

# How Old are African American Women When they Receive their First Mammogram? Results from a Church-Based Study

Janice V. Bowie · Anita M. Wells · Hee-Soon Juon ·  
Kim D. Sydnor · Elisa M. Rodriguez

Published online: 28 March 2008  
© Springer Science+Business Media, LLC 2008

**Abstract** African American women in the U.S. have the highest breast cancer mortality though not the highest breast cancer incidence. This high mortality rate has been attributed in part to discrepancies in screening between African American and White women. Although this gap in mammography utilization is closing, little is known about what has been and is driving the screening practices of African American women, in particular age at first mammogram. This study examined the rates of breast cancer screening in an African American community sample from eight churches in greater Baltimore, Maryland and investigated the association between various factors and age at first mammogram. Participants were 213 women ages 22–89 years. About 77% of women had ever had a mammogram. Over 40% had their first mammogram before age 40. Women who first screened before age 40 had greater odds than women who had never screened of being knowledgeable about screening guidelines, of having received a physician recommendation to screen, and of having three or more female relatives who had been screened. Women who first screened at or after age 40 were more likely to have stronger religious beliefs of health than women who never had screened. These findings suggest the importance of reinforcing factors in screening behavior for African American women and have implications for physician

training and public health education about breast cancer screening. A better understanding of African American women's mammography practice including early screening is needed to reduce this population's disproportionate breast cancer mortality risk.

**Keywords** Breast cancer · Age at first mammogram · African American · Church-based · Community Based Participatory Research

## Introduction

Breast cancer is the most frequently diagnosed form of non-skin cancer in American women [1–4] and is the second leading cause of cancer death in African American women [1, 5, 6]. Discrepancies in screening behavior between African American and White women have been reported as causal factors in African American mortality from breast cancer [7–9]. Recent reports, however, suggest that across age groups the gap in mammography utilization between African American women and White women is closing [10–12]. Although a number of state-sponsored programs exist for women who need mammograms, and the gap between African American and White women is closing, little is known about what has been and is driving screening practices of African American women, especially age of first mammogram.

Current screening guidelines supported and promoted by a broad array of medical organizations, national institutes, and cancer advocacy organizations recommend that women receive a baseline mammogram at age 40 years [13–15]. This recommendation is based on results from several large clinical trials that showed a considerable decrease in breast cancer mortality from regular screening

---

J. V. Bowie (✉) · H.-S. Juon · E. M. Rodriguez  
Department of Health, Behavior and Society, Johns Hopkins  
Bloomberg School of Public Health, 624 North Broadway,  
Baltimore, MD 21205, USA  
e-mail: jbowie@jhsph.edu

A. M. Wells · K. D. Sydnor  
School of Community Health and Policy, Morgan State  
University, 1700 East Cold Spring Lane, Jenkins 343,  
Baltimore, MD 21251, USA

among women as young as 40 years of age [16]. These current guidelines represent a shift from the prior recommendation that women receive a baseline mammogram between ages 35 and 40 years [15]. The American Cancer Society suggests that among women under the age of 40 only those who are at increased risk of breast cancer, for example those with a family history of breast or ovarian cancer, might benefit from practices such as screening mammography and should consult with their doctor before having a mammogram or any other screening procedure [17].

The National Health Interview Survey (NHIS) is one of only a few studies that ask women about their age at first mammogram [18]. Data from the 2005 NHIS showed that 39.69% of the 4,481 African American women interviewed had had their first mammogram before the age of 40 years [18]. A number of factors may have contributed to this screening practice such as the presence of symptoms, family history, education, income, perceived risk and worry, physician recommendation, and confusion about screening guidelines fueled in part by media messages. In addition, residual effects of the prior earlier screening guideline in combination with high reported incidence and mortality rates could be a motivating factor in the young age at first mammogram reflected in the NHIS data.

Several studies point to predictors of screening behavior [19–22]. Worry about breast cancer has been positively associated with screening mammography [20]. Findings from studies that included women under the age of 40 years on the impact of perceived risk on screening behavior, however, have been mixed [23–25, 22]. Physician recommendation has been reported as highly positively related to screening behavior [19, 21, 26, 27] including obtaining a first mammogram [19]. The literature also indicates, however, that there is a discrepancy between physicians' recommendations and women's beliefs regarding when mammography should begin, specifically that a majority of women believe mammography should begin before age 40 [28, 29]. This belief may be a contributing factor to the early age at which some women get their first mammogram.

The literature indicates that media coverage and reports about breast cancer have an impact on how women understand the disease and their risk, and therefore on their actions regarding breast cancer screening [30–33] including frequency of screening [33]. Researchers found that 81% of women surveyed reported that they get most of their information on health topics from TV, newspapers, and magazines; a significant majority of women incorrectly believed that mammography reduces the incidence of breast cancer [30].

The screening issue is particularly salient for the state of Maryland, which ranks twelfth for breast cancer mortality

in the U.S. African American women in Maryland are more frequently diagnosed with cancer of the breast than any other kind [34]. Female breast cancer accounts for 8.0% of all cancer deaths in Maryland [35]. It is the second leading cause of cancer death among African American women in the state [34]. Disproportionate breast cancer mortality among low SES African American women residing in the City of Baltimore is, in large part, responsible for Maryland's high breast cancer mortality [35].

Among all women in Maryland, rates of mammography are slightly higher than the national average. In 2006, nationwide 76.5% of women over age 40 reported receiving a mammogram within the previous two years; in Maryland the figure was slightly higher at 79.8%. Among African American women in Maryland the figure was even higher with 80.3% reporting receipt of a mammogram within the past 2 years. [36] These overall screening rates, however, do not tell the whole story.

Both income and education appear to have a relationship to rates of mammography among women in Maryland. According to 2006 data from the Behavioral Risk Factor Surveillance System, Maryland women in the poorest annual income brackets (<\$15,000 and \$15,000–24,999) and women with the least education (<high school) had rates of mammography screening less than both the state and national rates whereas their more affluent and educated counterparts had mammography rates higher than those for Maryland and the nation overall [34]. Maryland's overall screening rates also do not explain but rather raise questions about screening behavior among women under the age of 40 years who, particularly among African American women, are being diagnosed with and are dying from breast cancer at gradually increasing rates [11, 37, 38].

This article seeks to better understand the breast cancer screening behaviors of African American women and to explore factors that contribute to the timing of age at first mammogram, in particular why some African American women receive mammograms at an age less than generally recommended.

## Methods

### Research Questions

The research questions that guided the current study were:

1. What are the rates of breast cancer screening in this African American community?
2. What are the factors associated with age at first mammogram, including SES, access to health care, social norms, cancer beliefs, physician's recommendation, and religious beliefs?

## Study Design

The study followed a community based participatory research (CBPR) approach, which adheres to tenets of inclusion of community partners to guide the research project. The community partners in this study were church leaders, including pastors and lay health coordinators (LHCs). LHCs were selected by their pastors to serve on the research team based largely on interest in the topic, leadership skills, and time for involvement. There were eight LHCs of varying ages, education level, and knowledge of breast cancer. Most either currently or in the past held a position of leadership within their respective churches or served on a health ministry team. Three women were breast cancer survivors, which turned out to be a strong benefit in planning the study activities. The first component of the study, which featured completion of a self-administered questionnaire and participation in a church Women's Health Day (WHD) is the focus of the current study. The second component included completion of a telephone follow-up survey.

## Study Population

Eight churches participated in the study and were randomly assigned to one of three intervention formats: standard care that included a focus on overall health, breast health care that exclusively addressed breast health and comprehensive care that included breast health and other cancer screening practices. Each of the churches hosted a WHD according to the intervention format to which they were matched during randomization. Each WHD had a keynote speaker and a health presentation (varying according to intervention). For example, churches randomized to a "breast health care" format planned a day of activities that centered on breast health care. The breast cancer component of these presentations included statistics on the disease among African American women in Maryland and Baltimore, age-appropriate screening practices, sources of services for detection, and, in some instances, demonstration and practice of breast self-examination. The Susan G. Komen Foundation sponsored the research and their guidelines target selected screening activities for women ages 20 years and above, including breast self-examination. The participating churches refrained from hosting or participating in any other women's health programs during the study period.

## Study Sample

The study sample consisted of 213 African American women who attended the various WHDs across the eight churches and who completed the questionnaire.

All African American women ages 20 years and older who were part of the church congregations or who were affiliated with church members were eligible to participate.

## Recruitment

Age-eligible women in the church congregations were invited to participate in the WHD in advance of the event. LHCs from each church assumed the primary responsibility for publicizing the event to the women of their church. The research team assisted by providing any needed publicity material.

## Data Collection

In conjunction with the LHCs a self-administered questionnaire was developed prior to the start of the WHD events to determine cancer screening practices as well as to assess a variety of other areas. These measures included demographic characteristics (age, education, occupation, income and health status), screening behavior history (self-exam, clinical breast exam and mammography), lifestyle behavior (smoking, diet and exercise), family health history and knowledge/attitudes and beliefs regarding screening. Follow-up interviews were conducted via telephone by two LHCs and research staff trained to lead that phase of the data collection. The pre and post WHD surveys assessed if age-appropriate screening was initiated as well as whether there had been any shifts in knowledge, attitudes and behaviors. Participants in the WHDs received a gift bag valued at \$10 and those who completed the follow-up segment received a \$10 gift card of their choice to either a popular grocery or drug store chain.

## Measures

The dependent variable measured respondents' self reported age at first mammogram. Respondents were asked whether they ever had a mammogram and when they received their first mammogram. The outcome variable for the analysis was age at first mammogram. The measure was categorized as never had mammogram (=0), had first mammogram before age 40 (=1), and had first mammogram at or after age 40 (=2).

There were multiple independent variables including demographic factors, health status, predisposing factors, enabling factors and reinforcing factors. Demographic factors included: marital status (married, not married), education (1 = less than high school to 6 = graduate degree), employment (employed, not employed), and income (1 = less than \$10,000 to 7 = more than \$60,000). Education, income and employment also were used as measures of socioeconomic status (SES). Respondents

were asked to rate their general health on a five-point scale (1 = very poor to 5 = excellent) to obtain a measure of health status.

Predisposing factors included knowledge or beliefs of cancer risk, religious beliefs of health, perceived risk of getting breast cancer and knowledge of mammography guidelines. The knowledge of cancer risk (5 items, Cronbach's  $\alpha = .63$ ) was calculated as the sum of answers to five questions about whether cancer is caused by smoking, drinking alcohol, X-rays, eating habits, and environment. The response choices ranged from agree (=1) to disagree (=2) to don't know (=3). A score was computed adding the "disagree" and "don't know" responses together due to the small number in the "don't know" category. These were coded as disagree (=0). The sum of scores ranged from 0 to 5.

Religious belief of health (four items, Cronbach's  $\alpha = .67$ ) was measured from the following questions: (1) some sickness is self-inflicted or related to sin, (2) the church has a role in an individual's health, (3) God has a role in an individual's health and (4) the individual has a role in his or her health. Response choices ranged from strongly agree (=1) to strongly disagree (=4). The sum of scores ranged from four to 16. The mean score was used (1 = strong religious beliefs of health to 4 = weak religious beliefs of health). Perceived risk of getting breast cancer was measured by asking "what do you think your chances are of getting breast cancer in the future?" Response choices ranged from no chance (=0) to high chance (=3).

The knowledge of mammography guidelines was assessed by asking how often a woman should have a mammogram; response options included: once a month, once a year, once in two years, once in three years, once in four years, or don't know. Those who chose 'once a year' were categorized as knowing mammography guideline (=1) and all others were categorized as having no knowledge of guidelines (=0).

Enabling factors included health insurance coverage and regular source of care. Health insurance status was dichotomized as having (=1) or not having any health care coverage (=0). Having a regular source of care was dichotomized as having a regular doctor (=1) or not having a regular doctor (=0).

Reinforcing factors included physician recommendations for a mammogram and knowing family or relatives who obtained mammograms. The variable for number of relatives who had a mammogram was dichotomized as 0-2 (=0) or more than 3 (=1).

#### Data Analysis

We used multinomial logistic regression across various levels of predictors to examine the likelihood of women having the first mammogram before age 40 and at or after

age 40, compared to women who never had a mammogram. First, we performed bivariate analysis to determine which independent variables would distinguish women who had their first mammogram before age 40 and women who had their first mammogram at or after age 40. Next we conducted multivariate logistic regression analysis to identify the most important predictors of having early or later first mammogram. All variables with at least  $P < 0.20$  in the bivariate analysis were included in the multivariate analysis [39].

Only family income was included in the final model because income and education were highly correlated ( $r = .513$ ,  $P < .001$ ). Due to the number missing for family income, we used multiple imputations with STATA in the final model.

## Results

### Sample Characteristics

Demographic characteristics of the respondents are shown in Tables 1 and 2. The sample consisted of 213 African American women living in metropolitan Baltimore. Half of participants (51%) learned about the WHD from their own church; one fourth (26%) were invited to participate by church members. The mean age of participants was 52.4 years with a range of 22 to 89 years. About 6%

**Table 1** Characteristics of African American women at baseline survey

	<i>N</i>	%
Age (mean $\pm$ SD) ( $n = 204$ )	52.36 $\pm$ 14.86	(22 – 89)
Education ( $n = 204$ )		
<High school	13	6.4
GED/high school graduate	45	22.0
Some college	72	35.3
College graduate	39	19.1
Graduate degree	35	17.2
Marital status ( $n = 206$ )		
Married	83	40.3
Divorced/separated/widowed	68	33.0
Single	55	26.7
Employment ( $n = 206$ )		
Employed	112	54.4
Unemployed	33	16.0
Retired	61	29.6
Income ( $n = 213$ )		
<\$10,000	19	8.9
\$10–30 K	50	23.5
\$31–50K	42	19.7
\$50 K+	53	24.9
Missing	49	23.0

**Table 2** Characteristics of African-American women at baseline survey continued

	N	%
Church attendance ( <i>n</i> = 213)		
More than once a week	94	44.1
Every week or more often	74	34.7
Less than once a month	23	10.8
Never	22	10.4
Having health insurance ( <i>n</i> = 213)	188	90.4
Having a regular doctor ( <i>n</i> = 213)	190	92.2
General health status ( <i>n</i> = 213)		
Fair/poor	42	19.9
Breast cancer history ( <i>n</i> = 213)		
No family history	140	65.4
Self	11	5.1
Family	63	29.4

women did not complete a high school education and 40% were married. About 54% of participants were employed on a full or part time basis. Approximately 25% of women reported their annual income as more than \$50,000; 23% did not report income. About 40% of participants attended church more than once a week.

Almost 20% of respondents reported their health status to be fair to poor. More than 90% of women had health insurance and 92% said they had a regular doctor. About 30% reported a family history of breast cancer. About 5% of respondents were breast cancer survivors.

**Table 3** Breast cancer screening rates (*n* = 213)

	Number	%
Ever had mammogram		
Yes	164	77.00
No	49	23
Age at first mammogram		
<30 years old	28	13.20
30–39 years old	58	27.4
≥40 years old	77	36.3
Never had mammogram	49	23.1
Recency of mammogram		
<1 year	111	52.10
1–2 year	37	17.4
2+ years ago	16	7.5
Never had mammogram	49	23
Clinical breast exam within a year		
Yes	155	75.60
No	58	24.4
Monthly breast self-exam		
Yes	129	62.60
No	84	37.4

Prevalence of Breast Cancer Screening

Table 3 shows the rates of breast cancer screening. About 77% of respondents had ever obtained a mammogram. About 13% reported they had their first mammogram before age 30 years old. About 70% had their most recent mammogram taken within two years and just over 75% had a clinical breast exam within the past year. About 63% of women performed monthly breast exam.

Age at First Mammogram

Bivariate analyses predicting age at first mammogram are shown in Tables 4 and 5. In bivariate analyses, employment, knowledge of mammogram guidelines, physician recommendation and knowing relatives who had a mammogram were significantly related to age at first mammogram (*P* < .05). Marital status, family income, family history of breast cancer, and religious beliefs of health also were associated with age at first mammogram (*P* < .20).

In multivariate analyses, knowledge of mammogram guidelines, physician recommendations, and social norms were associated with early age of first mammogram (Table 6). Women who had knowledge of mammogram guidelines had more than three times greater odds of having an early mammogram (OR = 3.07; 95% CI, 1.27, 7.43). Women who had a doctor’s recommendation also were more likely to have an early mammogram than those without a doctor’s recommendation (OR = 3.07, 95% CI, 1.26, 7.53). Those women who had more than three relatives who had obtained a mammogram were more likely to have an early mammogram than their counterparts with no relative or less than two relatives receiving a mammogram (OR = 2.36, 95% CI, 1.03–5.42). Marital status and family income were marginally associated with age at first mammogram; married women were more likely to have early mammogram than those not married (OR = 2.34, *P* = 0.08). Women with higher incomes were more likely to have early mammograms than those with low incomes (OR = 1.28, 95% CI, 0.99, 1.65).

Religious belief of health was associated with having first mammogram. Those who had stronger religious beliefs of health were more likely to have their first mammogram at or after age 40 (OR = 0.74; 95% CI, 0.55, 0.99) than those who had weaker religious beliefs of health.

Discussion

The aim of this study was to better understand the breast health screening behaviors of African American women, specifically their rates of screening and the factors associated with age at first mammogram. The analyses show that

**Table 4** Bivariate analysis for age at first mammogram: family background/health status ( $n = 213$ )

		Age at first mammogram < age 40, odds ratio (95% CI)	Age at first mammogram ≥ age 40, odds ratio (95% CI)	<i>P</i> -value
Education	≤12	0.57 (0.25–1.32)	0.67 (0.28–1.59)	0.404
	13+	1.00	1.00	
Family income	1–7	0.92 (0.76–1.10)	0.82 (0.68–0.99)	0.114
Marital status	Not married	1.00	1.00	0.116
	Married	1.74 (0.84–3.61)	0.93 (0.43–1.99)	
Employment	Yes	0.51 (0.24–1.10)	0.33 (0.15–0.72)	0.017
	No	1.00	1.00	
Family history of breast cancer	No	1.34 (0.65–2.78)	2.16 (0.99–4.74)	0.138
	Yes	1.00	1.00	
Health status	1–5	1.28 (0.85–1.91)	0.97 (0.65–1.47)	0.269

Note: The reference category is no mammogram

**Table 5** Bivariate analysis for age at first mammogram: predisposing, enabling and reinforcing factors ( $n = 213$ )

		Age at first mammogram < age 40, odds ratio (95% CI)	Age at first mammogram ≥ age 40, odds ratio (95% CI)	<i>P</i> -value
<i>Predisposing factors</i>				
Knowledge of cancer risks	0–5	1.08 (0.79–1.37)	0.93 (0.70–1.25)	.748
Perceived risk of getting cancer	0–3	0.82 (0.56–1.21)	0.83 (0.56–1.22)	.547
Religious beliefs of health	1–4	1.11 (0.82, 1.52)	0.86 (0.63–1.19)	.191
Knowledge of mammogram guideline	Yes	4.41 (1.96–9.94)	2.24 (1.05–4.77)	.001
	No	1.00	1.00	
<i>Enabling factors</i>				
Having medical insurance	No	1.00	1.00	.665
	Yes	1.76 (0.45–6.85)	1.73 (0.43–6.86)	
<i>Reinforcing factors</i>				
Physician's recommendation	No	1.00	1.00	.000
	Yes	4.35 (1.88–10.04)	4.44 (1.90–10.37)	
Number of relatives had mammogram	0–2	1.00	1.00	.007
	3+	3.10 (1.48–6.50)	1.48 (0.72–3.04)	

Note: The reference category is no mammogram

the rate of screening for this church-based sample of African American women is almost equal to the national numbers for ever having received a mammogram (77% vs. 76.5% respectively). Similarly, the percentage of women who screened before age 40 is consistent with prior national research, which showed an approximate rate of 40% [18].

Analyses also showed that among the three age of screening categories, women who had never screened were distinguishable from those who had been screened before age 40 in the following ways: Women who had screened before age 40 had (1) greater odds of being knowledgeable about screening guidelines, (2) greater odds of having received a physician recommendation to screen, and (3)

greater odds of having three or more female relatives who had been screened compared to those who had never been screened. The before age 40 screeners were not significantly different from those who had never screened with regard to employment and family history of breast cancer, and were marginally distinguishable by marital status (more likely to have screened if married) and income (more likely to have screened if higher income).

These findings provide support for the importance of reinforcing factors (guideline knowledge and physician recommendations) in screening behavior for African American women before age 40. In our sample, the before age 40 screeners with three or more female relatives who

**Table 6** Multivariate analysis for age at first mammogram ( $n = 213$ )

		Age at first mammogram < age 40, odds ratio (95% CI)	Age at first mammogram ≥age 40, odds ratio (95% CI)
Marital status	Not married	1.00	1.00
	Married	2.34 (0.90–6.07)*	1.59 (0.71–3.53)
Employment	Yes	1.22 (0.50–2.99)	0.74 (0.35–1.58)
	No	1.00	1.00
Family income	1–7	1.28 (0.99–1.65)*	0.99 (0.79–1.24)
Family history of breast cancer	No	1.67 (0.73–3.82)	0.63 (0.30–1.33)
	Yes	1.00	1.00
Religious beliefs of health	1–4	0.98 (0.69–1.38)	0.74 (0.55–0.98)**
Knowledge of mammogram guideline	Yes	3.07 (1.27–7.43)**	1.73 (0.75–3.95)
	No	1.00	1.00
Physician's recommendation	No	1.00	1.00
	Yes	3.07 (1.26–7.53)**	0.80 (0.41–1.57)
Number of relatives had mammogram	0–2	1.00	1.00
	3+	2.36 (1.03–5.42)**	1.83 (0.88–3.78)

Note: \*  $P < .10$ , \*\*  $P < .05$ . The reference category is no mammogram

had received a mammogram also were more likely to have been screened themselves which suggests that female relatives' breast cancer screening practices may be an important factor in African American women's decision to pursue breast cancer screening earlier than is currently recommended. This relationship is present even though family history of cancer, a factor that could help to explain this link, was not a distinguishing characteristic.

The one difference between those who screened at or after age 40 and those who had never screened was level of religious belief regarding health. Those with stronger religious beliefs of health had greater odds of being screened. The characteristics generally associated with screening, such as knowledge of guidelines, physician recommendation, and sociodemographic characteristics, may not be the factors that are driving mammography screening for this age group and population. The link between religious beliefs of health and screening behavior may reflect the outreach targeted at faith-based institutions to bring the message of screening to the African American community. Maryland boasts the presence of many churches within its metropolitan area and for many African American women faith institutions serve an integral role in their daily lives.

There were no factors that distinguished women who first screened before age 40 from women who first screened at or after age 40. This finding was somewhat surprising given the significant differences found between each age category and women who never screened. Further study of women from all age categories is needed to better understand the phenomenon of early screening among African American women.

#### Strengths and Limitations of the Research

There are several strengths to the current research. The first is the community-based participatory research (CBPR) approach used to conduct the study. This approach, designed to foster community ownership and promote replication of effective interventions, was unique in its inclusion of the faith community as equal contributing partners in all phases of the research process. The partners participated in questionnaire development, data collection, and program implementation. Although the benefits of CBPR in breast cancer control are not the focus of this paper, their potential to foster and reinforce early detection and treatment through capacity building and sustainable partnerships with community based organizations is noteworthy. The current study adds to the body of literature on the use of CBPR approaches to breast cancer control in African American women.

A second strength of the study is the breadth of participant ages. Due to current screening guidelines, many breast cancer studies only include women age 40 and above. By including younger women, this research was able to assess screening behavior for an age group that is showing a rising incidence of aggressive breast cancer. This study also included an elderly population, older than customarily included in breast cancer research. Older women are surviving longer and need to be included in breast cancer studies because they are at increased risk of developing breast cancer as they age.

The Women's Health Days at each participating church provided a fitting and favorable setting for the study. Unlike some national studies that have a broader focus [18]

this study was designed for women only and was conducted in the context of women's health and spirituality. In addition, the incorporation of spirituality, specifically as it relates to health, allowed for an examination of spirituality both as a context for screening behavior and a contributing factor.

This study has some limitations. The measure for age at first mammogram was a range rather a discrete number. Given that the recommendation for age of first mammogram has shifted from age 35 to age 40, and given the percentage of women who reported screening before age 40, the findings would be more informative had the research team been able to analyze discrete age at first mammogram as it related to the screening guideline in place when the first mammogram was obtained.

In addition, the questionnaire did not probe into why the first mammogram was undertaken. Insight into women's decision-making rationale would better ground the research findings. Other study limitations include potential self-selection bias, limited validity of self-reported screening history, and possible recall bias as to when the first screening had occurred. The comparability of our screening numbers with other studies [18] however, suggests that these three limitations had a minimal impact on the study results.

#### Implications for Future Research

More studies are needed on African American women under age 40 who receive screening. While the behavior clearly is practiced, little is known about why it is happening, the range of ages under 40 included in the phenomenon, and where women are going to receive their early mammograms. Although research indicates that, increasingly, younger African American women are getting breast cancer and are being diagnosed with more aggressive forms of the disease, the current inaccuracy of mammography for this age group must be considered. The occurrence of false positives, and the financial and emotional costs associated with them are potential substantial side effects of early screening [17]. These risks should be contemplated, for example, as physicians' make their recommendations to women and as women make their decisions regarding whether or not to have an early mammogram.

The role physicians, clinics, publicly supported screening programs, and media messages may play in early screening also is important to understanding this behavior. Knowledge of this information can lead to providing more effective and efficient education and intervention services to African American women and, ultimately, working with them to improve their breast health.

#### Conclusion

Rates of screening, including early age at first mammogram, in the church-based African American study population were nearly identical to national rates for African American women. Knowledge of screening guidelines, physician recommendation, and the presence of three or more relatives who had been screened all were factors related to early age at first mammogram. Further study of why African American women seek their first mammogram and at what age, as well as what comprises their overall screening behavior (i.e., follow-up and regular screening practices) is warranted to reduce the disproportionate breast cancer mortality risk among African American women.

**Acknowledgements** The authors wish to acknowledge the invaluable partnership of the pastors and lay health coordinators who collaborated on this study and the vital contribution of the women who participated in the Women's Health Days. The authors also wish to acknowledge Susan G. Komen for the Cure for their financial support of this project (POP0403187).

#### References

1. American Cancer Society (2005). Cancer facts and figures for African Americans 2005–2006. Accessed on January 30, 2006 at <http://www.cancer.org/downloads/STT/CAFF2005AACorrPWSecured.pdf>.
2. Duncan, A. M. (2004). The role of nutrition in the prevention of breast cancer. *AACN Clinical Issues*, 15, 119–135.
3. Kumar, N. B., Riccardi, D., Cantor, A., Dalton, K., & Allen, K. (2005). A case-control study evaluating the association of purposeful physical activity, body fat distribution, and steroid hormones on premenopausal breast cancer risk. *Breast Journal*, 11, 266–272.
4. Thomas, E. C. (2004). African American women's breast memories, cancer beliefs, and screening behaviors. *Cancer Nursing*, 27, 295–302.
5. Fye, C. A. (2001). From a contemporary perspective: The health of African American women. *AME Church Review*, 117, 23–28.
6. Jones, L. A., & Chilton, J. A. (2002). Impact of breast cancer on African American women: Priority areas for research in the next decade. *American Journal of Public Health*, 92, 539–542.
7. Husaini, B. A., Sherkat, D. E., & Bragg, R. et al. (2001). Predictors of breast cancer screening in a panel study of African American women. *Women Health*, 34, 35–51.
8. Jacobellis, J., & Cutter, G. (2002). Mammography screening and differences in stage of disease by race/ethnicity. *American Journal of Public Health*, 92, 1144–1150.
9. Young, R. F., Waller, J. B. Jr., & Smitherman, H. (2002). A breast cancer education and on-site screening intervention for unscreened African American women. *Journal of Cancer Education*, 17, 231–236.
10. Ghafoor, A., Jemal, A., Ward, E., Cokkinides, V., Smith, R., & Thun, M. (2003). Trends in breast cancer by race and ethnicity. *CA Cancer Journal for Clinicians*, 53, 342–355.
11. Newman, L. A. (2005). Breast cancer in African-American women. *Oncologist*, 10, 1–14.
12. Smigal, C., Jemal, A., & Ward, E., et al. (2006). Trends in breast cancer by race and ethnicity: Update 2006. *CA Cancer Journal for Clinicians*, 56, 168–183.



13. Cozier, Y., Palmer, J., Rosenberg, L., Adams-Campbell, L. (2001). Recent mammography use among African-American women. *Ethnicity & Disease, 11*, 188–191.
14. Elmore, J., Armstrong, K., Lehman, C., Fletcher, S. (2005). Screening for breast cancer. *JAMA, 293*, 1245–1256.
15. Zabicki, K., Colbert, J. A., Dominguez, F. J., et al. (2006). Breast cancer diagnosis in women < or = 40 versus 50 to 60 years: Increasing size and stage disparity compared with older women over time. *Annals of Surgical Oncology, 13*, 1072–1077.
16. Mahon, S. M. (2003). Evidence-based practice: Recommendations for the early detection of breast cancer. *Clinical Journal of Oncology Nursing, 7*, 693–696.
17. Smith, R. A., Saslow, D., & Sawyer, K. A., et al. (2003). American cancer society guidelines for breast cancer screening: Update 2003. *CA Cancer Journal for Clinicians, 53*, 141–169.
18. Centers for Disease Control and Prevention. National Health Interview Survey, 2005. Accessed on May 10, 2007 at [http://www.wonder.cdc.gov/wonder/sci\\_data/surveys/nhis/type\\_txt/nhis2005/NHIS200.asp](http://www.wonder.cdc.gov/wonder/sci_data/surveys/nhis/type_txt/nhis2005/NHIS200.asp).
19. Colbert, J. A., Kaine, E. M., & Bigby, J., et al. (2004). The age at which women begin mammographic screening. *Cancer, 101*, 1850–1859.
20. Consedine, N. S., Magai, C., Conway, F., & Neugut, A. I. (2004). Obesity and awareness of obesity as risk factors for breast cancer in six ethnic groups. *Obesity Research, 12*, 1680–1689.
21. Garbers, S., & Chiasson, M. (2006). Breast cancer screening and health behaviors among african american and caribbean women in new york city. *Journal of Health Care for the Poor and Underserved, 17*, 37–46.
22. Martin, W., & Degner, L. (2006). Perception of risk and surveillance practices of women with a family history of breast cancer. *Cancer Nursing, 29*, 277–235.
23. Vernon, S. W. (1999). Risk perception and risk communication for cancer screening behaviors: A review. *Journal of the National Cancer Institute. Monographs, 25*, 101–119.
24. Bowen, D., Alfano, C., McGregor, B., & Andersen, M. (2004). The relationship between perceived risk, affect, and health behaviors. *Cancer Detection and Prevention, 28*, 409–417.
25. Katapodi, M., Lee, K., Facione, N., & Dodd, M. (2004). Predictors of perceived breast cancer risk and the relation between perceived risk and breast cancer screening: A meta-analytic review. *Preventive Medicine, 38*, 388–402.
26. Bazargan, M., Bazargan, S. H., Calderón, J. L., Husaini, B. A., Baker, R. S. (2003). Mammography screening and breast self-examination among minority women in public housing projects: The impact of physician recommendation. *Cellular and Molecular Biology, 49*, 1213–1218.
27. Nekhlyudov, L., Ross-Degnan, D., & Fletcher, S. W. (2003). Beliefs and expectations of women under 50 years old regarding screening mammography: A qualitative study. *Journal of General Internal Medicine, 18*, 182–189.
28. Dolan, N., Lee, A., & McDermott, M. (1997). Age-related differences in breast carcinoma knowledge, beliefs, and perceived risk among women visiting an academic general medicine practice. *Cancer, 80*, 413–420.
29. Woloshin, S., Schwartz, L., Byram, S., Sox, H., Fischhoff, B., Welch, H. (2000). Women's understanding of the mammography screening debate. *Archives of Internal Medicine, 160*, 1434–1440.
30. Covello, V., & Peters, R. (2002). Women's perceptions of the risks of age-related diseases, including breast cancer: Reports from a 3-year research study. *Journal of Health Communication, 14*, 377–395.
31. Haas, J., Kaplan, C., Des, J. G., Gildengoin, V., Pérez-Stable, E., & Kerlikowske, K. (2005). Perceived risk of breast cancer among women at average and increased risk. *Journal of Women's Health, 14*, 845–851.
32. Steele, W. R., Mebane, F., Viswanath, K., & Solomon, J. (2005). News media coverage of a women's health controversy: How newspapers and tv outlets covered a recent debate over screening mammography. *Women Health, 41*, 83–97.
33. Jones, B. A., Patterson, E. A., & Calvocoressi, L. (2003). Mammography screening in african american women: Evaluating the research.[erratum appears in cancer. 2003 apr 15;97(8):2047]. *Cancer, 97*, 258–272.
34. Centers for Disease Control and Prevention (CDC) (2007). Behavioral risk factor surveillance system survey data: Maryland—2006 women's health. Accessed on July 5, 2007 at <http://www.apps.nccd.cdc.gov/brfss/display.asp?cat=WH&yr=2006&qkey=4421&state=MD>.
35. Maryland Department of Health and Mental Hygiene. (2006). Cigarette restitution fund - cancer prevention, education, screening and treatment program - family health administration. Accessed on July 5, 2007, at <http://www.dhmh.state.md.us/mfr/docs/Cancer06.doc>.
36. Centers for Disease Control and Prevention & National Cancer Institute. United states cancer statistics: 1999–2003 incidence and mortality web based report. Accessed on July 5, 2007 at [www.cdc.gov/uscs](http://www.cdc.gov/uscs).
37. Bondy, M. L., Newman, L. A. (2003). Breast cancer risk assessment models: Applicability to African-American women. *Cancer, 97*, 230–235.
38. Jatoi, I., Anderson, W. F., Rao, S. R., & Devesa, S. S. (2005). Breast cancer trends among black and white women in the united states. *Journal of Clinical Oncology, 23*, 7836–7841.
39. Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression*, 2nd edition. New York: John Wiley & Sons, Inc.