Health-Related Quality of Life in a Multiethnic Sample of Breast Cancer Survivors

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ABSTRACT

*Background: Little is known about the experiences of women from varying ethnic groups following treatment for breast cancer. **Purpose:** This study provides a comprehensive description of heath-related quality of life (HRQL) and identifies problem areas and predictive factors for a multiethnic sample. **Methods:** Six hundred twenty-one breast cancer survivors from 2 major cities participated within 5 years of their diagnosis. Participants were African Americans, Latinas, Asian Americans, and Whites. Patients filled out questionnaire packets comprising standardized instruments related to HRQL, psychological adjustment, cancer-related treatment, and demographic variables. Data were analyzed using 2 methods: (a) observation of findings prior to controlling for demographic and treatment variables and (b) observation of findings after controlling for variables confounded with ethnicity. **Results:** Findings indicate that most women experienced good HRQL. Group differences revealed that African Americans found more meaning in life as a result of having breast cancer, and Latinas reported more physical symptoms. Age predicted aspects of HRQL for African Americans and Whites. **Conclusions:** This study comprehensively assessed HRQL following breast cancer for ethnic minority women. Most breast cancer survivors in this study reported levels of HRQL comparable to established norms. However, some quality of life impediments surfaced in particular groups. Researchers should not assume that predictive models of breast cancer HRQL are the same across ethnic groups.*

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INTRODUCTION

Hundreds of articles have documented the psychosocial aftermath of breast cancer and its treatments. However, the focus of this literature has been almost exclusively on non-Hispanic White women (1). Despite growing awareness of the importance of considering diversity in health psychology research (2), little is known about the experiences of ethnically diverse samples of women following the diagnosis of breast cancer. This underrepresentation in the literature is especially troublesome in light of the fact that tens of thousands of women from ethnic minority groups are living with the effects of the disease and its treatments (3).

The few studies that have considered ethnicity indicate that women from diverse ethnic groups report good quality of life overall following breast cancer (4–6). However, specific domains of quality of life are relatively more problematic for some ethnic subsamples of women as compared to women from one or more other ethnic groups. For example, African American breast cancer survivors reported more difficulties with physical functioning (7) and activities of daily living (8) than did non-Hispanic Whites; White patients experienced more sexual difficulties (9) than did African Americans; Latinas scored higher on measures of distress and concerns (10) than did White and African American patients; and Filipina patients reported more physical symptoms and more difficulties with emotional functioning (5) when compared to other Asian American ethnic groups and Whites. This variation in quality of life underscores the importance of using comprehensive, multidimensional quality of life assessments to ensure that the domains of greatest importance to women of all ethnicities are assessed.

Although providing important data about areas of relative distress and dysfunction, interpreting between-group differences is problematic. Ethnicity often serves as a proxy for other, perhaps more salient, variables, such as income, education, and treatment (1). The overlap between demographic/treatment variables and ethnicity is particularly relevant in the case of breast cancer research, because variables that often covary with ethnicity in the United States have been found to be related to quality of life after breast cancer as well. African Americans and Latinas are more likely to be poor than are Asian Americans or Whites (11), and economic problems are among the factors that place women at high risk for psychosocial morbidity following treatment for breast cancer (12). African American women (13) and Latinas (14) are diagnosed with breast cancer at a younger age than national norms, and younger women typically report higher levels of distress than older women following breast cancer (15,16). Breast cancer treatment also is confounded with ethnicity. African American women are less likely than White women, for example, to receive breast-conserving surgery versus mastectomy (17), and Asian American women have been re-

ported to be less likely to receive breast-conserving surgery than African Americans, Whites, or Latinas (18). These less disfiguring surgeries have been associated with better body image following breast cancer (19).

A few researchers have attempted to untangle these confounds by controlling for demographic and treatment differences when assessing the relation between ethnicity and health-related quality of life (HRQL) after breast cancer. In most cases, they have found that some previously significant findings lose significance, whereas others continue to show differences between ethnic groups even after controlling for variables such as cancer treatment, age, education, income, marital status, and comorbid conditions (5,7,10). In light of these findings, there appear to be benefits associated with providing results both with and without control for covariates. From a clinical perspective, it is important to understand quality of life as it is experienced by women, with all of the real-life complications and inequities. Relying entirely on this approach, however, makes it impossible for researchers to determine the relative contribution of ethnicity, if any, to quality of life after breast cancer.

As noted earlier, the substantial literature on non-Hispanic White breast cancer survivors provides data on the relations between demographic and treatment variables and quality of life. These data are important not only because they suggest possible confounds with ethnicity but also because they can aid in predicting which women will be at increased risk for difficulties. Whether these findings generalize to women in other ethnic groups is unknown.

As this review indicates, gaining an understanding of the role of ethnicity in quality of life following the diagnosis and treatment of breast cancer involves (a) description of multiple components of quality of life as reported by women of varying ethnic backgrounds, (b) indication of areas of relatively greater or lesser difficulty as described by women in different ethnic groups, (c) analysis of those differences after controlling for demographic and treatment variables that are confounded with ethnicity, and (d) identification of predictors of quality of life for each ethnic group. In this study we draw on data from a larger program of research on the quality of life of breast cancer survivors to address each of these issues (20,21). We have gathered comprehensive descriptions of quality of life through questionnaires completed by African American, Asian American, Latina, and non-Hispanic White women who had finished treatment for early-stage breast cancer during the preceding 5 years. To our knowledge, the four issues mentioned earlier have not been addressed in previous studies using standardized multidimensional assessments of quality of life with adequate numbers of participants from each of the major ethnic groups in the United States.

METHOD

Participants and Procedures

For the larger research program addressing quality of life and sexuality in breast cancer survivors, independent groups of breast cancer survivors were recruited from two large metropolitan areas (Los Angeles and Washington, DC) at two different time points. Data were collected from the first group 18 months prior to that of the second group. Sample sizes at each time point (Phase 1 = 864 participants, Phase 2 = 1,098 participants) provided ample opportunity to analyze HRQL of patients from varying ethnic backgrounds. For the purposes of this study, four ethnic groups with a sufficient number of patients were identified: African Americans ($n = 233$), Latinas ($n = 78$), Asian Americans ($n = 77$), and non-Hispanic Whites ($n = 1,561$).[1] For comparison purposes, 233 White breast cancer survivors were randomly selected, for a total sample of 621.

For both phases, women were invited to participate who (a) had received diagnoses of breast cancer at Stage, 0, I, or II; (b) were 1 to 5 years postdiagnosis; (c) had completed cancer treatment (with the exception of tamoxifen) and were considered "disease free"; (d) had no previous cancer diagnosis (other than noninvasive skin or cervical); (e) did not report having other major disabling medical or psychiatric conditions; and (f) could read and write English.

Participant identification and recruitment procedures were described in detail in a previous publication (20). Patients were identified through tumor registry listings from each city, from patient listings through offices of oncologists or surgeons, and from hospital logs. Women were approached by means of an invitation letter written on either physician or study-specific letterhead. The letter briefly described the study and included a response card that the woman could return to the study center indicating her interest in participating. Women who responded affirmatively were contacted by telephone and were screened for eligibility. Those women who indicated they wished to participate were mailed a questionnaire and consent form to fill out and return to the study center.

Fifty-seven percent of the total potentially eligible breast cancer survivors ($n = 6,364$) responded to the invitation letter; of those, 54% completed and returned the questionnaire (resulting in a final total sample of 1,962). Analysis of demographic differences between responders and nonresponders indicated that older, non-White, and unmarried women were less likely to respond to the initial study invitation (20).

Instruments

Questionnaires comprised standardized instruments to assess HRQL, cancer, sexuality, and information on demographics and medical treatment. Although the battery used in Phase 2 was reduced in length from the one used in Phase 1, most of the instruments were retained and either shortened or revised in some cases. The shortened scales were computed for Phase 1 to achieve comparability in the analyses. In this study, emphasis was placed on demographic variables, surgical and treatment procedures, and HRQL components. HRQL instruments comprise both general and cancer-specific measures related to quality of life after breast cancer.

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[1]Ethnicity was established by patients marking one ethnic group category from a list. Collapsing ethnic identity categories of Asian, Filipina, and Pacific Islanders later created an Asian American category for the purposes of this study.

Demographic and Medical Data

Patients reported their age and provided information on their ethnicity, education, occupation, and income by marking checklists. Patients reported the type of surgery they had received and whether they had received chemotherapy, radiation, and tamoxifen.

HRQL

RAND 36-Item Health Survey. The RAND 36-Item Health Survey, also known as the Medical Outcomes Study Short Form–36 (SF–36), was used to assess global HRQL. The RAND is a 36-item standardized assessment that measures eight dimensions of HRQL—specifically, physical functioning, role function–physical, bodily pain, social functioning, emotional well-being, role function–emotional, energy/fatigue, and general health perceptions. Each subscale is scored from 0 to 100, with 100 being the most favorable score (22); for instance, higher scores indicate better functioning for the physical, social, emotional, energy, and general health subscales, whereas higher scores on the Pain and Physical and Emotional Limitations subscales indicate less pain and fewer limitations, respectively. The SF–36 has demonstrated reliability and validity and has been used to evaluate functional status in healthy and clinical populations (7).

Cancer-Related Measures

Cancer Rehabilitation Evaluation System. The Cancer Rehabilitation Evaluation System (CARES) is a comprehensive, cancer-specific battery designed to assess quality of life and rehabilitation needs of cancer patients (23). This valid and reliable measure assesses self-reported difficulty with cancer concerns over the past 4 weeks; scores range from 0 (*not at all*) to 4 (*very much*), with higher scores indicating more difficulty. Three subscales measuring sexual dysfunction, sexual interest, and body image were included in this study.

Breast Cancer Prevention Trial Symptom Checklist. The 43-item Breast Cancer Prevention Trial Symptom Checklist (BCPT) was used to assess symptoms related to breast cancer treatment, menopause, and tamoxifen use. This checklist was developed specifically for the Breast Cancer Prevention Trial (24). Only 16 of the 43 items were measured in the second phase of this study; thus, only those 16 symptoms were extracted from Phase 1 for analyses. Participants rated symptoms for the past 4 weeks on response options ranging from 0 (*not at all*) to 4 (*extremely*). A summary score, formulated by collapsing BCPT symptom scores, ranges from 0 to 64, with high scores indicating greater levels of symptomatology. Reliability analyses produced alphas equal to or greater than .81 for each ethnic group.

Meaning Questionnaire. The Meaning Questionnaire is a 12-item measure developed for this study to address various existential issues of breast cancer survivorship. Patients endorse a range of psychosocial and personal experiences by providing responses on a scale ranging from 0 (*not at all*) to 4 (*very much*). Factor analysis generated 11 items loading on two composite

scores: (a) Meaning (6 items), with scores ranging from 0 to 24, and (b) Vulnerability (5 items), with scores ranging from 0 to 20. Reliability analyses revealed alphas for these two composite scores to be equal to or greater than .80 for both time points. In a subsequent study (25), breast cancer survivors completed both the Meaning Questionnaire and the Posttraumatic Growth Inventory (26), a measure assessing positive outcomes reported by persons who have experienced traumatic events and how successful individuals are in reconstructing or strengthening their perceptions of self, others, and the meaning of events. The high correlation between these assessment tools ($r = .71$) provides support for the validity of the Meaning Composite as a brief measure of posttreatment benefit finding.

General Psychological Measures

The Center for Epidemiologic Studies Depression Scale (CES–D) was used to determine current depressive symptomatology over the past week (27). This 20-item survey has excellent reliability and validity, including use with multiethnic samples (27). The assessment rates responses on a 4-point scale, with higher scores indicative of greater levels of depression (scores greater than or equal to 16 indicate a level of depression that warrants further evaluation). The Mental Health Index (MHI), developed for patients with chronic conditions in the Medical Outcomes Study (28), is a standardized 32-item scale that measures psychological distress and well-being over the past 4 weeks. The MHI composite score ranges from 0 to 100, with higher scores indicating better psychological well-being; it has established reliability and validity (29). The age-matched sample patient mean for the MHI is 70.3 ($SD = 20.82$). To assess perceived social support, the Medical Outcomes Study Social Support Survey (MOS) was included in the questionnaire (30). This instrument, developed as part of the Medical Outcomes Study for patients with chronic conditions, is a reliable and valid 20-item survey measuring perceived availability of overall functional social support on a 5-point scale, with higher scores indicative of greater levels of perceived social support. The patient norm for the MOS Social Support Survey is 70.1 ($SD = 24.2$). The Dyadic Adjustment Scale is a standardized tool used to assess marital satisfaction, cohesion, dyadic consensus, and affectional expression (31). The Revised Dyadic Adjustment Scale (32), a shortened version of its original, was used in Phase 2; therefore, only those questions that overlapped across phases were used in the analyses. The Revised Dyadic Adjustment Scale reported norm for married couples is 48.0 ($SD = 9.0$), with a possible range from 0 to 69 (lower scores are indicative of distress in marriage). The scale has good content validity and reliability.

Statistical Considerations

For the purposes of this study, the two phases were combined into one data set to ensure adequate power in analyses. With respect to geographic location of participants, preliminary analyses were performed to assess differences among breast cancer survivors from Washington, DC and Los Angeles. The majority of African Americans (54%) resided in Washington,

DC, whereas Whites (57.5%), Latinas (80.7%), and Asian Americans (84.4%) were more likely to be from Los Angeles, $\chi^2(3, N = 621) = 52.65, p < .001$. Comparisons of means, ranges, and standard deviations among the standardized HRQL measures yielded few differences between geographic locations; therefore, the two site samples were combined for all further analyses. Nevertheless, both phase and geographic location were included as covariates in the analysis of covariance (ANCOVA) and multiple regression analyses as described later.

Standard statistical methods were used as appropriate for continuous and categorical data. For comparative analyses among the ethnic groups, chi-square tests were used for nonparametric data, and analyses of variance (ANOVAs) and ANCOVAs were used for parametric data. ANOVAs of HRQL variables were run with two separate methods. For the first method, one-way ANOVAs with post hoc analyses[2] were used to observe ethnic group differences. For the latter method, ANCOVA was applied to HRQL data controlling for demographic and medical variables that frequently covary with ethnicity (such as income or education). To determine which variables would be used as covariates in analyses, intercorrelations of medical and demographic information were run to observe those that correlated with ethnicity. Of the initial variables analyzed,[3] six variables correlated significantly ($p < .05$) with ethnicity and were selected as the covariates. These were age, income, education, geographic location, type of surgery (mastectomy or breast-conserving surgeries), and whether patients received chemotherapy. Study phase, although not related to ethnicity, was included as a covariable because of its relation to most medical variables. With power set at .80, with a two-tailed statistical test at an alpha of .05, and based on the smallest ethnic group (Asian Americans, $n = 77$), our sample was powered to detect differences of approximately .5 *SD* or less, depending on the assessment instrument.

With regard to the relation between HRQL and demographic and treatment variables, two-tailed Pearson product–moment correlations and multiple regression analyses were conducted. The same variables used as control variables in the ANCOVA were entered as one block in regression analyses to determine the predictive power of these variables on patients' HRQL. Prior to regression analyses, multicollinearity was assessed. Given the complex pattern of correlations among independent variables, inspection of zero-order correlations would not suffice to reveal redundancies; therefore, collinearity diagnostics were performed (34). For all independent variables, the Variance Inflation Factors were close to a minimum, thereby not posing any concern for redundancy. Radiation treatment was highly correlated with having had lumpectomy, and thus the

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[2]For those variables where homogeneity of variances was established, Scheffé post hoc analyses were used. For those variables where homogeneity of variance was not established, Dunnett's T3 post hoc analyses were used (33).

[3]Demographic and medical variables originally tested for selection were having had mastectomy, chemotherapy, radiation, tamoxifen, and education, income, marital status, age, time since diagnosis, study phase, and location.

Variance Inflation Factor was unacceptably high to use radiation treatment as a covariable; therefore, we did not include this variable in analyses.

Although multiple comparisons were used to analyze the data, no correction for Type I error was made. Because the analyses in this study were largely exploratory, we set the alpha at .05 for all statistical tests. Bonferroni analyses indicate that findings with alpha greater than or equal to .003 should be interpreted with caution.

RESULTS

Participants

Medical and demographic data. Demographic characteristics are provided for each ethnicity in Table 1. Most participants were reasonably well educated, had moderate-to-high income levels, and were married or in a significant relationship. Level of education was significantly higher among Whites and Asian Americans (over 50% of women in each group had a 4-year degree) in comparison to African Americans and Latinas, $\chi^2(27, N = 620) = 120.64, p < .001$. Variations across ethnic groups also were evident on income levels. The majority of Whites and Asian Americans reported household income of $45,000 or more, whereas about 50% of African Americans and fewer than 40% of Latinas reported income in this range, $\chi^2(18, N = 598) = 73.93, p < .001$. Although there were no significant differences with respect to reporting relationship status (partnered vs. nonpartnered), differences were found among unpartnered women such that African Americans were more likely to be divorced, Whites were more likely to be widowed, and Asian Americans were more likely to be single, $\chi^2(12, N = 620) = 30.30, p = .003$.

The mean age of participants was 55.23 ($SD = 11.46$). The mean ages for breast cancer survivors were as follows: Latinas, 51.4 years (range = 30–74); Asian Americans, 51.96 years (range = 33–81); African Americans, 55.5 years (range = 32–87); and Whites, 57.3 years (range = 30–87). An ANOVA demonstrated that there were significant differences in age, omnibus $F(3, 617) = 7.93, p < .001$. Dunnett's T3 post hoc analyses showed that Asian Americans were younger than Whites ($p = .001$) and that Latinas were younger than both Whites and African Americans ($p < .001$ and $p = .02$, respectively); the age difference between Whites and African Americans was not significant.

Table 1 also provides information regarding medical and surgical characteristics of the sample. Surgical patterns differed among ethnicities: More than half of African American, Latina, and Asian American breast cancer survivors received mastectomy, whereas 59.6% of Whites received breast-conserving surgeries. Of those patients with mastectomy, 18% Asian American, 21% African American, 29% Latina, and 39% White breast cancer survivors received reconstruction, $\chi^2(6, N = 621) = 25.12, p < .001$. About half of the patients received adjuvant chemotherapy, with the exception of Whites, of whom only 32.5% received chemotherapy. Consistent with the fact that more Whites received lumpectomy as a form of surgery, White breast cancer survivors also were more likely to have received

TABLE 1
Medical and Demographic Characteristics by Ethnic Group

Variable	African American		White		Latina		Asian American		χ^2
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	
Mastectomy									
Yes	132	56.65	94	40.34	41	52.56	44	57.14	14.590*
No	101	43.35	139	59.66	37	47.44	33	42.86	
Chemotherapy									
Yes	113	48.71	75	32.47	38	48.72	40	51.95	17.089**
No	119	51.29	156	67.53	40	51.28	37	48.05	
Radiation									
Yes	106	45.49	142	60.94	40	51.28	33	42.86	14.408*
No	127	54.51	90	38.63	38	48.72	44	57.14	
Tamoxifen									
Yes	94	40.34	103	44.21	36	46.15	34	44.16	4.729
No	138	59.23	129	55.36	40	51.28	43	55.84	
Education									
High school or less	39	17.33	29	12.50	28	35.90	14	18.18	120.645**
Some college	118	48.89	78	33.62	38	48.72	11	14.29	
College graduate	20	8.89	33	14.22	3	3.85	25	32.47	
Postgraduate	56	24.89	92	39.66	9	11.54	27	35.06	
Income									
< 15k	14	6.22	13	5.83	3	4.05	2	2.63	73.931**
15–30k	47	20.89	22	9.87	18	24.32	12	15.79	
30–45k	49	21.78	28	12.56	25	33.78	14	18.42	
45–60k	41	18.22	40	17.94	8	10.81	14	18.42	
60–75k	38	16.89	23	10.31	11	14.86	6	7.89	
75–100k	17	7.56	40	17.94	4	5.41	13	17.11	
> 100k	19	8.44	57	25.56	5	6.76	15	19.74	
Relationship status									
Partnered	142	60.94	159	68.24	56	71.79	54	70.13	5.069
Not partnered	91	39.06	73	31.33	22	28.21	23	29.87	

*$p < .01$. **$p < .001$.

radiation treatment than were the other ethnic groups. Nearly half of all breast cancer survivors received tamoxifen treatment.

Mean time since diagnosis was 2.93 years ($SD = 1.19$) and did not differ significantly across ethnic groups, omnibus $F(3, 617) = 0.873$, $p = .455$. The mean times since diagnosis for breast cancer survivors were as follows: Latinas, 3.07 years ($SD = 1.21$); Asian Americans, 3.02 years ($SD = 1.18$); Whites, 2.93 years ($SD = 1.18$); and African Americans, 2.85 years ($SD = 1.21$).

Health-Related Quality of Life

RAND SF–36. Results from the RAND SF–36 are shown in Figure 1. Findings from the RAND revealed that, for the most part, patients' profile scores from across all ethnic groups were near or above age-matched population norms for healthy women (35). ANOVAs revealed significant differences among ethnic groups on emotional well-being, omnibus $F(3, 615) = 3.62$, $p = .013$; general health, omnibus $F(3, 616) = 2.96$, $p = .031$; and physical functioning, omnibus $F(3, 616) = 5.72$, $p = .001$. Scheffé post hoc analyses revealed that African American breast cancer survivors reported significantly higher emotional well-being than did Latinas. As for physical functioning, Dunnett's T3 showed that African Americans reported signifi-

cantly lower physical functioning in comparison to White and Asian American breast cancer survivors. No between-subjects effects were found for the RAND general health domain. After controlling for demographic and medical variables using
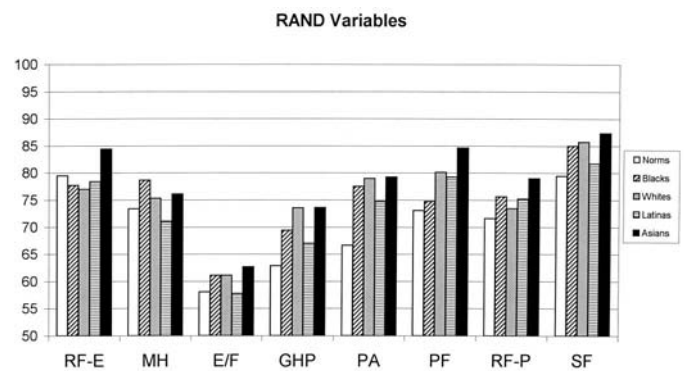

FIGURE 1   Mean RAND 36-Item Health Survey scores of breast cancer survivors by ethnicity in comparison to age-matched healthy controls. RF-E = emotional limitations; MH = emotional well-being; E/F = energy and fatigue; GHP = general health; PA = pain; PF = physical functioning; RF-P = physical limitations; SF = social functioning.

ANCOVA, significant differences in physical functioning and general health were lost; only on emotional well-being did ethnic differences remain, $F(10, 584) = 3.58$, $p = .014$. Estimated marginal means revealed that African American patients reported higher emotional well-being than did Whites or Latinas.

Cancer-Related Outcomes

CARES. Results from the CARES are reported in Table 2 and indicate that breast cancer survivors in our study reported having "little" concern with sexual interest and body image but reported "a fair amount of difficulty" with sexual dysfunction.

ANOVA results show that body image and sexual dysfunction varied across ethnic groups. Dunnett's T3 post hoc analyses revealed differences between African American and White breast cancer survivors for body image concerns, whereby African Americans reported having more concerns with their body image that did Whites; however, this difference was lost after controlling for demographic and medical variables using ANCOVA. Differences in sexual dysfunction were not found when ANOVA was performed, but ANCOVA analyses showed that African American breast cancer survivors reported less dysfunction than did Whites or Latinas.

TABLE 2
Summary of Analyses of Variance and Covariance, Unadjusted Means, and
Standard Deviations Comparing Ethnic Groups on Psychosocial and Cancer-Related Measures

Measure	Ethnic Group				ANOVA		ANCOVA[a]	
	African American[b]	*White*[c]	*Latina*[d]	*Asian American*[e]	*F*	*df*	*F*	*df*
Center for Epidemiologic Studies Depression Scale					2.32	(3, 612)	0.85	(10, 581)
M	10.78	9.97	13.30	11.03				
SD	9.27	9.52	9.98	10.57				
Mental Health Index					4.64**	(3, 615)	4.79**	(10, 583)
M	79.86$_{a/a}$	76.97$_{a,b/b}$	72.90$_{b/b}$	76.17$_{a,b/a,b}$				
SD	14.21	14.66	16.02	17.25				
Medical Outcomes Study—Social Support Survey					2.51	(3, 615)	3.48*	(10, 583)
M	79.01$_{/a}$	76.96$_{/b}$	74.44$_{/a,b}$	71.85$_{/b}$				
SD	19.86	22.30	20.44	24.16				
Dyadic Adjustment Scale					0.88	(3, 417)	0.65	(10, 390)
M	49.50	50.18	48.69	47.90				
SD	8.95	9.56	11.26	11.01				
Symptoms Summary Score (BCPT)					3.89**	(3, 593)	3.19*	(10, 564)
M	12.65$_{a/a}$	12.78$_{a/a,b}$	16.24$_{b/b}$	11.82$_{a/a}$				
SD	8.06	9.43	9.45	9.46				
CARES								
Body image					3.76*	(3, 613)	0.94	(10, 581)
M	1.09$_{a/}$	0.77$_{b/}$	1.07$_{a,b/}$	1.10$_{a,b/}$				
SD	1.22	1.03	1.21	1.15				
Sexual dysfuction					2.75*	(3, 375)	3.88**	(10, 354)
M	1.18$_{a/a}$	1.51$_{a/b}$	1.60$_{a/b}$	1.29$_{a/a,b}$				
SD	1.11	1.22	1.22	1.11				
Sexual interest					1.37	(3, 610)	0.48	(10, 578)
M	0.93	0.83	1.06	0.80				
SD	0.99	0.90	1.11	0.95				
Meaning Questionnaire								
Meaning					7.94***	(3, 615)	3.54*	(10, 585)
M	13.86$_{a/a}$	11.25$_{b/b}$	13.10$_{a,b/a,b}$	11.62$_{b/b}$				
SD	6.08	6.24	5.49	6.24				
Vulnerability					2.85*	(3, 615)	1.34	(10, 585)
M	6.02$_{a/}$	5.78$_{a/}$	7.62$_{a/}$	6.27$_{a/}$				
SD	4.95	4.54	5.66	4.85				

Note.   Subscripts denoted for significant pairwise comparisons only and listed as ANOVA/ANCOVA. Significant differences do not share subscript letters. BCPT = Breast Cancer Prevention Trial Symptom Checklist; CARES = Cancer Rehabilitation Evaluation System.
[a]Covariables: age, education, income, surgery (mastectomy/lumpectomy), chemotherapy (y/n), phase, location. [b]$n = 233$. [c]$n = 233$. [d]$n = 78$. [e]$n = 77$.
*$p < .05$. **$p < .01$. ***$p < .001$.

Physical symptoms. Overall, 76.8% of respondents reported experiencing at least one physical symptom as "moderately" or more troubling (greater than or equal to 2 on the BCPT 4-point scale). The most troublesome symptoms were hot flashes (37.8%) and body image problems (34.8%) for African American women, body image problems (38.1%) and vaginal dryness (32.3%) for Whites, body image problems (59.7%) and weight gain (42.3%) for Latinas, and forgetfulness (28.6%) and napping tendencies (26%) for Asian Americans.

An ANOVA and Scheffé post hoc analyses indicated that Latinas reported having more breast cancer related symptoms than any other group as measured by the BCPT summary score (see Table 2). This difference was maintained after ANCOVA, with Latina breast cancer survivors' symptomatology continuing to be significantly greater, omnibus $F(3, 564) = 3.19$, $p = .023$, than African Americans ($p < .007$) and Asian Americans ($p = .014$), but not Whites. ANCOVA analyses showed differences on individual symptoms such that African American patients reported less pain with intercourse than any other group, omnibus $F(3, 577) = 6.60$, $p < .001$, whereas Asian American patients reported having fewer problems with hot flashes in comparison to the other groups, omnibus $F(3, 584) = 3.03$, $p = .029$. Latinas experienced worse weight gain than any other group, omnibus $F(3, 583) = 3.59$, $p = .014$, and they had worse body image, omnibus $F(3, 583) = 5.36$, $p = .001$, in comparison to African Americans ($p = .019$) and Asian Americans ($p = .001$). Compared to African Americans, Whites had significantly worse vaginal dryness, omnibus $F(3, 583) = 5.93$, $p = .005$, and were more easily distracted, omnibus $F(3, 582) = 2.93$, $p = .018$.

Meaning Questionnaire. In general, most breast cancer survivors reported that they had found some sense of meaning in their life with respect to having had cancer. All Latinas, 98.7% of African Americans and Asian Americans, and 96.5% of Whites endorsed at least one statement confirming that breast cancer had led to benefits in their lives. Over half of respondents in each ethnic group indicated a change of at least "a fair amount" (greater than or equal to 2 on the 4-point scale) in terms of leading a healthier lifestyle, changing their outlook on life, recognizing the need to deal with other issues in their lives, and becoming more selective about how they spent their time. With respect to issues of vulnerability, 96.1% of Latinas, 94.4% of Whites, and 91% of African Americans and Asian Americans endorsed at least one item related to feeling vulnerable as a result of having had breast cancer. The items most frequently endorsed by all ethnic groups as "a fair amount" or higher were "thinking a lot more about my body" (Latinas = 57.1%, African Americans = 52.4%, Asian Americans = 49.4%, and Whites = 42.1%) and "worrying about cancer recurrence" (Latinas = 49.4%, African Americans = 40.3%, Asian Americans 39%, and Whites = 36.5%).

ANOVAs indicated significant differences on individual items. Scheffé post hoc analyses revealed that African American and Latina breast cancer survivors reported leading healthier lifestyles, omnibus $F(3, 615) = 8.29$, $p < .001$, than did Whites ($p < .001$ and $p = .021$, respectively). Dunnett's T3 post hoc analyses showed both African Americans and Latinas as having greater changes in outlook on life, omnibus $F(3, 615) = 10.74$, $p < .001$, than did Whites ($p < .001$ and $p = .015$, respectively) or Asian Americans ($p < .001$ and $p = .007$, respectively). With regard to the Meaning composite score, ANOVA and Scheffe post hoc analyses indicated that African American breast cancer survivors scored significantly higher than did Whites or Asian Americans (see Table 2). This ethnic difference remained after ANCOVA. With respect to the Vulnerability composite score, although the omnibus test was significant for ethnic differences, no differences were found through Dunnett's T3 post hoc analysis.

General Psychological Outcomes

No differences were found among ethnic groups on levels of depression as measured by the CES–D (see Table 2); approximately 25.6% of all women scored at or above the cutpoint of 16. With respect to emotional adjustment, means of the MHI for each ethnic group were above the reported age-matched MOS sample mean of 70.3 (28), with African Americans scoring significantly higher than Latinas as confirmed by Scheffé post hoc analyses. An ANCOVA revealed that this ethnic difference remained after controlling for demographic and medical variables, further revealing significantly higher scores for African American versus White breast cancer survivors. Results from the MOS Social Support Scale revealed that the breast cancer survivors in our study reported having good social support; means for each ethnic group were higher than the MOS norm of 70.1. Although no ethnic differences were observed through ANOVA, after controlling for medical and demographic variables, ANCOVA results showed differences among ethnic groups, with African American breast cancer survivors reporting significantly more social support than Whites or Asian Americans. With respect to the Revised Dyadic Adjustment Scale, completed only by those women who were in a relationship, mean scores in our sample clustered around the reported norm of 48.0 for married couples. Neither ANOVAs nor ANCOVAs revealed any differences among ethnicities.

Predicting Quality of Life

Multiple regression equations were run for each ethnic group independently using the covariables established for ANCOVAs as predictor variables for the quality of life measures. These seven predictor variables—age, income, education, study phase, geographic location, type of surgery (mastectomy or breast-conserving surgeries), and having chemotherapy—were entered as one block in regression analyses. To establish a comprehensive composite of HRQL among survivors, criterion variables were the eight domain scales of the RAND, the three subscales of the CARES, the summary scores on the BCPT and the Meaning Questionnaire, and the four general psychological measures. Because of space considerations, only those outcome variables with significant regression equations for any group are listed in Table 3.

African American breast cancer survivors. With respect to the RAND, the variance in the domains related to physical health—physical functioning and limitations, general health,

TABLE 3

Summary of Multiple Regression Analyses Predicting Quality of Life by Ethnicity

Ethnic Group and Measure	df	Overall Adjusted R^2	F Equation Value	Age	Income	Education	Surgery	Chemotherapy	Location	Phase
African Americans										
RAND										
Emotional well-being	(7, 216)	.013	1.428							
Physical functioning	(7, 216)	.129	5.719***	−0.257***	0.184*					
Physical limitations	(7, 216)	.060	3.039**	−0.145*	0.204***					
General health	(7, 216)	.046	2.521*	−0.211**						
Pain	(7, 216)	.035	2.145*						0.171*	
Energy	(7, 216)	.000	0.916							
CARES										
Body image	(7, 216)	.107	4.818***	−0.157*	−0.189*		0.309***			
Sexual dysfunction	(7, 135)	.038	1.809							
Sexual interest	(7, 213)	.000	0.747							
BCPT Summary score	(7, 202)	.052	2.649*					0.152*		−0.167*
Mental Health Index	(7, 215)	.013	1.421							
Meaning Questionnaire										
Meaning	(7, 216)	.038	2.256*	−0.214**						
Vulnerability	(7, 216)	.023	1.734							
Whites										
RAND										
Emotional well-being	(7, 214)	.064	3.160**	0.259***						
Physical functioning	(7, 214)	.164	7.202***	−0.286***					−0.146*	
Physical limitations	(7, 213)	.028	1.890							
General health	(7, 214)	.002	1.049							
Pain	(7, 214)	.037	2.212*							−0.150*
Energy	(7, 214)	.049	2.627*	0.157*						
CARES										
Body image	(7, 212)	.070	3.356**				0.290***			
Sexual dysfunction	(7, 122)	.078	2.560*	0.236*	0.213*			0.260**		
Sexual interest	(7, 211)	.034	2.084*		0.213**					
BCPT Summary score	(7, 209)	.006	1.186							
Mental Health Index	(7, 213)	.058	2.933**	0.287***						

Standardized Regression Coefficients

Measure	(df)					
Meaning Questionnaire						
Meaning	(7, 214)	.032	2.050*	−0.216**		
Vulnerability	(7, 214)	.033	2.088*	−0.205**		
Latinas						
RAND						
Emotional well-being	(7, 66)	.039	1.427			
Physical functioning	(7, 66)	.113	2.334*	−0.378**		
Physical limitations	(7, 66)	.049	1.536			
General health	(7, 66)	.000	0.491			
Pain	(7, 66)	.000	0.640			
Energy	(7, 66)	.000	0.916			
CARES						
Body image	(7, 64)	.000	0.860			
Sexual dysfunction	(7, 39)	.101	1.737			
Sexual interest	(7, 65)	.000	0.962			
BCPT Summary score	(7, 65)	.228	4.04***		−0.278*	0.377**
Mental Health Index	(7, 66)	.024	1.253			
Meaning Questionnaire						
Meaning	(7, 66)	.078	1.881			
Vulnerability	(7, 66)	.094	2.087			
Asian Americans						
RAND						
Emotional well-being	(7, 67)	.030	1.324			
Physical functioning	(7, 67)	.046	1.508			
Physical limitations	(7, 67)	.000	0.822			
General health	(7, 67)	.069	1.788			
Pain	(7, 67)	.000	0.292			
Energy	(7, 67)	.022	1.233			
CARES						
Body image	(7, 68)	.041	1.459			
Sexual dysfunction	(7, 37)	.124	1.892			
Sexual interest	(7, 68)	.000	0.304			
BCPT Summary score	(7, 67)	.004	1.048			
Mental Health Index	(7, 68)	.037	1.407			
Meaning Questionnaire						
Meaning	(7, 68)	.000	0.807			
Vulnerability	(7, 68)	.000	0.301			

Note. RAND = RAND 36-Item Health Survey; CARES = Cancer Rehabilitation Evaluation System; BCPT = Breast Cancer Prevention Trial Symptom Checklist.

*$p < .05$. **$p < .01$. ***$p < .001$.

and pain—was significantly accounted for by multiple regression. Age and income significantly predicted physical functioning and limitations, with younger age and higher income associated with better functioning. Age also was a significant predictor of general health, with younger women reporting better health. Cancer-related concerns such as symptom distress (measured by the BCPT) and body image (measured by the CARES) also were significantly predicted by multiple regression. Having had chemotherapy surfaced as a significant predictor for the BCPT summary score, as did phase of participation. With respect to body image concerns, being younger, having lower income, and having had mastectomy predicted lower satisfaction. For the meaning component from the Meaning Questionnaire, younger age was associated with having found more meaning as a result of breast cancer.

White breast cancer survivors. Four domains of the RAND—emotional well-being, physical functioning, pain, and energy—were significantly accounted for by multiple regression. Age surfaced as a significant predictor on three of these variables, with older age associated with better adjustment in emotional well-being and energy but worse adjustment in physical functioning. Mental health, as measured by the MHI, was significantly predicted by age as well; older White breast cancer survivors reported better mental health adjustment. With respect to the CARES, all three of the scaled scores were significantly predicted. Body image was significantly accounted for by surgery, with those who had mastectomy reporting the most concern with body image. Income accounted for the variance in sexual interest, as it did for sexual functioning, along with age and cancer treatment. Accordingly, being older, having a higher income, and having mastectomy were associated with worse sexual functioning. With respect to existential issues, both composite scores on the Meaning Questionnaire were predicted: Younger age was associated with having found more meaning as well as with experiences of vulnerability.

Latina breast cancer survivors. For the Latina breast cancer survivors in our sample, physical functioning from the RAND and the BCPT summary score were the only measures predicted by multiple regression. Younger age was associated with better adjustment in RAND physical functioning. The variance in breast cancer symptoms was significantly accounted for by income and chemotherapy. Women with lower income and those who had received chemotherapy were more likely to report more symptoms.

Asian American breast cancer survivors. None of the regression equations predicted outcomes for the Asian American breast cancer survivors in our sample.

Exploratory correlational analyses for Latina and Asian American breast cancer survivors. The smaller sample sizes for Latina and Asian American breast cancer survivors may have resulted in a lack of power to detect effects in regression analyses. Although the adjusted R^2s for the nonsignificant analyses were low, in some cases they were no lower than results that reached significance for the other two groups of respondents. Therefore, we explored the bivariate relations between those quality of life variables that yielded significant regression results for either African American or White women and the predictors that were entered into those regression equations. The results of these Pearson correlations are presented in Table 4. Similar to findings from the regression analyses, age correlated significantly with several measures for both Latina and Asian American women. Income also was significantly correlated with some outcomes for Latinas.

DISCUSSION

In this article we provide a comprehensive assessment of HRQL in a large, multiethnic sample of women who had been treated for breast cancer during the preceding 5 years. Our goals were to provide a description of quality of life for women in each ethnic group, to identify those domains that were relatively more problematic for some groups as compared to others both before and after controlling for confounding demographic and medical variables, and to identify demographic and medical predictors of quality of life for women in each ethnic group.

Overall quality of life was good, as has been reported in previous research. The inclusion of a multidimensional, standardized measure of quality of life in this study, unlike most other research in the area, allowed for confirmation of this description through reference to a healthy, age-matched normative sample. Women in all groups also reported levels of mental health, social support, and dyadic adjustment that were comparable to established norms in patient populations (28) and healthy populations (27,32). Although similar in overall quality of life and social adjustment to women who had not been diagnosed with cancer, almost all of these cancer survivors reported that having had cancer had changed their lives through an increased sense of both meaning and vulnerability.

Although women across ethnic groups were similar on many quality of life and psychological variables, there were several areas of relatively greater distress for some groups of women. Latinas reported worse mental health and emotional well-being than African Americans and more physical symptoms than women in any of the other ethnic categories. High levels of physical symptoms may point to a tendency to describe emotional distress in physical terms (36), but the reports of emotional difficulties indicate that these women were not expressing distress entirely through somatization. Indeed, the relatively worse emotional well-being reported by Latinas is consistent with previous research with breast and cervical cancer patients (10,37). African American women described more physical dysfunction than White or Asian American women and greater problems with body image than White women. Although there were significant mean differences on body image on the CARES, the pattern of results was not mirrored in frequencies reported on the symptom checklist, on which Latinas reported the highest level of body image problems. Finally, White or Asian American women reported finding less meaning through cancer than did African American women.

TABLE 4

Correlations Between Health-Related Quality of Life Variables and Selected Covariables for Latina and Asian American Patients

Measure	*Latinas*[a]				*Asian Americans*[b]			
	Age	*Income*	*Mastectomy*	*Chemotherapy*	*Age*	*Income*	*Mastectomy*	*Chemotherapy*
CARES								
Body image	−.002	−.182	.103	−.084	.006	−.168	.160	.137
Sexual dysfunction	.143	−.261	−.089	.267	.409**	−.015	.168	.038
Sexual interest	.030	−.182	.107	.097	.013	.008	.127	.091
BCPT summary score	−.096	−.252*	−.229*	.381**	−.122	−.044	.057	.093
Existential Questionnaire								
Meaning	−.259*	.017	.185	.267*	.090	−.106	.116	−.009
Vulnerability	−.230*	−.044	.042	.283*	.002	−.038	−.005	.103
Mental Health Index	.142	.287*	.083	−.067	.290*	.057	.028	−.131
CES–D	−.112	−.322**	−.124	.101	−.296**	−.167	−.064	.203
MOS Social Support	.099	.196	−.074	.008	.023	.107	−.004	−.106
RAND								
Emotional limitations	−.055	.245*	.007	−.016	.202	.025	.187	−.137
Emotional well-being	.144	.291*	.077	−.056	.232*	.095	−.022	−.075
Energy	.107	.241*	−.020	−.081	.245*	.127	.105	−.146
General health	.085	.122	.025	−.038	.088	.144	.083	−.189
Pain	.087	.133	−.034	−.121	−.084	.057	−.031	−.001
Physical functioning	−.381**	.118	−.040	−.002	.269*	.139	−.051	−.026
Physical limitations	−.244**	.173	−.043	.048	−.043	.205	.070	−.070
Social functioning	−.085	.312**	.026	−.006	.108	.133	.025	−.151

Note. The covariables phase and location were not significantly correlated with outcome measures and thus are not included in this table. Education was found to correlate only for Latinas specific to sexual interest and dysfunction at the .05 level. Because of space constraints, education is not included in this table. CARES = Cancer Rehabilitation Evaluation System; BCPT = Breast Cancer Prevention Trial Symptom Checklist; CES–D = Center for Epidemiologic Studies Depression Scale; MOS = Medical Outcomes Study Social Support Survey; RAND = RAND 36-Item Health Survey.
[a]$n = 78$. [b]$n = 77$.
*$p < .05$. **$p < .01$.

These findings are difficult to interpret in light of the confound between ethnicity and demographic and medical variables. With significant differences across ethnic groups on age, income, education, surgery, and adjuvant treatment, it is not surprising that there are some differences on quality of life measures. The results after controlling for these variables are mixed. The greater difficulties identified for Latinas are maintained, with one exception. Whites no longer have significantly fewer physical symptoms than Latinas, although the differences from African American and Asian American women on symptoms were maintained. In contrast, the physical functioning and body image difficulties reported by African Americans did not retain significance after controlling for medical and demographic variables. Instead of suggesting difficulties, analyses of covariance indicated better quality of life for African Americans. The higher levels of meaning were maintained. In addition, levels of social support emerged as higher than those reported by White or Asian American women, and sexual dysfunction emerged as lower than that reported by White or Latina women. In sum, after controlling for confounding variables, the data indicate that Latinas continue to experience greater difficulty with physical symptoms in comparison to Asian and African American patients and, to a lesser extent, Whites. Quality of life of African American breast cancer patients is better than that of others in areas of social support, sexual function, and finding meaning.

This variation in results—with different findings maintaining, losing, and gaining significance—indicates the importance of considering data both with and without control for likely confounds. We have suggested that ethnicity often is used as a proxy in cancer quality of life research for potentially more salient predictors, such as medical care, socioeconomic status, cultural variables, and health-related attitudes (1). In this study we controlled for only a small subset of these possible mediators. These variables appear to have played a role in the pattern of findings related to African Americans but not Latinas. It is likely that gaining further understanding of between-group differences will require including consideration of a much broader and more psychologically sophisticated group of correlates with ethnicity.

The medical and demographic predictor variables included here accounted for, at most, moderate proportions of the variance in outcome measures. The pattern of results for African American and White women was similar, although not identical. In both cases, significant predictions were achieved for multiple aspects of quality of life, with age and, to a lesser extent, income being the most frequent predictors. For Latinas, only the regression equations for physical functioning and symptoms reached significance. The strongest prediction obtained in this study was for reports of physical symptoms, on which over 22% of the variance was accounted for in this area of greatest distress for Latinas. Regression analyses yielded no significant findings for Asian Amer-

ican women, despite the fact that means and standard deviations on the measures were similar to those reported by other women.

Examination of bivariate correlations, however, revealed significant relations between age and several quality of life variables for Latinas and Asian Americans, similar to those found for the other groups. Although larger sample sizes would likely have yielded significant findings on the regression analyses for these women, the clinical importance of the association between medical and demographic variables in predicting quality of life appears to be limited. Future research should include assessment of conceptually based constructs, such as acculturation, familial social support, religiosity, other life stressors, and cultural views of body image (1).

Caution should be exercised in interpreting the results of this study. The inclusion criteria limited participation to women who spoke English, had access to medical care, and had no major comorbidities. These constraints on recruitment clearly restrict the generalizability of our findings. Given the focus of this article on ethnicity, the absence of non-English-speaking participants is particularly problematic. Providing assessment tools with established reliability and validity in several languages that are comparable across languages and groups of women is a major challenge for the field. The proportion of nonparticipants also raises questions about generalizability, although our response rate is similar to those of other breast cancer studies (38). Unlike some other studies, we have data on the medical and demographic biases in our sample that can guide interpretation. These data indicate that, compared to the population of breast cancer survivors, our respondents were more likely to be White, young, and married. It is possible, therefore, that our study may have yielded samples of ethnic women that were more highly self-selected and not fully comparable to the White sample, as is likely the case in many multiethnic studies. In light of these difficulties, our findings may not be representative of the full range of breast cancer survivors, particularly women who are less acculturated.

In addition to issues of generalizability, the categorization of women into broad ethnic categories further complicates interpretation of the results. As work by Gotay et al. (5) with Japanese American, Filipino American, and native Hawaiian cancer survivors demonstrates, there can be greater variability within ethnic groupings than between them. Finally, the cross-sectional and exploratory nature of this study, coupled with a focus on demographic/medical variables rather than more psychologically meaningful predictors, limits the extent to which we are able to explain the results.

Despite these drawbacks, this study provides one of the most comprehensive assessments of quality of life following breast cancer currently available for women of color. The study benefits from the inclusion of women from each of the major ethnic groups in the United States, the use of multidimensional and standardized measures, and the analytic approach of controlling for confounding variables. These findings suggest that most breast cancer survivors in our study have adjusted well to the disease and its treatment and have reported quality of life similar to women without the disease. Our data also suggest that psychologists and medical professionals should not assume that

descriptions of quality of life outcomes provided by non-Hispanic Whites can be generalized to all women. Future research should move beyond the exploratory and descriptive data provided here. Only through developing a deeper understanding of which domains are most salient for different women, and why, can the health care needs of all women be fully addressed.

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