities, while this study focused on Black women who have a higher prevalence of comorbidities at breast cancer diagnosis.

We also did not find "cancer exceptionalism," a belief that once the primary care provider refers the patient to oncology, the oncologist will assume all non-cancer care and the cancer diagnosis will supersede all other health problems.[55, 56] Most patients were engaged with primary care following the breast cancer diagnosis, and their cancer specialists did not assume comorbid care. Primary care providers were managing most of the clinical care for diabetes and hypertension post-diagnosis. This finding is not unexpected since patients often have a longer relationship with their primary care provider than with their new cancer specialists, and primary care providers see themselves playing an important role in managing comorbidities during cancer treatment.[57] Over two-thirds of primary care providers have reported to actively participate during cancer treatment, while almost a third of oncologists reported to actively manage comorbidities.[58] Another survey across five hospitals found that 88% of primary care providers report being involved in care at the time of cancer diagnosis, and 44% report involvement during active treatment.[59]

We did not find an increase in the proportion of patients seeing a medical specialist following the breast cancer diagnosis compared with the 12 months before diagnosis, though involving specialist care for comorbidities after cancer diagnosis may be warranted. Retrospective studies of chart reviews found that diabetes care at an endocrinology clinic was superior at delivering quality diabetes care than at primary care clinics.[60, 61] Also, a referral to a cardiologist to assess and monitor the risk for cardiotoxicity may have been necessary for this patient population. The 2019 American College of Cardiology/American Heart Association Task Force guidelines for the prevention of cardiovascular disease explicitly state that "a team-based care approach is recommended for the control of risk factors associated with atherosclerotic cardiovascular disease." [45] The women in this study are already at increased risk for cardiovascular disease given their comorbidities and the prevalent risk factors such as obesity and older age. In addition, breast cancer treatment, including radiation, anthracycline, and other chemotherapy agents (e.g., trastuzumab), may place these women at additional risk for cardiovascular disease.[62] Although the area of cardio-oncology is growing, evidence-based guidelines with a shared care approach are missing and should include risk-stratified guidelines to screen and monitor women for cardiotoxicity during treatment and into survivorship.[63]

The strength of this study, which contributes to its generalizability, is that it is a population-based, prospective cohort of Black breast cancer survivors covering over 300 healthcare providers across over 200 health care settings in ten New Jersey counties. In a previous publication, we showed that the distribution of tumor stage and grade among participants in the cohort was similar to all eligible cases identified by the New Jersey State Cancer Registry in the same counties.[33] We also abstracted medical and pharmacy records instead of relying solely on patient-reported data. We used the *All-or-None* approach to construct the optimal management measure, which looks at the entire sequence of care and not solely the parts, thereby encouraging a "system-of-care perspective."[48] However, some limitations should be noted. The small sample size limits the study's power. The study sample included patients with DCIS. However, because analyses were adjusted for stage, inclusion of DCIS cases should not have affected our conclusions. Medical records were abstracted in a standardized method, but providers' document medical visits differently, which may have led to misclassified outcomes. However, we chose measures based on longstanding, nationally recognized quality indicators used by employee-based health insurance companies, and Medicare and Medicaid programs for both reimbursement and quality monitoring. Additionally, this study only examined how health professionals managed comorbidities during cancer care and did not consider patients' preferences. This warrants further analyses from the patients' perspective to explore reasons for not seeking care or the ability to access care with a primary care provider or medical specialists. Lastly, there is no agreed-upon definition of shared care. We considered shared care when the patient had at least one visit with a primary care provider or medical specialist regardless of the medical visit's purpose within 12 months of cancer diagnosis. Studies are needed to validate how shared care has been defined and operationalized in the literature.

In conclusion, most women in our study are engaged with shared care, and comorbid care by primary care providers continues even after the breast cancer diagnosis. Shared care was statistically associated with optimal management of diabetes and hypertension. Yet, 46% of patients experienced suboptimal comorbidity management. There may be missed opportunities for the delivery of high-quality comorbid care and cancer care when patients are not engaged with primary care and/or with medical specialists. These findings are important in that shared care may promote optimal clinical care management and clinical outcomes of diabetes and hypertension especially for Black women who disproportionately bear the burden of these comorbidities. However, we did not examine if there was a formal delineation of providers' roles or duplication of services. Future research is needed to explore the processes of shared care to determine whether medical providers are performing clinical care independently or via teamwork in which providers are communicating and coordinating care interdependently [64, 65].

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Compliance with Ethical Standards:

This study was approved by the institutional review boards of all participating institutions and written informed consent was obtained from all study participants.

Conflict of Interest: *The authors declare that they do not have a conflict of interest.*

Disclaimer: *The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.*

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