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Factors influencing Breast Cancer Screening in Low-Income African Americans in Tennessee

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Abstract

This study examined demographic and lifestyle factors that influenced decisions and obstacles to being screened for breast cancer in low-income African Americans in three urban Tennessee cities. As part of the Meharry Community Networks Program (CNP) needs assessment, a 123-item community survey was administered to assess demographic characteristics, health care access and utilization, and screening practices for various cancers in low-income African Americans. For this study, only African American women 40 years and older (n=334) were selected from the Meharry CNP community survey database. There were several predictors of breast cancer screening such as marital status and having health insurance ($P < .05$). Additionally, there were associations between obstacles to screening and geographic region such as transportation and not having enough information about screenings ($P < .05$). Educational interventions aimed at improving breast cancer knowledge and screening rates should incorporate information about obstacles and predictors to screening.

Aside from skin cancer, breast cancer is the second leading cause of cancer deaths among women in the United States [1]. In 2013, the American Cancer Society estimates that 232,340 new cases of the disease will be diagnosed in women and 39,620 will die from the disease [1]. Although African Americans are less likely to be diagnosed with breast cancer, they continue to bear a disproportionately higher mortality burden for breast cancer compared with their Caucasian counterparts [2–6].

The causes of the inequalities are complex and involve various social, economic, and biological factors. Despite reported improvements in the rates of mammography screening among racial/ethnic minorities; many factors still remain that affect the initiation of this practice among these sub-groups. In the past, women with low socioeconomic status, uninsured status, and nonwhite race have experienced inequities in mammography use due to lack of awareness of the benefits of screening and limited access to care [7–12]. One study found that low income negates the advantage of good geographic access to healthcare

since poverty is associated with transportation, childcare and work schedule difficulties [13]. Persistent efforts are therefore needed to improve and sustain access to mammography for these individuals. Added to access and coverage, socioeconomic factors, health status, utilization of health services and cultural preferences, among others, have also been noted as hindrances to breast cancer screening [13 – 18]. Low levels of education attainment have also been noted as affecting readiness for cancer screening [19].

Early detection through mammography and other screenings has been associated with decreased breast cancer mortality among women [4, 5, 19 – 22]. The American Cancer Society recommends that women of average risk for breast cancer 40 years and older get an annual mammogram and clinical breast exam [23]. Despite the established benefits of screening, many women do not comply with the established breast cancer screening guidelines and the rates of noncompliance are much higher in certain subgroups, including low-income African Americans and Hispanic women [24 – 27]. This is particularly problematic because these groups in particular bear a higher burden of morbidity and mortality from breast cancer [28 – 30].

The current study examines socio-demographic factors that influence decisions to use mammography and other breast cancer screenings in low-income African Americans. In addition, this study examines the differences in obstacles to screening by geographic region. The impetus for this investigation is that while research has documented some factors that influence breast cancer screening behavior, more information is needed to understand influences and obstacles to breast cancer screening among low-income African Americans. This information in turn can be used to improve screening rates in this high-risk group.

Methods

In 2005, the National Cancer Institute funded 25 Community Networks Programs (CNP) to focus on reducing cancer disparities in diverse, high-risk populations located throughout the United States. One of the projects funded was the Meharry Medical College Community Health Centers-Community Networks Program (Meharry CNP), which focuses on reducing and in time eliminating cancer health disparities among African Americans. As part of the Meharry CNP needs assessment, a 123-item community survey was developed to assess demographic characteristics (age, race, income, education, marital status, employment status), health insurance coverage, health care access and utilization, health behaviors (smoking history, alcohol use), and screening practices (including obstacles to screening) for various cancers. The survey was modeled after the CDC's Behavioral Risk Factor Surveillance System (BRFSS) and contained many identically worded questions, including those about cancer.

Population studied

The survey was administered to 1140 African Americans in Nashville (n = 342), Chattanooga (n = 399), and Memphis (n = 399). To maximize recruitment of African Americans, communities within zip codes with a majority African American presence (> 50%) were targeted. Population characteristics including race, age, and gender information

for all zip codes in these cities were obtained from the U.S. Census Bureau projected for year 2005.

Participants were recruited for the survey at community events and businesses (i.e. community centers, health fairs, barbershops). All surveys were conducted by trained project staff at each site. A series of workshops were conducted to train staff in recruiting eligible participants, obtaining written informed consent, and administering the survey. The eligibility criteria included being 18 years and older, English speaking, and a resident of Nashville, Chattanooga or Memphis for the past 6 months. This survey protocol was approved by the Meharry Medical College and Erlanger Health Systems Institutional Review Boards (IRBs).

For this study, only African American women 40 years and older were selected from the Meharry CNP community survey database. The final sample size was 334. The rationale for selecting women over 40 was that organizations like the American Cancer Society (ACS)²⁴ recommend that women begin annual screenings for breast cancer starting at age 40.

Data coding and analysis

The primary outcome of interest was having been screened for breast cancer with a mammogram or a mammogram plus clinical breast exam in the past two years. Weight status and smoking status were two variables that were calculated. Weight status was categorized using body mass index (BMI) calculated as weight in kilograms divided by the square of height in meters. The three standard BMI categories used included normal weight (18.5 BMI 24.9), overweight (25 BMI 29.9), and obese (BMI 30). Smoking status was categorized as former, current, or never smokers (see Table 1). Current smokers consisted of those participants who responded “Yes” to the question “Do you smoke cigarettes now?” Participants were categorized as never smoked if they responded “No” to the questions “Have you smoked at least 100 cigarettes (5 packs of cigarettes) in your entire life?” and “Do you smoke cigarettes now?” Former smokers were those who responded “Yes” to the question “Have you smoked at least 100 cigarettes (5 packs of cigarettes) in your entire life?” and “No” to the question “Do you smoke cigarettes now?” Additionally, obstacles to screening (yes/no) were measured by nine items. For each item, participants had to indicate (yes/no) if the item was an obstacle.

Demographic, lifestyle, and health-related characteristics were calculated for both African American women who had a mammogram or mammogram plus clinical breast exam in the past two years and for those who did not. In Table 1, chi-square tests were used to examine the associations of demographic and lifestyle characteristics with screening status. In Tables 3 and 4, chi-square tests were used to examine associations between screening obstacles, and screening status and geographic region. For all chi-square tests, a p-value of <.05 was significant.

A binary logistic regression model was conducted in Table 2 to evaluate the associations between demographic and lifestyle variables with having had a mammogram or mammogram plus clinical exam in the past two years. Having a mammogram or mammogram plus clinical breast exam within the past two years (yes = 1 no = 0) was the

dependent variable. Demographic and lifestyle variables illustrated in Table 1 were only included as predictors in the logistic regression model if they had a significant (using chi-square tests) bivariate association with screening status. The final predictor variables selected were age at survey interview, city of the participant, BMI, marital status, annual household income, health insurance status, medical visits in past 12 months, and alcohol use in the past 30 days. All data analyses were conducted using SAS/STAT software, Version 9.1 of the SAS System for Windows (SAS Institute Inc., Cary, NC, USA).

Results

Demographic and lifestyle factors for African American women 40 years and older from the Meharry CNP community survey are presented in Table 1. A total of 64% and 56% of the study participants respectively reported either having had a mammogram or mammogram plus clinical breast exam (Mammogram+) within the past two years. Among women screened for breast cancer within the past two years, most were 40–64 years of age, had health insurance, and received a medical visit in the past 12 months.

Among African American women who had not been screened for breast cancer within the past two years, most had annual household incomes < \$15,000, were more likely to be single or never been married, and did not have at least one alcoholic beverage in the past 30 days. Both groups of participants had similar rates of having never smoked, being obese, or had a family history of any cancer. Respondents in both groups self-rated their health as good to excellent, were employed, and had less than a high school education.

Relationship between demographic and lifestyle factors and breast cancer screening behavior

As shown in Table 2, a logistic regression model was conducted to ascertain if demographic and lifestyle variables predicted screening behaviors for breast cancer. Table 2 summarizes the odds ratios (ORs) and 95% confidence intervals (CIs).

Mammogram alone—Several of the adjusted ORs were significant for breast cancer screening status. Compared to participants from Nashville, those from Chattanooga were 2.16 times as likely to have been screened in the past two years. Participants with annual household incomes ≥ \$15,000 were 2.15 times more likely to have been screened for breast cancer in the past 2 years compared to participants who had annual household incomes < \$15,000. Compared to participants who had at least one alcoholic beverage in the past 30 days, those who did not were 1.88 times as likely to have been screened for breast cancer in the past two years. Finally, participants who did not have health insurance were 0.32 times as likely to have been screened compared to those that did have health insurance.

A few crude ORs were no longer significant after adjusting for the other variables in the model. The increased odds of having been screened for participants 65 years and older compared to participants between 45–64 years were not detected after adjustments. Also, the decreased odds of having been screened for participants who had not had a medical visit in past 12 months compared to those who had were not detected after adjusting for other variables. Finally, the decreased odds of having been screened for participants who were

single compared to those who were married or had a partner were not detected after adjustments.

Mammogram plus clinical breast exam—Compared to participants who were normal weight, those who were overweight were 2.70 times as likely to have been screened for breast cancer in the past two years. Compared to participants who had at least one alcoholic beverage in the past 30 days, those who did not were 1.96 times as likely to have been screened for breast cancer in the past two years. Finally, participants who did not have health insurance were 0.29 times as likely to have been screened compared to those who did have health insurance.

Additional crude ORs were no longer significant after adjusting for the other variables in the model. The decreased odds of having been screened for participants who had not made a medical visit in past 12 months compared to those who had were not detected after adjusting for other variables. The decreased odds of having been screened for participants who were single compared to those who were married or had a partner were not detected after adjustments.

The increased odds of being screened for participants with greater educational attainment than a high school diploma and those with household annual incomes of \$15,000 were not detected after adjusting for other variables.

Obstacles to screening

Obstacles to receiving mammography plus clinic breast exam by geographic region are illustrated in Table 3. Identified obstacles included: trouble remembering to schedule screenings (68%), difficulties finding childcare or caring for elders (68%), transportation issues (67%), not knowing where to go for screening (59%), difficulty getting time-off work (61%), not having enough information about screenings (58%), not having health insurance (59%), cost of screening (49%) pain and discomfort of screening (47%), and fear of getting a positive cancer diagnosis (23%). There were few significant associations between region and obstacles to screening. For example, there was a significant association between transportation issues and region ($p < .05$). A total of 60% of participants in Nashville, 56% in Chattanooga, and 83% in Memphis reported transportation issues as an obstacle to getting a mammogram. There was a significant association between difficulties finding childcare or caring for elders and region ($p < .05$). A total of 67% of Nashville participants, 53% of Chattanooga participants, and 85% of Memphis residents reported finding childcare or caring for elders as an obstacle. In addition, Nashville (60%) and Memphis participants (73%) were more likely to have reported not having enough information about screenings as barrier compared to Chattanooga (44%) participants.

Also, cost of screening as an obstacle was more likely to have been reported by Nashville (60%) and Memphis (56%) participants compared to Chattanooga (36%) participants.

Discussion

African American women in this study had lower rates of screening for breast cancer with a mammogram (64%) compared to African American women in the State of Tennessee (73.6%) [31]. There are several possible explanations for differences in mammography screening rates between the two groups. Unlike the entire African American female population in Tennessee, the study sample consisted primarily of low-income participants who may have limited resources to devote to health screenings. For example, 54% of study participants had annual household incomes <\$15,000, 46% were employed, and 78% had health insurance. These rates are lower than those reported in the latest U.S. Census Bureau data for African Americans in two of the categories in Tennessee (18% have incomes below \$15,000, 58% are employed, and 86% have health insurance) [32].

In this study, the overall mammography plus clinical breast exam screening rate was 56% compared to women in the State of Tennessee (74%) [33]. The American Cancer Society recommends that women get a mammogram and clinical breast exam every year after the age of 40 years [23]. This study supports previous research identifying feelings of increased susceptibility to breast cancer, knowledge about screening guidelines, having health insurance, and having a regular physician as predictors of clinical and breast self-exams use [34–36]. Lower than recommended screening rates for a mammogram plus clinical breast exam among the study population may reflect screening obstacles identified by the majority of study participants, including not having enough information about screenings, not knowing where to go to be screened, and not having health insurance. Furthermore, participants who reported getting a mammogram plus clinical breast exam were more likely to have health insurance compared to those who did not.

Findings from the current study indicating associations between socio-demographic characteristics and mammography screening behavior reflect evidence in the extant literature. For example, participants who had health insurance and had a medical visit during the past 12 months were more likely to have received a mammogram during the past two years [7]. Medical visits often serve as reminders or cues to action for people to adopt healthy behaviors, as well as avoid risky ones based health provider recommendations. Also, people who have health insurance coverage are often more likely to complete mammography screenings than those who do not [12].

As in previous studies [23, 28], household income was a predictor of mammography use among African American women. In this study, study participants with annual household incomes of <\$15,000 were less likely to have had a mammogram compared to those with higher incomes. Marital status produced statistically significant findings in the current study. Study participants who were either single or never been married were less likely to have completed a mammography screening during the past two years compared to other groups. Lower screening rates among single and never married women suggests that spousal/partner support, may be an important component in influencing African American women's mammography screening behavior.

The present study found that African American women reported several obstacles to mammography use including issues related to cost, transportation, time, lack of information about where to go for screening, and fear of a cancer diagnosis. The biggest screening obstacles indicated were difficulties finding childcare and/or caring for elders, while fear of receiving a positive cancer diagnosis was least often mentioned. Of particular note were differences in mammography screening obstacles identified by geographic region.

Compared to Nashville and Chattanooga, participants in Memphis were more likely to report transportation, difficulties finding childcare and/or caring for elders, and not knowing where to go for screening as obstacles to mammography use. These results suggest that although low-income African Americans statewide may face similar obstacles to being screened for breast cancer, there may be specific contextual challenges within regions that may also affect mammography use. Important regional differences therefore may need to be considered when developing educational programs for increasing mammography screening rates among poor African American women in Tennessee.

Strengths and limitations. This study has some notable strengths including that it provides information about regional differences in breast cancer screening practices in Tennessee. In addition, it provides information about obstacles to screening for low-income African American women, a group particularly at risk for higher than average breast cancer mortality. The limitations of this study include that all the data are cross-sectional, hence causation cannot be inferred. In addition, all the variables were based upon self-report methodology and respondents may have been unwilling or may not have accurate information about their health status or actual screening behaviors. Previous research however regarding the concordance of self-reported mammography use and receipt of clinical breast exams with respondents' medical records has reported a level of high agreement between the two (87–88% agreement) [37].

Breast cancer mortality, due in part to lack of access to mammography and other breast cancer screenings, continues to disproportionately affect some U.S. subgroups more than others. African American women are one of these affected groups. Improving access to breast cancer screenings, in line with recommended guidelines, holds the promise to reduce cancer disparities for these women. Eliminating barriers to screening identified by socioeconomically disadvantaged women is the first step to realizing this possibility.

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Table 1
Demographic and Lifestyle Characteristics of African American women 40 years of Age or Older in the Meharry CNP Survey

Variables	Mammogram screen status			Mammogram screen plus Clinic breast exam		
	Screened N=215 (64%)	Not Screened N=119 (36%)	P Value	Yes N=187 (56%)	No N=147 (44%)	P value
Age at Interview (years)						
40 to 64	164 (76%)	102 (86%)	0.040	145 (78%)	121 (82%)	0.282
65+	51 (24%)	17 (14%)		42 (22%)	26 (18%)	
City						
Nashville	60 (28%)	33 (28%)	0.738	55 (29%)	38 (26%)	0.761
Chattanooga	82 (38%)	41 (34%)		68 (36%)	55 (37%)	
Memphis	73 (34%)	45 (38%)		64 (34%)	54 (37%)	
BMI						
Normal weight (18.5 BMI 24.9)	31 (17%)	20 (21%)	0.312	24 (15%)	27 (23%)	0.169
Overweight (25 BMI 29.9)	58 (31%)	22 (23%)		51 (31%)	29 (24%)	
Obese (30 BMI)	97 (52%)	54 (56%)		87 (54%)	64 (53%)	
Smoking						
Never	136 (68%)	65 (63%)	0.374	121 (69%)	80 (62%)	0.383
Former	17 (8%)	14 (13%)		16 (9%)	15 (12%)	
Current	48 (24%)	25 (24%)		38 (22%)	35 (27%)	
Medical Visit in Past 12 Months						
Yes	199 (94%)	92 (82%)	0.001	176 (96%)	115 (82%)	<0.001
No	13 (6%)	20 (18%)		8 (4%)	25 (18%)	
Family History of Cancer						
Yes	143 (67%)	70 (63%)	0.470	128 (68%)	85 (61%)	0.146
No	72 (33%)	42 (38%)		59 (32%)	55 (39%)	
Self-Rate Health						
Excellent/Very good/Good	135 (64%)	76 (68%)	0.421	118 (64%)	93 (67%)	0.542
Fair/Poor	76 (36%)	35 (32%)		66 (36%)	45 (33%)	
Education						

Variables	Mammogram screen status			Mammogram screen plus Clinic breast exam		
	Screened N=215 (64%)	Not Screened N=119 (36%)	P Value	Yes N=187 (56%)	No N=147 (44%)	P value
< High school	35 (16%)	26 (23%)	0.302	28 (15%)	33 (24%)	0.082
High school	91 (43%)	43 (39%)		77 (41%)	57 (41%)	
> High school	88 (41%)	42 (38%)		82 (44%)	48 (35%)	
Marital Status						
Married/Partner	59 (28%)	22 (21%)	<0.001	52 (28%)	29 (22%)	<0.001
Separated/Divorced/Widowed	114 (54%)	41 (39%)		103 (56%)	52 (39%)	
Single, Never been married	38 (18%)	43 (41%)		29 (16%)	52 (39%)	
Household Annual Income						
<\$15,000	96 (48%)	66 (64%)	0.009	81 (47%)	81 (63%)	0.004
\$15,000	103 (52%)	37 (36%)		93 (53%)	47 (37%)	
Employment Status						
Employed	97 (47%)	48 (44%)	0.655	89 (49%)	56 (42%)	0.179
Not employed	109 (53%)	60 (56%)		91 (51%)	78 (58%)	
Health Insurance						
Yes	181 (85%)	74 (64%)	<0.001	163 (89%)	92 (64%)	<0.001
No	31 (15%)	41 (36%)		21 (11%)	51 (36%)	
At least one alcoholic beverage in the past 30 days						
Yes	57 (28%)	42 (40%)	0.039	48 (27%)	51 (40%)	0.022
No	144 (72%)	63 (60%)		129 (73%)	78 (60%)	

Table 2

Odds Ratios (ORs) of the Association of Demographic and lifestyle factors with Breast Cancer Screening Status

Variables	Female African Americans (age 40)			
	Mammogram screening		Mammogram screen plus Clinic breast exam	
	Crude OR (95% CI)	Adjusted OR* (95% CI)	Crude OR (95% CI)	Adjusted OR* (95% CI)
Age at Interview (years)				
40 to 64	1.00	1.00	1.00	1.00
65+	1.87 (1.02, 3.41)	1.49 (0.68, 3.24)	1.35 (0.78, 2.33)	0.99 (0.49, 2.00)
City				
Nashville	1.00	1.00	1.00	1.00
Chattanooga	1.10 (0.62, 1.94)	2.16 (1.02, 4.56)	0.85 (0.50, 1.47)	1.47 (0.73, 2.96)
Memphis	0.89 (0.51, 1.57)	0.83 (0.40, 1.74)	0.82 (0.47, 1.42)	0.65 (0.32, 1.33)
BMI				
Normal weight (18.5 BMI 24.9)	1.00	1.00	1.00	1.00
Overweight (25 BMI 29.9)	1.70 (0.81, 3.59)	2.17 (0.85, 5.53)	1.98 (0.97, 4.04)	2.70 (1.13, 6.47)
Obese (30 BMI)	1.16 (0.60, 2.23)	1.35 (0.60, 3.05)	1.53 (0.81, 2.89)	1.83 (0.85, 3.96)
Smoking				
Never	1.00	1.00	1.00	1.00
Former	0.58 (0.27, 1.25)	0.58 (0.22, 1.54)	0.71 (0.33, 1.51)	0.72 (0.28, 1.84)
Current	0.92 (0.52, 1.62)	1.41 (0.66, 3.01)	0.72 (0.42, 1.23)	1.15 (0.57, 2.33)
Medical Visit in Past 12 Months				
Yes	1.00	1.00	1.00	1.00
No	0.30 (0.14, 0.63)	0.53 (0.21, 1.33)	0.21 (0.09, 0.48)	0.39 (0.15, 1.05)
Family History of Cancer				
Yes	1.00	1.00	1.00	1.00
No	0.84 (0.52, 1.35)	0.76 (0.43, 1.37)	0.71 (0.45, 1.13)	0.67 (0.39, 1.17)
Self-Rate Health				
Excellent/Very good/Good	1.00	1.00	1.00	1.00
Fair/Poor	1.22 (0.75, 1.99)	1.00 (0.52, 1.91)	1.16 (0.73, 1.84)	0.95 (0.52, 1.75)
Education				
< High school	1.00	1.00	1.00	1.00
High school	1.57 (0.84, 2.93)	1.77 (0.82, 3.86)	1.59 (0.87, 2.93)	1.53 (0.73, 3.23)
> High school	1.56 (0.83, 2.91)	1.11 (0.48, 2.59)	2.01 (1.09, 3.73)	1.28 (0.56, 2.89)
Marital Status				
Married/Partner	1.00	1.00	1.00	1.00
Separated/Divorced/Widowed	1.04 (0.57, 1.90)	1.42 (0.70, 2.89)	1.11 (0.63, 1.94)	1.44 (0.75, 2.77)
Single, Never been married	0.33 (0.17, 0.64)	0.50 (0.23, 1.08)	0.31 (0.16, 0.59)	0.47 (0.22, 1.00)
Household Annual Income				

Variables	Female African Americans (age 40)			
	Mammogram screening		Mammogram screen plus Clinic breast exam	
	Crude OR (95% CI)	Adjusted OR* (95% CI)	Crude OR (95% CI)	Adjusted OR* (95% CI)
<\$15,000	1.00	1.00	1.00	1.00
\$15,000	1.91 (1.17, 3.12)	2.15 (0.99, 4.64)	1.98 (1.24, 3.16)	1.74 (0.84, 3.62)
Employment Status				
Employed	1.00	1.00	1.00	1.00
Not Employed	0.90 (0.56, 1.44)	1.67 (0.80, 3.45)	0.73 (0.47, 1.15)	1.27 (0.64, 2.54)
Health Insurance				
Yes	1.00	1.00	1.00	1.00
No	0.31 (0.18, 0.53)	0.32 (0.16, 0.64)	0.23 (0.13, 0.41)	0.29 (0.14, 0.58)
At least one alcoholic beverage in the past 30 days				
Yes	1.00	1.00	1.00	1.00
No	1.68 (1.03, 2.77)	1.88 (1.02, 3.48)	1.76 (1.08, 2.85)	1.96 (1.09, 3.53)

CI = confidence intervals

Table 3

Obstacles to Breast Cancer Screening by City

Reported Obstacles	All Participants N=133 (%)	Nashville N=30 (%)	Chattanooga N=55 (%)	Memphis N=48 (%)	P Value
Fear of finding out I have cancer	31 (23%)	8 (27%)	9 (16%)	14 (29%)	0.273
Not having health insurance	78 (59%)	18 (60%)	27 (49%)	33 (69%)	0.128
Cost of cancer screenings	65 (49%)	18 (60%)	20 (36%)	27 (56%)	0.050
Pain and discomfort of screenings	63 (47%)	17 (57%)	22 (40%)	24 (50%)	0.306
Difficulty getting time-off work	81 (61%)	19 (63%)	28 (51%)	34 (71%)	0.113
Trouble remembering to schedule screenings	91 (68%)	18 (60%)	36 (65%)	37 (77%)	0.238
Not having enough information about screenings	77 (58%)	18 (60%)	24 (44%)	35 (73%)	0.011
Not knowing where to get screened	78 (59%)	18 (60%)	27 (49%)	33 (69%)	0.128
Transportation issues	89 (67%)	18 (60%)	31 (56%)	40 (83%)	0.010
Finding childcare or caring for elders	90 (68%)	20 (67%)	29 (53%)	41 (85%)	0.002