

Sociocultural Correlates of Breast Cancer Knowledge and Screening in Urban African American Women

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African American women are more likely to die of breast cancer than women of any other racial or ethnic group,¹ even though national surveys report that mammography rates are higher for African Americans than for other groups.² At least part of this discrepancy has been attributed to delayed diagnosis.^{3,4} Identifying sociocultural factors that influence timely screening and incorporating them into health messages for African American women may help reduce this disparity. This study examined associations between 5 such factors—collectivism, spirituality, racial pride, and present and future time orientation—and breast cancer–related knowledge, barriers to mammography, and mammography use and stage of change among urban African American women.

METHODS

Study Population

African American women aged 18 to 65 (N=1241) were recruited from 10 public health centers in the city of St. Louis, Mo, were provided informed consent, completed a baseline questionnaire, and received \$20 for participating. Fourteen women were removed from the sample because they did not provide personal identification information (n=2), were age ineli-

gible (n=2), or enrolled twice (n=10); the final sample was 1227. Of these, all women aged 40 years and older (n=435) are included in the current analyses.

Measures

Sociocultural constructs. Sociocultural constructs were measured with scales developed by the project team and found to perform well in psychometric testing in a pilot sample of 72 African American women from low-income urban housing communities.⁵ Internal consistency and temporal stability (2-week test–retest interval) on these scales were, respectively, collectivism (6 items; $\alpha=.93$; $r=0.85$; $P=.001$), spirituality (9 items; $\alpha=.88$; $r=0.89$; $P=.001$), racial pride (7 items; $\alpha=.84$; $r=0.52$; $P=.001$), present time orientation (5 items; $\alpha=.73$; $r=0.52$; $P=.01$), and future time orientation (5 items; $\alpha=.72$; $r=0.54$; $P=.07$).

Breast cancer–related knowledge. Based on previous research with African American women,^{6–9} measures of mammography knowledge (5 items), breast cancer knowledge (6 items), and breast cancer treatment knowledge (3 items) were developed. All items used a yes/no/not sure response format, and test–retest reliability for the measures was acceptable: $r=0.62$; $P<.001$ (mammography); $r=0.63$; $P<.001$ (breast cancer); and $r=0.45$, $P<.01$ (treatment). Correct responses were summed to form an index variable for each measure with values of 0–5 (mammography), 0–6 (breast cancer), and 0–3 (treatment).

Barriers to mammography. A yes/no/not sure response format was used to assess whether women perceived each of 7 barriers to mammography as applying to them. Responses indicating the presence of a barrier were summed to form an index variable used in analyses, with possible values ranging from 0 to 7. Test–retest reliability for these items was acceptable ($r=0.70$; $P<.01$).

Mammography use and stage of change. Three items assessed mammography use and stage of change. The first identified time of last mammogram (≤ 12 months ago; > 12 months ago; never). Test–retest reliability for this item was adequate ($r_s=0.72$; $P<.001$); for analyses, it was dichotomized into ever or never having a mammogram. The second assessed thinking

about having a mammogram in the next 6 months (i.e., stage of change¹⁰). Test–retest reliability for this item was poor ($r=0.13$; $P=.60$). The third assessed having an appointment for a mammogram in the next 6 months. Test–retest reliability for this item was strong ($r=0.78$; $P<.001$). Women were classified as (1) *precontemplators* if they had not had a mammogram in the last 12 months, were not thinking about having one, and had no appointment for one; (2) *contemplators* if they were thinking about having one; (3) *in preparation* if they had an appointment for one; and (4) *in action/maintenance* if they had had a mammogram in the last 12 months. Family history of breast cancer, recommendation from a doctor or nurse to get a mammogram, age, years of school completed, work status (full time, part time, not working), and income also were assessed.

Statistical methods. Missing values for each sociocultural scale (2%–5% of respondents) were imputed by multiplying the sum of answered items by the ratio of items unanswered on the scale. Scale scores were dichotomized into high or low because of limited variability. This stratification was based on decisions from the larger intervention trial to create equal-sized groups of women who were high and low on each construct. Cutpoints approximated a median split.

Stepwise multiple logistic regression (for mammography use and stage of change) and stepwise multiple linear regression (for barriers and knowledge) were conducted for variables that had a P value less than .10 in bivariate comparisons to the outcome. Sociocultural variables and demographics (age, education, income, employment, and family history) were independent variables in both analyses, and physician or nurse recommendation and each knowledge scale were added as independent variables for the mammography use and stage of change analyses. Independent variables were sequentially selected for inclusion or exclusion from the model based on entry criteria of .10 and removal criteria of .15. Data were analyzed with SAS, Version 8.2 (SAS Institute Inc, Cary, NC).

RESULTS

Demographic Characteristics

Participants ranged in age from 40 to 65, with a mean age of 48.60 years (SD=6.46). The mean years of education were 12.37

(SD=2.19) and ranged from 3 to 20 years. About 43% (n=188) were single, 18.9% (n=82) were married, 27.1% (n=118) were separated or divorced, and 8.7% (n=38) were widowed (9 [2.1%] were missing data). About 44% (n=193) were employed full time, 13.1% (n=57) worked part time, and 40.2% (n=175) were not employed at the time of enrollment (10 [2.3%] were missing data). The median house-

hold income before taxes was in the \$10 001 to 20 000 bracket, with a range from less than \$5000 to more than \$60 000 per year.

Knowledge About Mammography, Breast Cancer, and Its Treatment

Women who had a present time orientation were younger, were less educated, had lower incomes, and had less *mammography knowledge*.

Those who were less educated and had lower incomes had less *knowledge about breast cancer*. Those who had a present time orientation, were younger, were less educated, had lower incomes, were not employed, and did not have a family history of breast cancer had less *knowledge about breast cancer treatment* (Table 1).

Barriers to Mammography

Women who had a present time orientation reported more barriers to mammography than did those who scored low on present time orientation ($\beta=0.29$ [SE=0.11]; $P<.01$). Income was negatively associated with barriers ($\beta=-0.21$ [SE=0.07]; $P<.01$).

Mammography Use and Stage of Change

Present time orientation was negatively associated with ever having a mammogram, and age and mammography knowledge were positively associated. Age, employment, physician or nurse recommendation to get a mammogram, and mammogram knowledge were positively associated with mammography stage of change (Table 2).

Missing Data

Respondents not reporting key demographic information needed for analyses were excluded (n=56). Excluded respondents had fewer years of education (10.8 vs 12.3; $P=.01$), were less likely to be employed (41% vs 61%; $P=.01$), and were more likely to score high on racial pride (78% vs 62%; $P=.03$). By conducting analyses with and without demographic variables of interest, we examined whether these differences affected the associations and found that statistical significance did not change in either direction for any association (data not reported).

DISCUSSION

Present time orientation (i.e., a focus on immediate or short-term consequences vs planning for the future) was negatively associated with breast cancer–related knowledge and mammography and positively associated with perceived barriers to mammography. Because getting a mammogram suggests thinking about the future in the absence of symptoms, this finding is consistent with definitions of present time orientation and findings reported in previous research.^{11–13} Having a present time orientation is

TABLE 1—Knowledge Scores, by Demographic and Sociocultural Characteristics, With Multiple Linear Regression Results (N = 379)

	n	Mammography Knowledge (Range 0–5; $R^2=0.13$)		Breast Cancer Knowledge (Range 0–6; $R^2=0.10$)		Breast Cancer Treatment Knowledge (Range 0–3; $R^2=0.14$)	
		Mean \pm SD ^a	β (SE) ^b	Mean \pm SD ^a	β (SE) ^b	Mean \pm SD ^a	β (SE) ^b
Age, y ^{c,e}	379	0.16	0.03 (0.01)**	0.04	NS	0.15	0.02 (0.01)**
Education, y ^{c,d,e}	379	0.29	0.12 (0.03)**	0.27	0.15 (0.04)**	0.22	0.05 (0.02)*
Annual household income, \$ ^{c,d,e}							
≤ 10 000	175	3.12 \pm 1.3	0.27 (0.09)**	2.82 \pm 1.6	0.41 (0.11)**	1.54 \pm 1.0	0.22 (0.07)**
10 001–40 000	144	3.72 \pm 1.1		3.56 \pm 1.4		2.01 \pm 0.8	
> 40 000	60	3.90 \pm 1.2		3.85 \pm 1.6		2.15 \pm 0.8	
Employment status ^{c,d,e}							
Employed	231	3.62 \pm 1.3	NS	3.45 \pm 1.6	NS	1.94 \pm 0.8	0.16 (0.10)
Not employed	148	3.24 \pm 1.2		2.97 \pm 1.6		1.61 \pm 1.0	
Family history of breast cancer ^b							
Yes	45	3.56 \pm 1.3	NS	3.49 \pm 1.5	NS	2.04 \pm 0.8	0.32 (0.14)*
No	334	3.46 \pm 1.2		3.23 \pm 1.6		1.78 \pm 0.9	
Collectivism							
High	224	3.54 \pm 1.2	NS	3.28 \pm 1.6	NS	1.83 \pm 0.9	NS
Low	155	3.37 \pm 1.3		3.25 \pm 1.6		1.79 \pm 0.9	
Spirituality ^c							
High	212	3.59 \pm 1.3	NS	3.32 \pm 1.6	NS	1.85 \pm 0.9	NS
Low	167	3.32 \pm 1.2		3.19 \pm 1.6		1.77 \pm 0.9	
Racial pride ^{c,d,e}							
High	235	3.58 \pm 1.2	NS	3.42 \pm 1.6	NS	1.90 \pm 0.9	NS
Low	144	3.30 \pm 1.3		3.01 \pm 1.5		1.67 \pm 0.9	
Present orientation ^{c,d,e}							
High	125	3.18 \pm 1.3	-0.28 (0.13)*	2.97 \pm 1.6	NS	1.62 \pm 0.9	-0.21 (0.10)*
Low	254	3.61 \pm 1.2		3.41 \pm 1.5		1.91 \pm 0.9	
Future orientation							
High	129	3.38 \pm 1.2	NS	3.23 \pm 1.6	NS	1.84 \pm 0.8	NS
Low	250	3.52 \pm 1.3		3.28 \pm 1.5		1.80 \pm 0.9	

Note. NS = not significant.
^aPearson correlations reported for association of age and education with knowledge. For categorical characteristics, mean knowledge score is reported by category.
^bParameter estimates from stepwise multiple linear regression testing for the association of each characteristic adjusted for the other characteristics remaining in the model. Parameters are reported for variables remaining in the final regression model.
^cIn bivariate comparison to mammogram knowledge, $P \leq .10$.
^dIn bivariate comparison to cancer knowledge, $P \leq .10$.
^eIn bivariate comparison to treatment knowledge, $P \leq .10$.
 * $P \leq .05$; ** $P \leq .01$.

TABLE 2—Percentage of Respondents in Each Stage of Change for Mammography and Mammography History With Adjusted Odds Ratios (ORs) for Associations With Demographic and Sociocultural Characteristics (N = 379)

	Stage of Change for Mammography					Mammography History		
	Precontemplation (n = 25)	Contemplation (n = 90)	Preparation (n = 58)	Action (n = 199)	OR ^a (95% CI)	Never Had a Mammogram (n = 68)	Has Had a Mammogram (n = 297)	OR ^b (95% CI)
Age, y ^{c,d}	46.0 ± 4.8	46.6 ± 5.4	48.2 ± 5.9	49.5 ± 6.6	1.06 (1.02, 1.10)**	44.4 ± 3.5	49.4 ± 6.4	1.20 (1.11, 1.28)**
Education, y ^d	11.7 ± 1.6	12.6 ± 1.8	12.2 ± 2.2	12.6 ± 2.3	NS	12.1 ± 1.6	12.6 ± 2.2	NS
Annual household income, \$								
≤ 10 000	40%	50%	43%	45%	NS	47%	45%	NS
10 001–40 000	48%	34%	38%	40%	43%	37%		
> 40 000	12%	16%	19%	15%	10%	17%		
Employed ^c	40%	57%	74%	63%	1.49 (0.98, 2.27)	60%	61%	NS
Family history of breast cancer	12%	7%	17%	13%	NS	7%	13%	NS
MD recommendation ^{c,d}	32%	45%	84%	75%	1.76 (1.42, 2.18)**	54%	69%	NS
Mammogram knowledge ^{c,d}	2.56 ± 1.4	3.23 ± 1.3	3.59 ± 1.4	3.70 ± 1.1	1.31 (1.11, 1.55)**	2.79 ± 1.4	3.65 ± 1.2	1.57 (1.25, 2.00)**
Breast cancer knowledge ^{c,d}	2.40 ± 1.8	3.40 ± 1.6	3.07 ± 1.5	3.39 ± 1.5	NS	2.66 ± 1.6	3.42 ± 1.5	NS
Breast cancer treatment knowledge ^{c,d}	1.48 ± 1.0	1.68 ± 0.9	1.76 ± 1.0	1.93 ± 0.9	NS	1.49 ± 1.0	1.89 ± 0.9	NS
High collectivism	56%	58%	71%	57%	NS	57%	59%	NS
High spirituality ^{c,d}	48%	48%	71%	56%	NS	44%	58%	NS
High racial pride ^{c,d}	40%	62%	52%	67%	NS	44%	66%	1.66 (0.91, 3.02)
High present orientation ^d	52%	29%	33%	32%	NS	44%	30%	0.48 (0.26, 0.88)*
High future orientation	16%	36%	40%	35%	NS	31%	35%	NS

Note. CI = confidence interval; NS = not significant.

^aAdjusted odds ratios from stepwise multiple logistic regression testing for the association of each characteristic adjusted for the other characteristics remaining in the model. Odds ratios are reported for variables in the final model. For categorical variables, the reference category is the second row within each characteristic; for continuous variables, odds are based on a 1-year increase. Logistic regression is modeling the probability of being in the action stage.

^bLogistic regression is modeling the probability of having had a mammogram.

^cIn bivariate comparison to mammography stage, $P \leq .10$.

^dIn bivariate comparison to mammography history, $P \leq .10$.

* $P \leq .05$; ** $P \leq .01$.

probably more closely linked to income than race,^{14–16} and we believe it reflects life circumstance more than individual disposition. Still, effects of present time orientation persisted after adjusting for income, education, and employment, 3 indicators of social circumstance.

The pattern of association between racial pride and these same outcomes was also consistent but in the opposite direction and not reaching statistical significance. Our racial pride scale captures a type of race-related activism (e.g., “Black women should keep up with issues that are important to the Black community”), conscientiousness (e.g., “Racial pride is important for developing strong Black families”), and connectedness (e.g., “I feel a strong connection to other Black women”) that may reflect heightened awareness about issues affecting African American women and could translate into personal action on health-related matters.

Receiving a recommendation from a health care provider has been shown to be an important predictor of mammography^{17,18} and was found to be so again in this study. Unlike many studies of breast cancer screening in underserved women, we did not find an association between education, income, and mammography. This may reflect the relatively minimal variation in socioeconomic status in our sample or a growing awareness among women that programs exist to pay for mammograms if you cannot afford one.

Public health practitioners working to promote mammography might consider integrating present time orientation and racial pride into their approaches for African American women. In our work in health communication, this means developing messages and materials that validate and build on a woman's status on these variables. Previous research has shown that “tai-

loring”¹⁹ messages in this way can enhance their effectiveness.^{20,21} As this study progresses, we will test for the first time the effects of health messages that are tailored for African American women specifically on sociocultural variables. We encourage others to experiment with these constructs in hopes of enhancing interventions promoting breast cancer screening among African American women and helping eliminate health disparities. ■

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Contributors

S.N. Lukwago, M.W. Kreuter, C.L. Holt, and K. Steger-May wrote the brief. M.W. Kreuter and C.S. Skinner designed the study. K. Steger-May and C.L. Holt designed and conducted the analyses. C.S. Skinner and D.C. Bucholtz critically reviewed and provided feedback on the brief.

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Human Participant Protection

This project was approved by the Saint Louis University institutional review board.

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