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Understanding Racial/Ethnic Differences in Breast Cancer-Related Physical Well-Being: The role of patient-provider interactions

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Abstract

Objective: Racial/ethnic differences in cancer symptom burden are well-documented, but limited research has evaluated modifiable factors underlying these differences. Our objective was to examine the role of patient-provider interactions to help explain the relationship between race/ethnicity and cancer-specific physical well-being (PWB) among women with breast cancer.

Methods: The Pathways Study is a prospective cohort study of 4,505 women diagnosed with breast cancer at Kaiser Permanente Northern California between 2006 and 2013. Our analysis included white, black, Hispanic, and Asian participants who completed baseline assessments of PWB, measured using the Functional Assessment of Cancer Therapy for Breast Cancer, and patient-provider interactions, measured by the Interpersonal Processes of Care Survey (IPC) (N=4,002). Using step-wise linear regression, we examined associations of race/ethnicity with PWB, and changes in associations when IPC domains were added.

Results: We observed racial/ethnic differences in PWB, with minorities reporting lower scores than whites (beta, black: −1.79; beta, Hispanic: −1.92; beta, Asian: −1.68; p<0.0001 for all comparisons). With the addition of health and demographic covariates to the model, associations between race/ethnicity and PWB score became attenuated for blacks and Asians (beta: −0.63, p=0.06; beta: −0.68, p=0.02, respectively) and, to a lesser extent, for Hispanic women (beta: −1.06, p=0.0003). Adjusting for IPC domains did not affect Hispanic-white differences (beta:

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−1.08, p=0.0002), and slightly attenuated black-white differences (beta: −0.51, p=0.14). Asian-white differences narrowed substantially (beta: −0.31, p=0.28).

Conclusions: IPC domains, including those capturing perceived discrimination, respect, and clarity of communication, appeared to partly explain differences for black and Asian women. Results highlight opportunities to improve providers' interactions with minority patients, and communication with minority patients about their supportive care needs.

Introduction

Among patients with cancer, racial/ethnic differences in symptom burden and severity are well-documented. Prior studies have demonstrated that, compared to white patients, black and Hispanic patients are more likely to report severe or worsening pain,[1–4] and Hispanic patients are also more likely to experience fatigue.[4] Available evidence suggests that symptom burden differences may result, at least in part, from disparities in adequacy of symptom management. For example, a substantial body of research has documented black-white and Hispanic-white disparities in the assessment and treatment of pain and other disease- and treatment-related symptoms,[1] and patients of both minority groups are also more likely than white patients to report having unmet supportive care needs.[5] The factors that contribute to disparities in symptom management remain unclear.

Patients' interactions with their oncology providers represent an essential aspect of cancer care that has been shown in prior research to be associated with quality of life-related outcomes. For instance, a recent study found that patient-rated physician communication quality was positively associated with patient-rated symptom management quality, with patients rating their physician's communication highly being more likely to report having their symptom management needs met, compared to those with lower communication scores.[6] Prior studies have also shown that patient-provider interactions differ based on race/ethnicity. Specifically, racial/ethnic minority patients, particularly Asian and black patients, tend to report suboptimal communication with providers, and more discrimination by providers.[7–12] Therefore, interactions between oncology providers and their patients represent a potential target for interventions aimed at reducing disparities in symptom management.

Despite these established relationships between patient-provider communication, race/ethnicity, and symptom experiences, the role of patient-provider interactions in helping to explain racial/ethnic differences in symptom experiences has not been empirically evaluated. Our study helps to advance understanding of potentially modifiable determinants of racial/ethnic differences in symptom burden by addressing this gap in the literature. By leveraging unique data from a longitudinal, multi-ethnic cohort of women with breast cancer[13] our study also addresses two additional limitations of prior work in this area. First, to date, most studies have focused on black-white differences and, to some extent, Hispanic-white differences in symptom burden.[14] Our study includes Asian patients with cancer as well, a group whose symptom management experiences are not well understood. Second, while most prior work has investigated disparities in management of specific symptoms, primarily pain,[1] our study uses a comprehensive measure of the physical burden of breast cancer and

its treatment.[15] Our objectives were to: 1) Examine racial/ethnic differences in the physical burden of breast cancer and its treatment among white, black, Hispanic, and Asian breast cancer patients, and 2) Determine whether differences in the physical burden of disease were explained by racial/ethnic differences related to interactions with health care providers.

Methods

Study Population

The Pathways Study is a prospective cohort study that enrolled 4,505 women with recently diagnosed invasive breast cancer from Kaiser Permanente Northern California (KPNC) between 2006 and 2013.[13] Cancer diagnoses were ascertained by automatic scanning of electronic pathology reports and confirmed by medical record review. Participants were KPNC members at the time of diagnosis with primary invasive breast cancer (any stage), at least 21 years of age at diagnosis, with no prior history of cancer other than non-melanoma skin cancer, ability to speak English, Spanish, Cantonese, or Mandarin, and living within 65 miles of a study field interviewer. Pathways participants included in this analysis are those who self-identified as black, white, Hispanic, or Asian, and who completed quality of life assessments as part of the baseline survey (N=4,002). All participants provided written informed consent before study enrollment. The study was approved by the Institutional Review Board of KPNC.

Data Collection

The present analysis is based on data collected at baseline (on average, two months post-diagnosis) and six-month follow-up. During the baseline interview, information was collected on age, race/ethnicity, education, marital status, household income, interactions with health care providers and quality of life. Quality of life was also assessed at six-month follow-up. Data on tumor characteristics, treatment received, and comorbidities were obtained from KPNC's electronic health record (EHR) databases.

Variables and Measures

Self-reported race/ethnicity (white, black, Hispanic, Asian) was our main independent variable, adjusting for patient-physician interactions. Patient-physician interactions were assessed at baseline using the Interpersonal Processes of Care (IPC) 18-item questionnaire,[11] in which respondents were asked to report on the frequency that various aspects of the patient-physician interaction occurred over the past 12 months. Five response choices ranging from "always" to "never" were provided for each question. The questions map to seven domains, six of which were included in our analysis: compassion (physician expressed concern about the patient's feelings, respectful of patient as a person), elicited concerns (physician let patient say what was important, heard patient's concerns and took them seriously), lack of clarity (physician spoke quickly and used complex words), patient-centered decision-making (physician and patient worked out treatment plans together), explained results (physician provided information about results of tests and exams, and about medications, including side effects), and discrimination due to race/ethnicity (patient perceived discrimination or inattentiveness of physician due to patient's race/ethnicity). The only domain not included in our analysis was "disrespectful office staff," given our focus on

patients' interactions with physicians. For each domain, scores range from 1 to 5, and a higher IPC score indicates higher frequency of the specific process. Some domains score in a positive direction (better patient-physician interaction with increasing score), including compassion and elicited concerns. Others (lack of clarity and discrimination) score in a negative direction (worse patient-physician interaction with increasing score).

Our primary outcome was physical well-being (PWB), as measured at baseline and six-month follow-up as part of the Functional Assessment of Cancer Therapy for Breast Cancer (FACT-B).[15] The FACT-B is a validated, breast cancer-specific quality of life instrument that has been extensively used to measure quality of life in breast cancer patients and survivors across the care continuum. The PWB domain asks patients to indicate their agreement with the following statements on a five-point Likert scale of 1 (not at all) to 4 (very much) with "not applicable" as a response option: I have a lack of energy; I have nausea; Because of my physical condition, I have trouble meeting the needs of my family; I have pain; I am bothered by side effects of treatment; I feel ill; I am forced to spend time in bed. We operationalized PWB as a continuous outcome with scores ranging from 0 to 28, and higher scores indicating better PWB.

Statistical Analysis

We first conducted descriptive and bivariate analyses to determine the distribution of health and demographic and health characteristics by race/ethnicity. Racial differences in demographic and health characteristics were assessed using chi-square tests. Differences in PWB were assessed using ANOVA. Next, we examined the relationships between race/ethnicity and IPC domain scores in unadjusted generalized linear models (GLM). Then we estimated GLMs adjusting for demographic (age, education and income levels, marital status, preferred questionnaire language) and health characteristics, including tumor characteristics (stage, grade, nodal and hormone receptor status, treatment received), and comorbidities (measured using the Charlson comorbidity index).

We then conducted a stepwise regression analysis using GLM, starting with a univariate regression, to estimate the association of race/ethnicity with baseline PWB score (step 1). Next, demographic and health characteristics were added to the model (step 2). Lastly, IPC domains were added to the step 2 model (step 3), and changes in the association of race/ethnicity with baseline PWB score were noted. Specifically, a decrement in the adjusted coefficients for race/ethnicity would suggest that the relationship between race-ethnicity and PWB score may be partially mediated by patient-provider relationship characteristics captured by the IPC domains. To evaluate potential interaction effects, we included interaction terms (between race/ethnicity and IPC domains) to the step 3 model and conducted race-stratified analyses when statistically significant interactions were observed. All analyses used SAS 9.3 (Cary, NC) and were repeated for PWB measured at six-month follow-up, as a secondary outcome.

Results

Cohort Characteristics, by Race/Ethnicity

The distribution of cohort characteristics by race/ethnicity is given in Table 1. Of the 4,002 women included in our analysis, 2,666 (67%) were white; 313 (8%) were black; 512 (13%) were Asian; and 494 (28%) were Hispanic. Over 99% of black and white women selected English as their preferred language for the study questionnaires; 10% of Asian women and 22% of Hispanic women chose to complete the questionnaires in a non-English language. With respect to other demographics, black women were more likely than women in the other racial/ethnic groups to be unmarried and low-income (making less than $25,000/year). They were also mostly likely to have multiple comorbidities. For tumor-related characteristics, black women were more likely than white women to have hormone receptor-negative disease. White women were the most likely to undergo radiation therapy. Conversely, while approximately 55% of black, Hispanic, and Asian women received adjuvant chemotherapy, only 43% of white women did (p<0.0001). Mean baseline and six-month PWB scores are also shown by race/ethnicity in Table 1.

Unadjusted and Adjusted Associations of Race/Ethnicity with IPC Domains

Estimates of the adjusted and unadjusted associations of race/ethnicity with each IPC domain are given in Table 2. Before and after adjustment, we observed statistically significant racial/ethnic differences in IPC scores across all domains. For example, compared to white women, black (adjusted beta: 0.31, p<0.0001), Hispanic (adjusted beta: 0.13, p<0.00001), and Asian women (adjusted beta: 0.25, p<0.0001) reported higher scores on the discrimination domain, reflecting more frequent experiences with discrimination in their clinical encounters. Asian women reported lower scores on "elicited concerns" (adjusted beta: −0.25, p<0.0001 and patient-centered decision-making (adjusted beta: −0.17, p=0.0006), signaling fewer instances of providers' hearing and responding to concerns, and involving patients in decisions.

Primary Analysis Examining Relationships between Race/Ethnicity, Patient-Physician Interactions, and PWB at Baseline

Table 3 presents associations of race/ethnicity and covariates with physical well-being (PWB) at baseline. In the univariate regression (step 1), we observed large and statistically significant racial/ethnic differences in baseline PWB score, with racial/ethnic minority women experiencing lower scores than white women (beta, black: −1.79; beta, Hispanic: −1.92; beta, Asian: −1.68; p<0.0001 for all comparisons). With the addition of demographic and health variables to the model (step 2), the association of race/ethnicity with PWB score became attenuated substantially for black and Asian women (beta, black: −0.63, p=0.06; beta, Asian: −0.68, p=0.02) and, to a lesser extent, for Hispanic women (beta: −1.06, p=0.0002). In this model, younger age at diagnosis, chemotherapy receipt, and low income were statistically significantly associated with decreases in PWB score of at least one point. The subsequent addition of IPC domains to the model (step 3) did not affect Hispanic-white differences in PWB (beta: −1.08, p=0.0002), and slightly affected black-white differences (beta: −0.51, p=0.14). However, Asian-white differences narrowed substantially (beta: −0.31 p=0.28). IPC domains that were positively associated with PWB score included compassion

(beta: 0.40, p=0.02), "elicited concerns" (0.59, p=0.0009), and "explained results" (beta: 0.46, p=0.002). Discrimination was negatively associated with PWB (beta: −0.62, p=0.003).

When we added interactions of race/ethnicity and IPC domains to the final model (data not shown), the interactions of Asian race with "elicited concerns" and discrimination were statistically significant, indicating differential effects of these two IPC domains on Asian versus white women's PWB. In race-stratified models (data not shown), among white women, "elicited concerns" was positively associated with PWB (beta: 1.03, p<0.0001), and discrimination was not statistically significantly associated with PWB (beta: −0.06, p=0.88). Among Asian women, "elicited concerns" was negatively associated with PWB, although the association did not reach statistical significance (beta: −1.05, p=0.07). Discrimination had a strong and negative association with PWB for Asian women (beta: −1.41, p=0.005). The interaction of black race with "elicited concerns" was also significant. Among black women, this domain was not statistically significantly associated with PWB (beta: −0.73, p=0.32).

Secondary Analysis Examining Relationships between Race/Ethnicity, Patient-Physician Interactions, and PWB at Six Months

Supplemental Table 4 presents associations of race/ethnicity and covariates with physical well-being (PWB) at six months, among the 2,740 women who completed a six-month follow-up assessment. In a univariate regression model of race/ethnicity and PWB score assessed at six-month follow-up (step 1), Hispanic-white PWB differences were similar to differences observed at baseline (beta: −1.88, p<0.0001). Black-white differences were larger at 6 months than at baseline (beta: −2.09, p<0.0001) and Asian-White differences were smaller than at baseline (beta: −0.93, p=0.003). Consistent with our baseline analysis, adjustments for demographic and health characteristics (step 2) somewhat attenuated differences in six-month PWB for all racial/ethnic minority groups (beta, black: −1.30, p=0.002; beta, Hispanic: −0.83, p=0.02; beta, Asian: −0.23, p=0.46). However, unlike in the baseline analysis, a black-white difference in PWB score of greater than one point persisted after adjustment for health and demographic factors. Also different from the baseline analysis, English language was strongly negatively associated with PWB score (beta: −1.95, p=0.0008). In the models including IPC domains (step 3), Asian-white differences in six-month PWB were nearly eliminated (beta: 0.23, p=0.47). Black-white differences were also substantially attenuated, although a statistically significant difference remained, and Hispanic-white differences were relatively unchanged (beta, black: −0.99, p=0.02; beta, Hispanic: −0.70, p=0.001). As in the baseline analysis, "elicited concerns" was significantly associated with six-month PWB score (beta: 0.76, p<0.0001), as was lack of clarity (beta: −0.30, p=0.04).

When we added interactions of race/ethnicity and IPC domains to the final six-month PWB model (data not shown), the interaction of black race and the "lack of clarity" domain was statistically significant, indicating that unclear communication may differentially impact PWB for black compared to white women. In race- stratified models (data not shown), among white women, "lack of clarity" was not statistically significantly associated with

PWB (beta: −0.20, p=0.23). Among black women, "lack of clarity" was strongly negatively associated with PWB (beta: −2.35, p=0.003; data not shown).

Discussion

Within a cohort of women recently diagnosed with breast cancer, we observed unadjusted racial/ethnic differences in baseline and six-month follow-up PWB that approached or exceeded the FACT-B's minimally important difference of two points[16] for all racial/ethnic minority groups. We also observed racial/ethnic differences in women's perceptions of their interactions with providers. Results of our step-wise regression analysis suggest that racial/ethnic differences in PWB were partly explained by demographic and health factors for women in all minority groups. Patient-provider interactions helped to explain PWB differences for Asian women and, to a lesser extent, for black women.

Based on our results, patient-provider interactions may represent a modifiable factor contributing to Asian-white differences in PWB and therefore, could be a potential target for interventions to improve the symptom management experiences of Asian women with breast cancer. It is important to note, however, that at KPNC and in general, Asian women with breast cancer represent a heterogeneous group with respect to ethnicity and nativity. In our sample, Asian women were predominantly Filipina (38%) or Chinese (37%), and 75% of Asian women were born outside of the U.S. (compared to 9% of white patients, 5% of black patients, and 42% of Hispanic patients). Given that most Asian women in our sample were not born in the U.S., it seems likely that cultural differences between Asian women and their providers may partly explain our results.[17] Future research should explore the communication needs and preferences of specific patient sub-groups of Asian patients with cancer. The feasibility/acceptability of interventions that support culturally sensitive communication between oncology providers and Asian patients with breast cancer represents another important area for future inquiry.

We also observed that black-white differences in baseline PWB were slightly attenuated by the inclusion of IPC domains. This suggests that, although patient-provider interactions may contribute somewhat to baseline PWB differences for black patients, other factors not captured by our analysis are relevant. Given that the inclusion of IPC domains minimally impacted Hispanic-white differences in PWB, unmeasured factors are also likely important for this group. For example, black and Hispanic women were more likely than Asian or white women in our sample to be low-income and to have low educational attainment. They also had higher incidence of more advanced (stage III-IV) breast cancer. Being of lower socio-economic status and/or experiencing more advanced illness may result in competing social and health concerns that could render symptom management needs secondary, resulting in necessary supportive care being delayed or forgone. In addition, research suggests that black and Hispanic women rely heavily on faith-based and community support, which, relative to provider support, may play an equally important or larger role in impacting the cancer care experiences of women in these minority groups.[18–21]

Our study has some limitations. For example, the IPC questionnaire did not ask patients to reflect on their interactions with oncologists specifically. Rather, the questionnaire referred

more generally to interactions with "your doctors over the past twelve months." Because Pathways participants were recently diagnosed with breast cancer and completed the IPC survey in the context of a breast cancer study, we expect that, in general, women's responses reflected their experiences interacting with oncologists. However, it is possible that women answered these questions relative to their interactions other providers, for example primary care providers, who may not in be involved in cancer-related symptom management. Relatedly, we were not able to account for patient-physician racial/ethnic concordance, or the length of the patient-physician relationship, which could modify the relationships between race, perceived interactions with providers, and PWB. We also lacked measures of acculturation, which may help to explain some of the racial/ethnic differences in perceived interactions that we observed between Asian and white patients. [17]

In conclusion, our results demonstrate a need to improve both the patient-physician communication and symptom management experiences of racial/ethnic minorities with breast cancer. Efforts to improve minority patients' experiences of interacting with physicians – specifically by fostering feelings of respect and inclusion versus discrimination – may hold promise for helping to address disparities in symptom management. In addition to implementing routine symptom monitoring for all patients with cancer using validated patient-reported outcome tools, interventions that aim to address disparities should also consider evaluating culturally sensitive approaches to communicating with patients who are racial/ethnic minorities. Altogether, these next steps show promise to help improve the cancer care experiences of all patients regardless of race/ethnicity.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Distribution of Patient Demographic and Health Characteristics by Race/Ethnicity (N=4,002)

Characteristic	White (N=2,672) N (%)	Black (N=316) N (%)	Hispanic (N=498) N (%)	Asian (N=516) N (%)	p-value
Age at diagnosis, years					
<50	417 (15.6)	81 (25.6)	184 (37.0)	207 (40.1)	<0.0001
50–59	739 (27.7)	112 35.4)	145 (29.1)	167 (32.4)	
60–69	873 (32.7)	79 (25.0)	99 (9.9)	103 (20.0)	
70	643 (24.1)	44 (13.9)	70 (14.1)	39 (7.6)	
AJCC Stage					
I	1497 (56.0)	150 (47.5)	260 (52.2)	276 (53.5)	0.06
II	882 (33.0)	118 (37.3)	173 (34.7)	187 (36.2)	
III	252 (9.4)	38 (12.0)	55 (11.0)	48 (9.3)	
IV	41 (1.5)	10 (3.2)	10 (2.0)	5 (1.0)	
Grade					
Well differentiated	765 (28.6)	54 (17.1)	112 (22.5)	129 (25.0)	<0.0001
Moderately differentiated	1142 (42.7)	131 (41.5)	201 (40.4)	226 (43.8)	
Poorly differentiated	606 (22.7)	110 (34.8)	144 (28.9)	133 (25.8)	
Undifferentiated	12 (0.45)	4 (1.3)	2 (0.40)	5 (1.0)	
Unknown	147 (5.5)	17 (5.4)	39 (7.8)	23 (4.5)	
Nodal status					
Positive	763 (28.6)	111 (35.1)	166 (33.3)	152 (29.5)	0.09
Negative	1889 (70.7)	204 (64.6)	330 (66.3)	362 (70.2)	
Unknown	20 (0.80)	1 (0.30)	2 (0.40)	2 (0.40)	
Hormone receptor status					
ER+/PR+	1745 (65.3)	142 (44.9)	311 (62.50	337 (65.3)	<0.0001
ER+/PR-	544 (20.4)	67 (21.2)	97 (19.5)	97 (18.8)	
ER-/PR+	2 (0.07)	1 (0.3)	3 (0.6)	0 (0.0)	
ER-/PR-	378 (14.2)	104 (32.9)	87 (7.5)	82 (15.9)	
Unknown	3 (0.1)	2 (0.6)	0 (0.0)	0 (0.0)	
Surgery received					

Characteristic	White (N=2,672)	Black (N=316)	Hispanic (N=498)	Asian (N=516)	p-value
	N (%)	N (%)	N (%)	N (%)	
Yes	2644 (99.0)	311 (98.4)	495 (99.4)	510 (98.8)	0.6
No	28 (1.0)	5 (1.6)	4 (0.6)	6 (1.2)	
Radiation therapy received					
Yes	1251 (46.8)	125 (39.6)	215 (43.2)	171 (33.1)	<0.0001
No	1419 (53.1)	60.4)	283 (56.8)	345 (66.9)	
Unknown	2 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	
Chemotherapy received					
Yes	1156 (43.3)	179 (56.6)	269 (54.0)	289 (56.0)	<0.0001
No	1510 (56.5)	137 (43.0)	227 (45.6)	225 (43.6)	
Unknown	6 (0.2)	0 (0.0)	2 (0.4)	2 (0.4)	
Hormonal therapy received					
Yes	2033 (76.1)	192 (60.8)	370 (74.3)	397 (76.9)	<0.0001
No	619 (23.2)	119 (37.7)	126 (25.3)	118 (22.9)	
Unknown	20 (0.8)	5 (1.6)	2 (0.4)	1 (0.2)	
Charlson comorbidity score					
0	2354 (88.1)	254 (80.4)	445 (89.4)	478 (92.6)	<0.0001
1	152 (5.7)	36 (11.4)	26 (5.2)	15 (2.9)	
2	105 (3.9)	18 (5.7)	20 (4.0)	16 (3.1)	
3	61 (2.3)	8 (2.5)	7 (1.4)	7 (1.4)	
Education					
High school or less	341 (12.8)	54 (17.1)	163 (32.7)	54 (10.5)	<0.0001
Some college	929 (34.8)	142 (44.9)	193 (38.8)	96 (18.6)	
College graduate	719 (26.9)	74 (23.4)	87 (17.5)	245 (47.5)	
Post graduate	682 (25.5)	46 (14.6)	55 (11.0)	121 (23.5)	
Unknown	1 (0.04)	0 (0.0)	0 (0.0)	0 (0.0)	
Income					
<$25K	234 (8.8)	48 (15.2)	57 (11.5)	46 (8.9)	<0.0001
$25K-$49K	503 (18.8)	71 (22.5)	104 (20.9)	76 (14.7)	
$50K-$89K	771 (28.9)	102 (32.3)	158 (31.7)	132 (25.6)	
$90K	910 (34.1)	56 (17.7)	106 (21.3)	209 (40.5)	

Characteristic	White (N=2,672) N (%)	Black (N=316) N (%)	Hispanic (N=498) N (%)	Asian (N=516) N (%)	p-value
Unknown	254 (9.5)	39 (12.3)	73 (4.7)	53 (10.3)	
Language					<0.0001
English	2660 (99.5)	314 (99.4)	391 (78.5)	464 (89.9)	
Other	12 (0.5)	2 (0.6)	107 (21.5)	52 (10.1)	
Marital Status					<0.0001
Married/Partnered	1614 (60.4)	134 (42.4)	336 (67.5)	355 (68.8)	
Single	1056 (39.5)	182 (57.6)	160 (32.1)	157 (57.6)	
Unknown	2 (0.07)	0 (0.0)	2 (0.40)	4 (0.78)	
Physical Well-Being (PWB)					
Baseline PWB Score, Mean (SD)	22.4 (5.4)	20.6 (6.5)	20.4 (6.7)	20.7 (6.6)	<0.0001
Six-Month PWB Score, Mean (SD)	23.2 (4.9)	21.1 (6.0)	21.3 (5.9)	22.3 (6.0)	<0.0001

Table 2.

Association of Interpersonal Processes of Care (IPC) Domains with Race/Ethnicity (N=4,002)

| Race/Ethnicity | Coefficients and p-values | | | | | |
	Compassion (N=3,978)	Elicited Concerns (N=3,984)	Patient-Centered Decision-Making (N=3,958)	Explained Results (N=3,982)	Lack of Clarity (N=3,984)	Discrimination (N=3,969)
Black						
Unadjusted	0.05 (p=0.27)	0.01 (p=0.80)	−0.21 (p=0.0004)	0.01 (p=0.78)	0.06 (p=0.16)	0.33 (p<0.0001)
Adjusted*	0.09 (p=0.04)	0.06 (p=0.16)	−0.11 (p=0.07)	0.05 (p=0.13)	0.02 (p=0.64)	0.31 (p<0.0001)
Hispanic						
Unadjusted	0.12 (p=0.0009)	0.02 (p=0.58)	0.02 (p=0.65)	−0.02 (p=0.63)	0.11 (p=0.001)	0.14 (p<0.0001)
Adjusted*	0.12 (p=0.001)	0.07 (p=0.05)	0.07 (p=0.20)	0.05 (p=0.20)	0.08 (p=0.04)	0.13 (p<0.0001)
Asian						
Unadjusted	−0.06 (p=0.11)	−0.25 (p<0.0001)	−0.17 (p=0.0003)	−0.14 (p=0.0002)	0.26 (p<0.0001)	0.25 (p<0.0001)
Adjusted*	−0.01 (p=0.75)	−0.21 (p<0.0001)	−0.17 (p=0.0006)	−0.08 (p=0.04)	0.24 (p<0.001)	0.25 (p<0.0001)
White						
Unadjusted	REF	REF	REF	REF	REF	REF
Adjusted*	REF	REF	REF	REF	REF	REF

*
Adjusted for demographic characteristics (age, marital status, income and education levels, language); tumor characteristics (stage, grade, hormone and nodal status); and Charlson comorbidity score

Table 3.

Associations of Race/Ethnicity and Covariates with Physical Well-Being (PWB) at Baseline (N=4,002)

Characteristic	Coefficients and p-values*		
	Step 1: Univariate model	Step 2: Adjusted model without IPC domains	Step 3: Adjusted model with IPC domains
Race/Ethnicity			
Black	−1.79 (p<0.0001)	−0.63 (p=0.06)	−0.51 (p=0.14)
Hispanic	−1.92 (p<0.0001)	−1.06 (p=0.0003)	−1.08 (p=0.0002)
Asian/Pacific Islander	−1.68 (p<0.0001)	−0.68 (p=0.02)	−0.31 (p=0.28)
White	REF	REF	REF
Age at diagnosis, years			
<50		−3.53 (p<0.0001)	−3.26 (p<0.0001)
50–59		−2.83 (p<0.0001)	−2.62 (p<0.0001)
60–69		−1.26 (p<0.0001)	−1.15 (p<0.0001)
70		REF	REF
AJCC Stage			
I		1.05 (p=0.20)	1.17 (p=0.16)
II		0.43 (p=0.59)	0.59 (p=0.45)
III		−0.64 (p=0.44)	−0.43 (p=0.60)
IV		REF	REF
Grade			
Well differentiated		0.39 (p=0.74)	0.20 (p=0.71)
Moderately differentiated		0.42 (p=0.72)	0.20 (p=0.87)
Poorly differentiated		0.56 (p=0.63)	0.33 (p=0.78)
Undifferentiated		REF	REF
Nodal status			
Positive		−0.28 (p=0.35)	−0.20 (p=0.49)
Negative		REF	REF
Hormone receptor status			
ER+/PR+		0.97 (p=0.01)	0.89 (p=0.02)
ER+/PR-		0.84 (p=0.04)	0.83 (p=0.04)

| Characteristic | Coefficients and p-values* | | |
	Step 1: Univariate model	Step 2: Adjusted model without IPC domains	Step 3: Adjusted model with IPC domains
ER-/PR+		0.04 (p=0.99)	0.30 (p=0.89)
ER-/PR-		REF	REF
Treatment Receipt (yes vs. no)			
Surgery		−0.65 (p=0.50)	−0.74 (p=0.45)
Radiation therapy		0.43 (p=0.02)	0.41 (p=0.03)
Chemotherapy		−1.47 (p<0.0001)	−1.59 (p<0.0001)
Hormonal Therapy		−0.33 (p=0.29)	−0.42 (p=0.17)
Charlson comorbidity score			
0		1.15 (p=0.07)	1.00 (p=0.11)
1		0.07 (p=0.92)	0.10 (p=0.89)
2		−0.18 (p=0.81)	−0.14 (p=0.85)
3		REF	REF
Education			
High school or less		0.67 (p=0.03)	0.48 (p=0.13)
Some college		−0.23 (p=0.34)	−0.41 (p=0.10)
College graduate		−0.01 (p=0.96)	−0.09 (p=0.71)
Post graduate		REF	REF
Income			
<$25K		−1.29 (p=0.0006)	−1.10 (p=0.003)
$25K-$49K		−0.58 (p=0.04)	−0.41 (p=0.15)
$50K-$89K		−0.52 (p=0.03)	−0.38 (p=0.10)
$90K		REF	REF
Language			
English		−0.04 (p=0.94)	−0.24 (p=0.62)
Other		REF	REF
Marital status			
Married/Partnered		−0.15 (p=0.45)	−0.5 (p=0.46)
Single		REF	REF
IPC Domains			

Characteristic	Step 1: Univariate model	Step 2: Adjusted model without IPC domains	Step 3: Adjusted model with IPC domains
Coefficients and p-values*			
Compassion			0.40 (p=0.02)
Elicited concerns			0.59 (p=0.0009)
Explained results			0.46 (p=0.002)
Shared decision-making			−0.12 (p=0.27)
Lack of clarity			−0.24 (p=0.06)
Discrimination due to race/ethnicity			−0.58 (0.005)