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Variance in Breast Cancer Screening Beliefs and Behaviors amongst African American and Afro-Caribbean Women

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Abstract

Objectives: This study examined breast cancer screening adherence among African American and Afro-Caribbean women. Characteristics, attitudes, beliefs and barriers for these subpopulations were explored.

Methods: The Witness Project of Harlem hosted 167 breast and cervical cancer education programs in local community settings. Attendees completed questionnaires to self-report screening adherence as well as attitudes, beliefs and barriers.

Results: Of the sample (1633 women), 1347 (67.9%) were African American and 286 (14.4%) were Afro-Caribbean. Adherence rates for breast self-exam; clinical breast exam and mammography were similar with differences less than 4% while factors for screening adherence differed.

Discussion: This study suggests that women within the Black population may not share the same health related beliefs and/or attitudes, supporting the idea that programs should be culturally-tailored for subpopulations. To improve future interventions, more research should examine differences in determinants between these two ethnic subgroups and the sources of these differences.

Keywords: African American; Afro-Caribbean; Breast cancer screening; Cancer worry and beliefs

Introduction

In the United States it was estimated that, in 2012, over 229,000 women were newly diagnosed with breast cancer [1]. One in eight women are said to be at risk for breast cancer, with White women more commonly diagnosed [2]. However, African American/Black women experience an inequitable burden of breast cancer [3]. Despite a lower incidence rate, the mortality rate for African American/Black women is approximately 40.0% higher than the mortality rate for White women [3]. Among African American/Black women, breast cancer is the most commonly diagnosed cancer and is the second most common cause of cancer death [3].

As one of the main ethnic minority groups in the United States, African Americans/Blacks represent 13.0% of the total US population [4]. When preparing data, the Census considers all individuals with ancestral roots in Africa under the category 'African American/Black' [5]. However, the majority (54.0%) of the African American foreign-born population emigrated from the Caribbean and their offspring continue to be included under this large heterogeneous umbrella [3,5]. Recent research has begun acknowledging that dichotomizing data into large categories of participants, such as Black v. White or Black v. Hispanic, may not adequately represent the health behaviors of women within ethnic subgroups, particularly when examining patterns of breast and cervical cancer screening adherence [6-13]. Such racial dichotomies within these broad categories overlook women within these broad categories whom may be screening at different rates and experiencing unique sets of barriers [6-8,10-13]. Within the Black population, some researchers have begun distinguishing between screening rates and factors for African American and Afro-Caribbean women [6-13]. Accessing and understanding this information is important so that public health practitioners can most effectively develop and direct interventions to each respective population's needs, thereby potentially increasing screening rates and helping to reduce disparities in cancer incidence and mortality [6-13].

Background

Breast cancer adherence behavior

Researchers interested in learning whether there are different patterns of breast care between African American women and Afro-Caribbean women have surveyed participants about their individual histories of breast self-exams (BSE), clinical breast exams (CBE) and mammograms [6-13]. The results have been varied, suggesting the need for more studies to examine what trends, if any, prevail. Even across the literature that finds a strong disparity in screening rates there is a lack of consensus. While some research on these three modes of screening posits that African American women may be utilizing each of these early detection measures at promising rates while Afro-Caribbean women's adherence trails behind, others' findings posit that the rates may be tempered/affected by how long the individuals were in the United States [6,9,10]. Still, other researchers have questioned the scope of these disparities either doubting their prevalence altogether or suggesting that while there are some differences in certain screening rates, there may also be some similarities and the nuances need to be understood [6-9].

Health belief barriers

Raising screening adherence within these groups remains a critical goal; therefore, it is important to understand barriers to care that these unique subpopulations face. Despite some research signifying improvements in screening rates for African American women, women

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within both of these ethnicities are not always screening at optimal rates [6]. Since Afro-Caribbean women have been shown, in the few studies available, to screen less often than African American women, it is also important to ask whether there are barriers that more strongly deter Afro-Caribbean women from adhering to screening [7-9,11,14].

Breast cancer worry has been one factor that researchers have investigated [7,10-12]. One study found that heightened cancer worry amongst Afro-Caribbean women led to greater rates of BSE, but that this pattern did not hold true for African American women [10]. However, other studies reported that elevated levels of cancer worry amongst African American women led to greater adherence to CBEs and mammograms, and might be one reason African Americans have better screening histories than Afro-Caribbean women [7,11]. While Consedine et al. acknowledge that their research cannot speak to fear of diagnosis, Mandelblatt et al., presented evidence that suggests Black women who have such fears may, in fact, be less likely to have bother mammograms [7,12]. This latter study, however, makes no comment on how this factor might differ between African American and Afro-Caribbean women and so these differences should be further explored [12].

Breast cancer worry and its relationship to screening habits have been looked at across these populations, with mixed findings across the research. Mandelblatt et al., presented evidence that suggests Black women who have fears of diagnosis may be less likely to screen, but the research does not tease out differences between African American and Afro Caribbean women. In the little research available that does try to distinguish between these groups of women, the researchers' findings conflict. Similarly, researchers looking at medical mistrust as a barrier to breast cancer screening are not in accord. While medical mistrust has been reported in literature, across the board, as impeding breast cancer screening, how that mistrust manifests for Afro-Caribbean and African American women remains unclear. Some research even suggests that Afro-Caribbean and African American women do, in fact, trust medical opinion at high levels.

Medical mistrust is another barrier that has been reported in the literature as impeding breast cancer screening [8,9,11]. A study investigating beliefs that different ethnic groups hold on breast cancer discovered that African American and Afro-Caribbean women were among the most likely to belief that cancer surgeries only made the illness worse, indicating that medical mistrust might be present [8]. Data has suggested that those who have this belief about surgery may be less inclined to get screened and that such medical mistrust might thus be a barrier to adherence [11]. However, other data has surfaced that indicates African American and Afro-Caribbean women might trust medical opinions at higher levels [7,9,11].

Although it has been suggested that, for African American women, having faith in God might be another barrier associated with lower mammography and CBE adherence, the literature exploring barriers to care for both African American and Afro-Caribbean women does not provide any conclusive information on this front [8,11,15-20]. Though a study exploring screening barriers throughout six ethnicities found that 25.0% of their study population believed that illness was in God's hands, the research did not explore if this held significance for these two subpopulations [11]. Additionally, although Afro-Caribbean women were more likely to say they ascribed to such beliefs than African American women, its relation to screening adherence was not discussed [8].

As evident in the literature presented above, the relationship between cancer screening behaviors and health beliefs are significant and vary between ethnic subgroups. The following hypotheses were developed to be examined in the current study.

Hypothesis 1: Afro-Caribbean women will express more worry in regards to breast cancer.

Hypothesis 2: African American women will adhere to screening exams more frequently than Afro-Caribbean women.

Hypothesis 3: Afro-Caribbean women will be more fatalistic and suspicious of modern medicine than African American women.

The goal of this manuscript was to better understand the breast cancer screening characteristics, attitudes, beliefs and barriers to screening among African Americans and Afro-Caribbeans, as well as, to explore the correlations in regards to breast cancer screening adherence.

Methods

Intervention

The Witness Project of Harlem (WPH) is an educational program geared to increase breast and cervical cancer screening rates among the African American community. Programs are conducted in local churches and community gathering places. The Witness Project model integrates the use of local African American women in the community [16,17].

Cancer survivors serve as Witness Role Models (WRM), and non-cancer survivors serve as, Lay Health Advisors (LHA). The WRMs share their personal experiences with cancer while discussing the importance of early detection and prompt treatment; all of the testimonies are shared within a spiritual context [17].

Fatalism, medical mistrust and fear of cancer diagnosis are also discussed as barriers that might keep Black women from getting screened; the WRMs and LHAs try to assuage such fears and provide reassurance of the benefits of early detection. The LHAs teach the women how to properly self-examine their breasts, provide information on breast and cervical cancer screening guidelines, and offer participants information about local cancer screening services and resources. By incorporating WRMs and LHAs, the WPH aims to promote awareness, knowledge and motivation for early detection and screening behaviors to reduce the morbidity and mortality caused by breast and cervical cancer in African American women [18].

Study population

Programs were conducted in local churches and community centers in predominantly Black neighborhoods. From March 30, 2001 to March 25, 2010, 167 programs were conducted. Overall, 3502 women were educated, of which 1983 (56.6%) completed the questionnaire. Of these women, 1347 (67.9%) were African American, 286 (14.4%) were Afro-Caribbean, 210 (10.6%) were Hispanic, 38 (1.9%) were White and 45 (2.3%) reported as "Other." A small number of participants (2.9%) did not disclose their ethnicity. The goal of this analysis is to compare the differences and similarities of health practices and beliefs between African American and Afro-Caribbean women. Thus, we only included women who self-identified as African American or Afro-Caribbean; this resulted in a total sample of 1633 women.

Data collection

Data for this analysis comes from a brief questionnaire that women were asked to fill out during the WPH programs. The form was comprised of questions that captured each participant's age, race/

ethnicity, current breast cancer screening practices (as recommended by the American Cancer Society guidelines that were current at the time of the educational programs) and health beliefs.

Measures

Breast Cancer Worry: For worry the participants responded on a four-point Likert scale (not at all worried, a little worried, somewhat worried and very worried) to the question "When you think about getting breast cancer, how worried do you get?" [19]. For this analysis, the responded were recoded into two categories: not at all worried/a little worried and somewhat worried/very worried.

Medical Mistrust: The participants' level of medical mistrust was measured using the statement, "People of my ethnic group should be suspicious of modern medicine." This statement was taken from the Group-Based Medical Mistrust Scale, which measures suspicion of health care systems and health care professionals and treatments provided to individuals of the respondent's racial or ethnic group [20]. The responses are a four-point Likert scale, strongly disagree, disagree, agree and strongly agree which were then collapsed for analysis to strongly disagree/disagree and agree/strongly agree.

Fatalism: A single item from Holt's Spiritual Health Locus of Control scale was used to measure the participants' level of fatalism [21]. The participants responded to "I rely on God to keep me in good health" on a four-point Likert scale with responses ranging from strongly disagree, disagree, agree and strongly agree. For data analyses, the above responses were recoded into two categories: strongly disagree/disagree and agree/strongly agree.

Breast Cancer Screening Adherence: Cancer screening adherence was categorized as adherent or non-adherent to screening based on recommendations by the American Cancer Society (ACS) [22]. The ACS recommends that women at average risk for developing breast cancer begin annual mammography at age 40 years and have a clinical breast exam annually and that women in their 20s and 30s have a clinical breast exam at least every 3 years [22,23]. Therefore, women age 40 and older who reported undergoing screening mammography and clinical breast exam once a year were categorized as adherent as were women in their 20s and 30s who reported undergoing clinical breast exam at least every 3 years. At the time the data were collected, the ACS recommended monthly breast self-examination (BSE) [22]. Although, in 2003, the ACS dropped BSE as part of their standard breast cancer screening recommendations, sources still suggest that BSE may help some women detect changes in their breasts [23]. Therefore, in the current study, women who reported performing BSE monthly were categorized as adherent whereas those who under practiced or over practiced BSE were categorized as non-adherent. The participants who didn't report their current screening were considered non-compliant with screening thus non-adherent.

Analyses

Analyses were conducted to evaluate the characteristics of the two subgroups in regards to the three screening exams (BSE, CBE and Mammography). Adherence to each of the exams was measured by following the American Cancer Society age-specific screening guidelines that were in place at the time the study was initiated. The participants who didn't report their current screening were considered non-compliant with screening

Statistical analysis was performed using the IBM SPSS 20.0 package. Equality of proportions for categorical variables were compared using a chi-square test. All tests were two-sided and considered significant if $p \leq 0.05$. The primary analysis was conducted to test if African American participants would adhere to breast and cervical cancer screening exams more frequently than the Afro-Caribbean participants. The secondary analysis was designed to examine the associations of subgroup characteristics and health belief variables with screening rates.

A multivariable logistical regression model was then developed for each screening exam. This allowed the assessment of the varying effects to adherence after adjusting for participant characteristics and health beliefs.

All variables were included in the model irrelevant of their secondary univariate alpha. A backwards conditional regression was conducted in order to generate the models presented. Variables were retained in the model if an alpha of 0.10 or less was expressed.

Results

Of the 3502 women educated at the WPH breast and cervical cancer education programs, 1983 (56.6%) agreed to participate in the research study. When the participants were stratified by ethnicity, 67.9% were African American and 14.4% were Afro-Caribbean, and comprise the sample of 1,633 women in this manuscript. The remaining 17.6% (n=350) self-identified as either being Hispanic, White, Other or they did not report their ethnicity. African American participants were older than Afro-Caribbean participants, with about 40% of African Americans being over the age of 60 and over 50% of Afro-Caribbeans being under the age of 50 (p=0.002). There was no statistical difference in need for assistance or ever hearing about BSE, CBE or mammography. The adherence rates for all three exams were extremely similar between the two subgroups, with their being no more than a 4% difference in adherence rates to either BSE, CBE or mammography; 3.7%, 0.7% and 2.7% respectively. There was less than a 5% difference for women being worried about getting breast cancer between the groups and less than 2% difference in regards to being suspicious about modern medicine. Both these variables were not of statistical significant. However, there was a statistical trend in regards to fatalism, Afro-Caribbean women were slightly more fatalistic than their counterparts (p=0.059) (Table 1).

Factors: BSE adherence

In the univariate analysis many variables were of statistical significance in regards to BSE adherence for African Americans, while only two demonstrated such significance for Afro-Caribbeans. African American women needing assistance with free or low cost screening (p=0.035), ever examining your own breast (p=0.000), ever having a CBE (p=0.000), CBE adherence (p=0.002), ever having a mammogram (p=0.001), and mammography adherence (p=0.004) all emerged as significant variables. However, only the variables ever examining your own breast (p=0.000) was of significance for Afro-Caribbeans (Table 2).

The strongest factor for African American women's adherence to BSE was breast cancer worry, with participants who reported being somewhat/very worried about getting breast cancer being 1.72 times more likely to adhere to BSE than those who reported being not at all/a little worried (p=0.033), then having ever received a mammogram (OR=0.27; p=0.038). However, for Afro Caribbean women, no significant factors for monthly BSE adherence emerged (Table 3).

Factors: CBE adherence

In the univariate analysis there were many variables of interest for

	African-African		Afro-Caribbean		Total		
	N	%	N	%	N	%	*p-value*
Age							*0.002*
under 40	217	18.2%	57	23.2%	274	20.7%	
40-49	218	18.3%	60	24.4%	278	21.3%	
50-59	243	20.4%	57	23.2%	300	21.8%	
60-69	276	23.2%	38	15.4%	314	19.3%	
70 and over	238	20.0%	34	13.8%	272	16.9%	
Assistance with free or low cost screening							*0.349*
Yes	300	22.3%	71	24.8%	371	22.7%	
No	1047	77.7%	215	75.2%	1262	77.3%	
Have you ever examined your own breasts?							*0.645*
Yes	1176	88.0%	247	87.0%	1423	87.5%	
No	161	12.0%	37	13.0%	198	12.5%	
BSE Adherence							*0.201*
Adherent	370	27.5%	68	23.8%	438	25.6%	
Non-Adherent	977	72.5%	218	76.2%	1195	74.4%	
Have you ever had a clinical breast exam?							*0.322*
Yes	1234	92.2%	256	90.5%	1490	91.3%	
No	104	7.8%	27	9.5%	131	8.7%	
CBE Adherence							*0.842*
Adherent	828	61.5%	174	60.8%	1002	61.4%	
Non-Adherent	519	38.5%	112	39.2%	631	38.6%	
Have you ever had a mammogram?							*0.157*
Yes	1102	82.2%	225	78.7%	1327	80.5%	
No	238	17.8%	61	21.3%	299	19.5%	
Mammography Adherence							*0.520*
Adherent	638	56.5%	124	54.1%	762	55.3%	
Non-Adherent	492	43.5%	105	45.9%	597	44.7%	
When you think about getting breast cancer, how worried do you get?							*0.216*
not at all/a little worried	532	45.2%	107	41.0%	639	43.1%	
somewhat/very worried	645	54.8%	154	59.0%	799	56.9%	
People of my ethnic group should be suspicious of modern medicine							*0.577*
strongly disagree/ disagree	787	70.8%	169	69.0%	956	69.9%	
agree/strongly agree	325	29.2%	76	31.0%	401	30.1%	
I rely on God to keep me in good health							*0.059*
strongly disagree/ disagree	276	24.5%	47	18.9%	323	21.7%	
agree/strongly agree	852	75.5%	202	81.1%	1054	78.3%	

Table 1: Descriptive characteristics of study population by ethnic subgroup.

African American women and Afro-Caribbean women. Age (p=0.000) and BSE adherence (p=0.002) were only significant for African American women and suspicion of modern medicine (p=0.027) was only significant for Afro-Caribbean women. Both subgroups shared many variables of significance such as assistance with free or low cost screening, ever examining your own breast ever having a CBE, ever having a mammogram, mammography adherence, ever having a Pap exam and pa adherence (Table 4).

Looking at the logistic regression for African Americans and Afro-Caribbeans adherence to CBEs, similar factors surfaced for both groups. Across ethnicities, being adherent for mammograms was the strongest factor for being adherent with CBEs. African American women who said they got their annual mammogram were 30.93 times more likely to be CBE adherent compared to those who did not (p=0.000), and Afro-Caribbean women who adhered to mammogram screenings were 32.64 times more likely to be CBE adherent (p=0.000). No other variables emerged as significant for Afro-Caribbean women. However, for African American women, between the ages of 60-69 were more likely to be adherent than a women under 40 (OR=0.434, p=0.010) (Table 5).

Factors: Mammogram adherence

In the univariate analysis many similarities were seen between African American women and Afro-Caribbean women. Assistance with free or low cost screening, ever having a CBE, CBE adherence, ever having a mammography, were all statistically significant for both ethnic subgroups. Age, ever examining your own breasts, and BSE adherence were also found to be statistically significant for African Americans, while Afro-Caribbeans also found suspicion of modern medicine to be of significance (Table 6).

When considering predictive variables for mammogram adherence only two similarities emerged. Just as mammogram adherence was a strong factor for CBE adherence across ethnicities, the strongest factor for mammogram adherence was being adherent to CBEs for both African American and Afro-Caribbean participants. African Americans who were adherent to CBEs were 38.21 times more likely to adhere to mammograms than those who were not (p=0.000); Afro-Caribbeans who were CBE adherent were 31.92 times more likely to be adherent to mammogram screenings compared to those who expressed they were not adherent with CBEs (p=0.000). It was also found, across both ethnicities, that those aged 60-69 would have higher odds for mammogram adherence when compared with those aged 40-49. African Americans in this age group were 2.63 times more likely to be adherent than those aged 40-49 (p=0.001). Notable is that being between 70-79 years of age was a significant variable for African Americans, when compared to 40-49 year olds (OR=1.99, p=0.034), but not for Afro Caribbeans (Table 7).

Discussion

Surveying the predominantly Black participants in the WPH programs, this study set forth to examine and better understand the similarities and differences among African American and Afro-Caribbean women in regards to breast and cervical cancer screening. This research was intent on examining specific determinants that might predict screening adherence for these two subpopulations. This discussion will explore results that demonstrated how, regardless of similar adherence rates between African American and Afro-Caribbean women, homogeneity between these two subgroups should not be assumed. Public health practitioners working within Black communities should better understand that barriers for screening may be heterogeneous among subpopulations.

It was anticipated that Afro-Caribbean women would convey more worry in regards to breast and cervical cancer, be more fatalistic and suspicious of modern medicine, and be less adherent to the screening exams than African American women. Contrary to expectations, the

	African American					Afro-Caribbean				
	Adherent		Non-Adherent			Adherent		Non-Adherent		
	N	%	N	%	*p-value*	N	%	N	%	*p-value*
Age					*0.093*					*0.250*
under 40	50	23.0%	167	77.0%		11	19.3%	46	80.7%	
40-49	57	26.1%	161	73.9%		18	30.0%	42	70.0%	
50-59	63	25.9%	180	74.1%		18	31.6%	39	68.4%	
60-69	92	33.3%	184	66.7%		8	21.1%	30	78.9%	
70 and over	60	25.2%	178	74.8%		5	14.7%	29	85.3%	
Assistance with free or low cost screening					*0.035*					*0.545*
Yes	68	22.7%	232	77.3%		15	21.1%	56	78.9%	
No	302	28.8%	745	71.2%		53	24.7%	162	75.3%	
Have you ever examined your own breasts?					*0.000*					*0.000*
Yes	368	31.3%	808	68.7%		68	27.5%	179	72.5%	
No	2	1.2%	159	98.8%		0	0.0%	37	100.0%	
Have you ever had a clinical breast exam?					*0.000*					*0.106*
Yes	354	28.7%	880	71.3%		64	25.0%	192	75.0%	
No	12	11.5%	92	88.5%		3	11.1%	24	88.9%	
CBE Adherence					*0.002*					*0.188*
Adherent	250	30.3%	574	69.7%		46	26.4%	128	73.6%	
Non-Adherent	118	22.6%	405	77.4%		22	19.6%	90	80.4%	
Have you ever had a mammogram?					*0.001*					*0.396*
Yes	325	29.5%	777	70.5%		56	24.9%	169	75.1%	
No	44	18.5%	194	81.5%		12	19.7%	49	80.3%	
Mammography Adherence					*0.004*					*0.728*
Adherent	201	31.5%	427	68.5%		32	25.8%	92	74.2%	
Non-Adherent	117	23.8%	375	76.2%		25	23.8%	80	76.2%	
When you think about getting breast cancer, how worried do you get?					*0.315*					*0.406*
not at all/a little worried	141	26.5%	391	73.5%		23	21.5%	84	78.5%	
somewhat/very worried	188	29.1%	457	70.9%		40	26.0%	114	74.0%	
People of my ethnic group should be suspicious of modern medicine					*0.606*		.			*0.743*
strongly disagree/disagree	218	27.7%	569	72.3%		39	23.1%	130	76.9%	
agree/strongly agree	95	29.2%	230	70.8%		19	25.0%	57	75.0%	
I rely on God to keep me in good health					*0.395*					*0.379*
strongly disagree/disagree	73	26.4%	203	73.6%		9	19.1%	38	80.9%	
agree/strongly agree	248	29.1%	604	70.9%		51	25.2%	151	74.8%	

Table 2: Unadjusted breast self-exam adherence by participant characteristics.

	African American				Afro-Caribbean			
	p-value	OR	95% CI		p-value	OR	95% CI	
			Lower	Upper			Lower	Upper
When you think about getting breast cancer, how worried do you get?	.033	1.715	1.045	2.812				
Have you ever had a mammogram?	.028	.254	.075	.864				
Age (reference Under 40)								
40-49	.126	.691	.430	1.110	.508	1.349	.556	3.274
50-59	.991	.997	.639	1.557	.469	.680	.239	1.931
60-69	.041	.583	.348	.977	.998	.000	0.000	

Table 3: Predictive model for BSE adherence.

data did not reveal those relationships. The breast cancer screening rates amongst the subgroups were relatively the same; no more than a four percent difference in adherence rates was detected.

The findings from this study are mostly consistent with prior research on breast cancer screening among these subpopulations that found African American women to utilize BSE, CBE, and mammograms at a higher rate [7,10,11]. However these results are unable to support findings from one reviewed study that suggested Afro-Caribbeans who lived in the country longer were more likely to be adherent to BSE, CBE, and mammograms [9,10]. We were unable to include that type of analysis into our study as the instrument did not ask the participants how many years they have resided in the United States.

This study's findings on each ethnic sub-groups' health beliefs

	African American					Afro-Caribbean				
	Adherent		Non-Adherent			Adherent		Non-Adherent		
	N	%	N	%	*p-value*	N	%	N	%	*p-value*
Age					*0.000*					*0.777*
under 40	148	68.2%	69	31.8%		36	63.2%	21	36.8%	
40 - 49	123	56.4%	95	43.6%		37	61.7%	23	38.3%	
50 - 59	151	62.1%	92	37.9%		38	66.7%	19	33.3%	
60 - 69	201	72.8%	75	27.2%		23	60.5%	15	39.5%	
70 and over	118	49.6%	120	50.4%		18	52.9%	16	47.1%	
Assistance with free or low cost screening					*0.000*					*0.001*
Yes	142	47.3%	158	52.7%		31	43.7%	40	56.3%	
No	686	65.5%	361	34.5%		143	66.5%	72	33.5%	
Have you ever examined your own breasts?					*0.000*					*0.018*
Yes	755	64.2%	421	35.8%		157	63.6%	90	36.4%	
No	71	44.1%	90	55.9%		16	43.2%	21	56.8%	
BSE Adherence					*0.002*					*0.188*
Adherent	250	67.9%	118	32.1%		46	67.6%	22	32.4%	
Non-Adherent	574	58.6%	405	41.4%		128	58.7%	90	41.3%	
Have you ever had a clinical breast exam?					*0.000*					*0.000*
Yes	824	66.8%	410	33.2%		174	68.0%	82	32.0%	
No	4	3.8%	100	96.2%		0	0.0%	27	100.0%	
Have you ever had a mammogram?					*0.000*					*0.001*
Yes	715	64.9%	387	35.1%		148	65.8%	77	34.2%	
No	112	47.1%	126	52.9%		26	42.6%	35	57.4%	
Mammography Adherence					*0.000*					*0.000*
Adherent	571	89.5%	67	10.5%		114	91.9%	10	8.1%	
Non-Adherent	106	21.5%	386	78.5%		24	22.9%	81	77.1%	
When you think about getting breast cancer, how worried do you get?					*0.357*					*0.714*
not at all/a little worried	347	65.2%	185	34.8%		65	60.7%	42	39.3%	
somewhat/very worried	404	62.6%	241	37.4%		97	63.0%	57	37.0%	
People of my ethnic group should be suspicious of modern medicine					*0.736*					*0.027*
strongly disagree/disagree	505	64.2%	282	35.8%		116	68.6%	53	31.4%	
agree/strongly agree	212	65.2%	113	34.8%		41	53.9%	35	46.1%	
I rely on God to keep me in good health					*0.379*					*0.997*
strongly disagree/disagree	183	66.3%	93	33.7%		30	63.8%	17	36.2%	
agree/strongly agree	540	63.4%	312	36.6%		129	63.9%	73	36.1%	

Table 4: Unadjusted clinical breast exam adherence by participant characteristics.

	African American				Afro-Caribbean			
	p-value	OR	95% CI		p-value	OR	95% CI	
			Lower	Upper			Lower	Upper
Age (reference Under 40)								
40-49	.336	.743	.406	1.361				
50-59	.981	1.007	.546	1.860				
60-69	.010	.434	.230	.819				
Have you ever had a mammogram?	.069	.314	.090	1.095				
MAM adherence	.000	30.934	19.737	48.483	.000	32.647	11.989	88.899

Table 5: Predictive model for CBE adherence.

differs from prior research that has found African American women to be more expressive of cancer worry, but were similar when considering suspicion of modern medicine [7-9]. Afro-Caribbean women showcased significantly more cancer worry than African Americans but held similar levels of concern regarding modern medicine. Afro-Caribbeans also exhibited more fatalistic tendencies than African Americans.

Distinct differences were seen within BSE adherence for the two

	African American					Afro-Caribbean				
	Adherent		Non-Adherent			Adherent		Non-Adherent		
	N	%	N	%	*p-value*	N	%	N	%	*p-value*
Age					*0.000*					*0.261*
40 - 49	104	47.7%	114	52.3%		28	46.7%	32	53.3%	
50 - 59	146	60.1%	97	39.9%		37	64.9%	20	35.1%	
60 - 69	195	70.7%	81	29.3%		21	55.3%	17	44.7%	
70 and over	118	49.6%	120	50.4%		18	52.9%	16	47.1%	
Assistance with free or low cost screening					*0.000*					*0.008*
Yes	83	37.6%	138	62.4%		16	36.4%	28	63.6%	
No	555	61.1%	354	38.9%		108	58.4%	77	41.6%	
Have you ever examined your own breasts?					*0.003*					*0.816*
Yes	583	58.2%	419	41.8%		110	54.5%	92	45.5%	
No	52	44.1%	66	55.9%		13	52.0%	12	48.0%	
BSE Adherence										*0.728*
Adherent	201	63.2%	117	36.8%	*0.004*	32	56.1%	25	43.9%	
Non-Adherent	437	53.8%	375	46.2%		92	53.5%	80	46.5%	
Have you ever had a clinical breast exam?					*0.000*					*0.009*
Yes	625	58.9%	436	41.1%		121	57.1%	91	42.9%	
No	9	14.8%	52	85.2%		3	21.4%	11	78.6%	
CBE Adherence					*0.000*					*0.000*
Adherent	571	84.3%	106	15.7%		114	82.6%	24	17.4%	
Non-Adherent	67	14.8%	386	85.2%		10	11.0%	81	89.0%	
Have you ever had a mammogram?					*0.000*					*0.000*
Yes	638	61.2%	404	38.8%		124	59.6%	84	40.4%	
No	0	0.0%	81	100.0%		0	0.0%	21	100.0%	
When you think about getting breast cancer, how worried do you get?					*0.727*					*0.264*
not at all/a little worried	259	57.7%	190	42.3%		43	50.6%	42	49.4%	
somewhat/very worried	311	58.8%	218	41.2%		73	58.4%	52	41.6%	
People of my ethnic group should be suspicious of modern medicine					*0.936*					*0.047*
strongly disagree/disagree	403	60.0%	269	40.0%		83	61.9%	51	38.1%	
agree/strongly agree	148	59.7%	100	40.3%		28	46.7%	32	53.3%	
I rely on God to keep me in good health					*0.460*					*0.214*
strongly disagree/disagree	143	60.9%	92	39.1%		18	47.4%	20	52.6%	
agree/strongly agree	405	58.1%	292	41.9%		93	58.5%	66	41.5%	

Table 6: Unadjusted mammography adherence by participant characteristics.

	African American				Afro-Caribbean			
	p-value	OR	95% CI		p-value	OR	95% CI	
			Lower	Upper			Lower	Upper
Assistance with free or low cost screening?	.019	1.850	1.104	3.100				
Age (reference 40-49)								
50-59	.059	1.762	.978	3.175				
60-69	.001	2.632	1.454	4.763				
70 or older	.034	1.990	1.055	3.753				
Have you ever had a CBE?	.049	2.655	1.003	7.028				
CBE adherence	.000	38.213	23.663	61.708	.000	31.922	11.711	87.007

Table 7: Predictive model for mammography adherence.

subgroups. Among African American women age, ever having a mammography, as well as strong worry in regards to breast cancer were factors associated with greater odds of being adherent to BSE; however only age was of minimal significance for Afro-Caribbean women.

In conducting multivariable models that controlled for influential covariates, significant covariates of screening differed between the two ethnic subgroups. In these models, we found that ever having a mammogram, mammography adherence, relying on God for good health and needing help with transportation were associated with increased odd of adherence to CBE among African American women, while mammography adherence was the only variables associated with increased odds of CBE adherence among Afro-Caribbean women.

Differences in regards to mammography screening were also found. Among African Americans needing assistance with free or low

cost screening, CBE adherence, Pap adherence, cancer worry and age were associated with increased odds of mammography adherence. While needing assistance with free or low cost screening, help with transportation, ever performing BSE, ever hearing about CBE, CBE adherence and age were strong associates for Afro-Caribbeans.

Among Blacks in general, factors of BSE, CBE and mammograms have included breast cancer worry [7,10-12]. In one study, cancer worry was even incorporated as a factor of cervical cancer screening [12]. However, looking at the direction of cancer worry (is it a barrier or a motivator) to screening has yielded varying results [7,10-12]. Other studies have looked at medical mistrust as a determinant of cancer screening for these subpopulations, but again, the research is divided [7-9,11]. Though a couple of studies have established that there is a religious component to health for Black women, only one study reviewed here discussed its relation to screening, and did not discuss significance [8,11]. To our knowledge, this is one of only a few studies to examine specific determinants of BSE, CBE and mammography adherence among African Americans and Afro-Caribbeans separately [7-12]. Evidently, more research is needed to better understand the differences in determinants between these two ethnic subgroups and the sources of these differences.

This study is not without its limitations. It is important to note that although this study recognizes the need to distinguish between African American and Afro-Caribbean participants, there might be differences within the Afro-Caribbean populations that are not recognized or addressed here; such as language, insurance status, years living in the U.S. and documentation status. Additionally, due to the lack of random sampling, it might be difficult to generalize these results. For example, certain attitudes or beliefs might be underrepresented by this study population with those who are suspicious of modern medicine electing not to participate in the research study, and may be related to the relatively low completion rates of the survey. The lack of understanding of the doctor's relationship with the women may be a confounding variable that was not researched by us unlike other studies [7,9,11]. The quantitative exploration of attitudes and beliefs lends itself to another limitation. Supplementing the instrument with open-ended questions exploring the participants' feelings might have helped yield additional substantive insight into the concerns of these subpopulations. Another limitation is the potential selection bias of the study findings. Without collecting demographic information from the program participants who elected to not participate in the research study we are unable to state if there are any differences between the groups.

Although there are limitations, this study also carries much strength. We have gained a deeper understanding into the characteristics, attitudes, beliefs and barriers to screening that this sample of African American and Afro-Caribbean women experience. This information will help strengthen WPH programs; allowing for improvement of screening rates and healthcare-seeking behaviors. These specific subpopulations face different barriers to breast cancer screening. By understanding these differences we will be better equipped to reach these subpopulations with health messages that target their respective obstacles. While more research needs to be done so that we can understand the source of these differences, knowing what these differences are provides substantial insight into what challenges should be pursued.

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