Individual, Provider, and System Risk Factors for Breast and Cervical Cancer Screening Among Underserved Black, Latina, and Arab Women

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Abstract

Background: Socioeconomic and racial/ethnic disparities in breast and cervical cancer screening persist. An exploratory study was conducted to better understand co-occurring risk factors in underserved groups that could inform interventions to improve screening adherence. The objective of this study was to examine associations between breast and cervical cancer screening adherence and co-occurring risk factors in three racial/ethnic groups of underserved women.

Methods: Black, Latina, and Arab women ($N = 514$), ages 21 to 70 years, were enrolled into the Kin Keeper[SM] randomized controlled trial in communities around Detroit, Michigan. We used participant baseline assessments (e.g., demographic characteristics, health literacy) to explore screening risks using an additive approach and multivariate logistic analyses.

Results: For black women, having more health literacy risks were associated with reduced odds of a clinical breast exam (CBE), mammogram, and Papanicolaou (Pap) test; more competing priorities were associated with reduced odds of a Pap test; lack of doctor mammogram recommendation was significantly associated with decreased odds of CBE. For Latina women, lack of doctor recommendations were significantly associated with decreased odds of CBE, mammogram, and Pap test. For Arab women, lack of doctor recommendations were significantly associated with decreased odds of CBE, mammogram, and Pap test; more competing priorities were significantly associated with reduced odds of CBE and Pap test. All results were significant at $p < 0.05$.

Conclusions: Characteristics associated with breast and cervical screening adherence differs among Black, Latina, and Arab underserved women. Interventions to improve screening should be tailored for racial/ethnic groups with particular attention to competing survival priorities, health literacy risks factors, and provider recommendations.

Introduction

EFFORTS TO IMPROVE BREAST and cervical cancer screening adherence, to date, have focused on individual, provider, and system strategies. Evidence-based interventions to improve both breast and cervical cancer screening include provider assessment and feedback, one-on-one client education, and client reminders. In addition, reducing out of pocket costs and reducing structural, noneconomic barriers, such as alternative screening settings or lack of transportation, are effective strategies for breast cancer only.[1] However, regardless of effective interventions, socioeconomic and racial/ethnic

disparities persist in breast and cervical cancer screening adherence with important implications for diagnosis, treatment, and outcomes.[2–4] Furthermore, few studies have identified what interventions are effective for particular subgroups of women who underutilize services.[1] To improve screening adherence, given the cultural diversity of underserved women, a better understanding of risk factors for inadequate screening is needed to be able to tailor interventions for specific cultural groups.

Prior studies have identified individual risk factors associated with inadequate screening. These factors included competing survival priorities (e.g. financial strain, housing,

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multiple jobs),[5,6] comorbid health conditions,[7,8] poor health,[9,10] risk behaviors,[11] and health literacy factors such as lack of information.[12–14] Further, provider factors (e.g., lack of a primary care physician, lack of provider recommendation)[15,16] and system factors (e.g., lack of health insurance, difficulties accessing services) have also been associated with screening behavior.[17–19] Prior studies, with several exceptions,[20–22] were commonly focused on a single racial/ethnic group or considered all underserved women, but few included subgroup analysis by race/ethnicity.

Those studies that have examined the independent effects of individual, provider, and/or system risk factors on screening behavior typically use multivariate approaches.[11,23] However, co-occurring risk factors can produce increased vulnerability for inadequate screening among underserved women. For example, a woman may not get screened because she knows little about breast cancer risk, lacks knowledge of her family cancer history, and has less than a high school education, all possibly influencing her utilization of health care. Thus, the total number of risk factors may be more important than the risk type for vulnerable families.[24,25] A method for understanding multiple risk factors is using an additive approach, where each risk factor is given equal weight and then risk factors are added together to identify the potential effect of co-occurring risks rather than the effects of specific individual risks.[26,27] This additive approach, to our knowledge, has only been used in a single study to examine co-occurring risk factors for inadequate cancer screening that included income, education, and health insurance, in white, black, Hispanic, and Asian women.[28] The study found that having more risks factors was associated with a lower incidence of preventive screenings.

In the context of a randomized controlled trial designed to test an intervention to improve breast and cervical cancer screening adherence, we were provided an opportunity to explore multiple risk factors for participation in cancer screening in urban black, Latina, and Arab women at the time of study enrollment in the trial. Our conceptual approach to the identification of risk factors was guided by the work of Gerend and Pai, who elaborated socio-economic factors that may contribute to disparities in breast cancer mortality using a social determinants model.[19,29] Our intent was to examine individual, provider, and system risk factors. The objectives of this study were (1) to describe patient, provider, and system risk factors and breast and cervical cancer screening behavior for three racial/ethnic groups of traditionally underserved women, and (2) to examine the associations between breast and cervical cancer screening behavior and co-occurring risk factors in each group. This study adds to the current literature by exploring the co-occurring nature of multiple domains of risk factors for inadequate cancer screening, using an additive approach, in three distinct racial/ethnic groups of women.

Methods

Study design and population

The study is an exploratory analysis of baseline data from women when they enrolled in a randomized trial of Kin Keeper[SM] before any intervention was delivered. Kin Keeper[SM] is a cancer prevention intervention that targets Black, Latina, and Arab women who are currently enrolled in a health program (e.g., chronic disease, maternal child health

or other) and who receive services from community health workers (CHW). The intervention is integrated into existing program services and reaches the participants and their female family members. The intervention has been previously described in detail.[30,31] The study was based in Detroit and Dearborn, Michigan and was conducted in collaboration with community partners: the Detroit Department Health and Wellness Promotion (DDHWP), one the largest health departments in the United States that serves primarily Black and Latino residents, and the Arab Community Center for Economic and Social Service (ACCESS), a sophisticated health and human service agency that serves the largest Arab population in the United States. Women, between the ages of 21–70 years who were currently engaged in a public health program through DDHWP or ACCESS and had an established relationship with a community health worker (CHW) were the focus of this project. Black, Latina, and Arab women residing in southeast Michigan (Detroit and Dearborn) were randomized to intervention and control conditions. Each woman then recruited two or more female family members to participate in the family group intervention study, resulting in a total sample of 514 participants. Past screening history or cancer history were not exclusion criteria. The study was approved by the Michigan State University Institutional Review Board.

Data collection

All participants completed a baseline questionnaire at study enrollment including sociodemographic characteristics (e.g., age, marital status, education, employment, income); health (e.g., chronic illness, risk behaviors); health care (e.g., access, health insurance); and health literacy (e.g., cancer literacy tools) during a home visit. Women were recruited in the study between January 2011 and April 2012.

Outcomes

The outcomes in this study were appropriately timed clinical breast exam (annual), mammogram (annual for women over 40 years of age), and cervical cancer screening (every 3 years) at the time of study enrollment. The outcomes were defined as binary indicators based on yes/no responses to the following statements: "Had a clinical breast exam" in the last 12 months; "Had a mammogram" in the last 12 months; and "Had a Pap test" in the last 3 years. These outcomes reflect cancer screening recommendations by the American Cancer Society[32] (annual screening) and by the 2002 U.S. Preventive Services Task Force (USPSTF) for mammography screening[33] (screening every 1–2 years). These recommendations do differ from the 2009 USPSTF recommendations, which were not available at the time of study development.[34] Further, the recent Patient Protection and Affordable Care Act specifies coverage of breast cancer screening according to the 2002 recommendations.[35]

Explanatory variables

We included age and marital status as individual sociodemographic explanatory variables. In addition, since prior literature has indicated a strong correlation of screening with physician recommendations, we used physician recommendation for screening as binary independent predictors of baseline screening outcomes. Then, in order to account for the effect of multiple co-occurring risk factors, we developed four broad additive risk scores: a competing survival priorities

score; a health risks score; a health literacy risks score; and a system risks score (Table 1). Each score was defined as the sum of three binary variables to create an additive score ranging from zero to three. Consistent with existing literature, we assigned an equal weight of 1 to each risk factor when defining the additive risk scores.[26,36] We defined the competing survival priorities score as the sum of three binary indicators: working two or more jobs (not used for Latina women because none worked two or more jobs), whether the participant needed to reschedule physician appointments, and the family income <$10,000 per year. The health risks score was defined as the sum of the following binary indicators: the participant had a chronic disease (depression or diabetes or hypertension), she smoked (not used for Latinas because only two smoked), and she had perceived poor or very poor health. We defined the health literacy risks score as the sum of three indicators: whether the participant had low cancer literacy (breast or cervical, as appropriate), she had

no knowledge of own family cancer history, and had an education less than 12 completed years. Finally, the system risks score was defined as the sum of the following three indicators: no health insurance, difficult access to doctor, and low recent exposure to cancer media (breast when the outcomes were breast related, and cervical when the outcome was a Papanicolaou [Pap] test). The cancer literacy variables were defined based on the psychometrically standardized literacy assessment tools Breast Cancer Literacy Assessment Tool (BCLAT)[28] and Cervical Cancer Literacy Assessment Tool (CCLAT).[37,38] Participant scores on the BCLAT and CCLAT were coded "low" if fewer than 75% of the answers were correct.

Analyses

We performed all analyses by race/ethnicity to investigate how risk factors for screening behavior differ in various racial/ethnic groups. Counts and percentages by

TABLE 1. SAMPLE CHARACTERISTICS AND CANCER SCREENING OUTCOMES

Percentages (means for the additive scores)	All (N = 514)	Black (n = 216)	Latina (n = 65)	Arab (n = 233)
	%	%	%	%
Individual explanatory variables				
Age <40	33.27	38.32	40.63	26.43
Age 40–50	34.26	28.97	35.94	38.77
Age ≥50	32.48	32.71	23.44	34.80
Unmarried	28.11	51.42	17.46	8.97
No doctor recommended clinical breast exam past year	62.06	63.68	68.25	58.87
No doctor recommended mammography past year (≥40)	51.34	52.67	52.63	50.00
No doctor recommended Pap test past 3 years	59.10	63.72	60.00	54.55
Additive score explanatory variables				
1. Competing priorities risk score (range 0–3): mean score (SD)	0.89 (1.04)	0.75 (0.97)	1.38 (1.16)	0.87 (1.03)
Working 2 or more jobs	5.36	6.60	–	5.79
Needed to reschedule appointments	38.13	35.26	52.63	36.65
With family income <$10,000 per year	24.32	20.83	46.15	21.46
2. Health risks score (range 0–3): mean score (SD)	0.88 (0.87)	0.87 (0.83)	0.78 (1.05)	0.92 (0.86)
Any chronic illness (hypertension, diabetes, depression)	42.02	43.98	32.31	42.92
Smoking	24.60	28.30	–	27.80
Poor or very poor health	27.90	25.23	30.77	29.57
3. Health literacy risks score (range 0–3): mean score (SD)	1.23 (1.29)	0.80 (1.07)	2.15 (1.12)	1.37 (1.36)
Education less than high school	30.14	9.62	66.67	38.70
No knowledge of cancer history in the family	28.41	34.12	31.24	22.31
Inadequate breast cancer literacy	53.89	51.85	69.23	51.50
Inadequate cervical cancer literacy	63.23	59.72	70.77	64.38
4. System risks score (range 0–3): mean score (SD)	1.44 (1.23)	1.54 (1.33)	1.40 (1.00)	1.35 (1.19)
With no health insurance coverage	34.26	20.56	61.90	39.47
Difficult access to the health provider	10.28	8.41	20.31	9.21
With low recent exposure to breast cancer media	44.09	36.10	67.19	44.78
With low recent exposure to cervical cancer media	55.02	50.24	82.54	51.74
Outcomes				
Clinical breast exam last 12 months	60.87	61.21	47.69	64.32
Mammography last 12 months (age ≥40)	62.99	62.60	50.00	66.27
Pap test last 3 years	75.79	83.41	67.69	71.05

Note: Each additive score includes three binary variables to create a score from zero to three. We defined the competing survival priorities score as the sum of three binary indicators: working two or more jobs (not used for Latina women because none worked two or more jobs), whether the participant needed to reschedule physician appointments and the family income <$10,000 per year. The health risks score was defined as the sum of the following binary indicators: the participant had chronic disease (depression, diabetes, or hypertension), she smoked (not used for Latina because only two smoked), and she had perceived poor or very poor health. We defined the health literacy risks score as the sum of three indicators, with the noted exceptions for Latina: whether the participant had low cancer literacy (breast or cervical, as appropriate), she had no knowledge of own family cancer history, and had an education less than 12 completed years. The system risks score was defined as the sum of the following three indicators: no health insurance, difficult access to doctor, and low recent exposure to cancer media (breast when the outcomes were breast-related, and cervical when the outcome was a Papanicolaou [Pap] test).
SD, standard deviation.

race/ethnicity provided descriptive characteristics at baseline. We used multivariate logistic analyses (except for Latinas, where instead we used bivariate logistics due to the small sample size) to present effects of the explanatory variables on the outcomes of interest. The mammography analyses were restricted to women age 40 years or older. We present the results as odds ratios (OR) with statistical significance reported at the standard level accepted in the medical literature ($p = 0.05$). For the additive scores, the associations with the outcomes are reported as OR per unit increase in the score. As intrafamily clustering may have been possible, we performed the logistic analyses both with and without adjusting for clustering. As the findings were virtually identical with and without adjusting for clustering and because there were missing data in the family relationship variable, we reported the results without the clustering adjustment to benefit from the maximum available sample size. All data analyses were conducted using SAS statistical software (SAS 9.3, SAS Institute Inc.).

Results

The first set of analyses compared the three groups on the variables of interest. Latina (17%) and Arab women (9%) were less likely to be unmarried than black women (51%). Over 90% of black women and 61% of Arab women graduated high school, compared with 33% of Latinas. Approximately 20% of black, 62% of Latinas, and 39% of Arab women had no health insurance. Only 22% of Arab women did not know of cancer history in their families, compared with 34% of black women and 31% of Latinas. While some black (8%) and Arab (9%) women reported difficulty in accessing health care, 20% of Latinas reported difficulties. Over 63% of black women received no doctor recommendation for a clinical breast exam in the prior 12 months, compared with 68% of Latina and 59% of Arab women. Latinas were less likely to have an appropriate clinical breast exam (48%), mammography (50%), or a Pap test (68%), compared with both Black (61%, 62%, and 83%) and Arab women (64%, 66%, and 71%).

The second set of analysis examined the impact of the risk factors on cancer screening within each racial/ethnic group. Regression analyses for clinical breast exam (CBE) (Table 2)

indicated that among black women, no doctor recommendation for mammogram (OR = 0.4) and a higher health literacy risk score (i.e., lower health literacy) were associated with reduced odds (OR = 0.7) of having CBE in the last year. Among Latinas, lack of doctor recommendation for CBE (OR = 0.04) and no doctor recommendation for mammography (OR = 0.02) were associated with reduced odds of having a CBE in the past year. Among Arab women, no doctor recommendation for CBE (OR = 0.2), no doctor recommendation for mammography (OR = 0.26), and a higher competing priorities score were associated with reduced odds of having a CBE in the last year (OR = 0.6).

Table 3 presents the results for mammography. Among black women, a higher health literacy risks score (i.e., lower health literacy) was associated with reduced odds of having had a mammography in the past year (OR = 0.7). Among Latinas, there were strong associations between lack of doctor recommendations for mammography (OR = 0.04) and CBE (OR = 0.01) and reduced odds of a mammography in the past year. Lack of doctor mammography recommendation was negatively associated with the odds of a mammography in the past year among Arab women (OR = 0.25).

Table 4 presents the results for having a pap test. Higher competing priorities score (OR = 0.7) and health literacy risks score (OR = 0.5) were negatively associated with the odds of a Pap test in the past three years among black women. Among Latinas, the lack of doctor's recommendation for a Pap test (OR = 0.09) was associated with reduced odds of receiving a Pap test in the past 3 years. Among Arab women, lack of doctor recommendation for a test (OR = 0.26) and a higher competing priorities score (OR = 0.62) were associated with reduced odds of receiving a Pap test in the past 3 years. All reported results from Tables 2, 3, and 4 were considered statistically significant ($p < 0.05$).

Discussion

Overall, our findings are consistent with other studies; racial/ethnic women in underserved urban communities had low rates of breast and cervical cancer screening rates.[2,23,39,40] We also found racial/ethnic differences in risk factors,

TABLE 2. ASSOCIATIONS BETWEEN CLINICAL BREAST EXAM SCREENING AND INDIVIDUAL AND FAMILY CHARACTERISTICS, ODDS RATIO [95% CONFIDENCE INTERVAL]

Clinical breast exam last 12 months	Black (n = 216) multivariate OR[a]	Latina (n = 65) bivariate OR[b]	Arab (n = 233) multivariate OR[a]
Personal barriers / determinants			
Age ≥40 years (vs. age 21–40)	1.88 [0.93, 3.78]	6.41* [2.07, 19.88]	2.61* [1.16, 5.89]
Unmarried (vs. married)	0.93 [0.48, 1.81]	1.41 [0.38, 5.18]	0.49 [0.14, 1.71]
No doctor recommended clinical breast exam (vs. doctor recommended)	0.72 [0.32, 1.64]	0.04* [0.01, 0.21]	0.20* [0.08, 0.54]
No doctor recommended mammography (vs. doctor recommended)	0.4* [0.17, 0.96]	0.02* [0.002, 0.16]	0.26* [0.09, 0.70]
Competing priorities risk score[c]	1.04 [0.75, 1.44]	1.16 [0.75, 1.77]	0.60* [0.41, 0.86]
Health risks score[c]	0.74 [0.51, 1.07]	0.94 [0.58, 1.48]	1.12 [0.73, 1.70]
Health literacy risks score[c]	0.70* [0.53, 0.94]	1.06 [0.69, 1.65]	1.03 [0.78, 1.36]
System risks score[c]	1.06 [0.83, 1.34]	1.04 [0.64, 1.70]	1.01 [0.75, 1.34]

[a]Odds ratios (OR), multivariate logistic analyses, all of the above variables included in the models.
[b]Odds ratios (OR), bivariate logistic analyses.
[c]For the additive scores, the associations with the outcomes are reported as OR per unit increase in the score.
*p < 0.05.

TABLE 3. ASSOCIATIONS BETWEEN MAMMOGRAM SCREENING AND INDIVIDUAL AND FAMILY CHARACTERISTICS, ODDS RATIO [95% CONFIDENCE INTERVAL]

Mammogram last 12 months (age 40 years and older)	Black (n = 216) multivariate OR[a]	Latina (n = 65) bivariate OR[b]	Arab (n = 233) multivariate OR[a]
Age ≥50 (vs. age 40–49)	1.42 [0.61, 3.33]	0.73 [0.20, 2.72]	0.52 [0.24, 1.13]
Unmarried (vs. married)	0.55 [0.23, 1.32]	1.83 [0.27, 12.5]	0.48 [0.86, 3.01]
No doctor recommended clinical breast exam (vs. doctor recommended)	0.57 [0.21, 1.56]	0.04* [0.01, 0.22]	0.69 [0.28, 1.69]
No doctor recommended mammography (vs. doctor recommended)	0.74 [0.28, 1.96]	0.01* [0.002, 0.12]	0.25* [0.10, 0.61]
Competing priorities risk score[ac]	0.68 [0.41, 1.10]	1.35 [0.77, 2.37]	0.75 [0.52, 1.08]
Health risks score[c]	0.86 [0.52, 1.42]	0.62 [0.31, 1.22]	1.01 [0.64, 1.58]
Health literacy risks score[c]	0.66* [0.46, 0.95]	0.85 [0.43, 1.70]	1.09 [0.82, 1.46]
System risks score[c]	1.12 [0.83, 1.50]	1.88 [0.91, 3.90]	0.92 [0.67, 1.27]

[a]OR, multivariate logistic analyses, all of the above variables included in the models.
[b]OR, bivariate logistic analyses.
[c]For the additive scores, the associations with the outcomes are reported as OR per unit increase in the score.
*$p < 0.05$.

preventive screening behavior, and predictors of screening behavior in our sample. For example, our study showed that for black women about 80% indicated they had some form of public or private health insurance and 90% reported access to a health provider that was not difficult. However, about 40% had inadequate breast screening (CBE, mammography), and 17% reported inadequate pap testing. For black women, having more health literacy risks were associated with reduced odds of a clinical breast exam (CBE), mammogram, and Pap test; more competing priorities were associated with reduced odds of a Pap test; and lack of doctor mammogram recommendation was significantly associated with decreased odds of CBE.

Almost half of Latina women had a family income <$10,000 per year; more than half had less than a high school education, no health insurance, or had the challenge of re-scheduling health appointments. Most had inadequate breast and cervical cancer screening adherence. For Latinas, lack of doctor recommendations were significantly associated with decreased odds of CBE, mammogram, and Pap test. Although 40% of Arab women had no health insurance, only 9% indicated difficult access to a health provider. However, 37% of women had rescheduling appointment challenges and about 30% had inadequate screening adherence. For Arab women, lack of doctor recommendations were significantly associated with decreased odds of CBE, mammogram, and Pap test; more competing priorities were significantly associated with reduced odds of CBE and Pap test.

Although many women reported system barriers to screening, especially Latina women, we did not find system barriers to predict breast and cervical and cancer screening rates. Lack of findings for system barriers may be attributed to the fact that the study sample was recruited from women who were already engaged in community health or clinical services and had an existing relationship with a community health worker. Arab women, in particular, were connected to a large, comprehensive clinical service that specifically targets the Arab population in Detroit.

About a quarter of participants reported that they were in poor or very poor health, 25% were smoking, and 42% indicated a chronic illness (hypertension, diabetes, or depression). While other studies have found chronic illness and health risk behaviors, such as smoking, to be associated with screening, our study found that health risk factors were significant only in Black women for CBE.[11]

TABLE 4. ASSOCIATIONS BETWEEN PAP TEST SCREENING AND INDIVIDUAL AND FAMILY CHARACTERISTICS, ODDS RATIO [95% CONFIDENCE INTERVAL]

Pap exam last 36 months	Black (N = 216) multivariate OR[a]	Latina (N = 65) bivariate OR[b]	Arab (N = 233) multivariate OR[a]
Personal barriers / determinants			
Age ≥40 years (vs. age 21–40)	0.78 [0.29, 2.12]	5.17* [1.68, 15.93]	1.69 [0.77, 3.69]
Unmarried (vs. married)	1.43 [0.58, 3.53]	0.78 [0.20, 3.03]	0.1* [0.02, 0.39]
No doctor recommended Pap test (vs. doctor recommended)	0.67 [0.27, 1.69]	0.09* [0.02, 0.42]	0.26* [0.12, 0.54]
Competing priorities risk score[c]	0.66* [0.44, 0.99]	1.00 [0.64, 1.58]	0.62* [0.45, 0.86]
Health risks score[c]	0.85 [0.52, 1.37]	0.76 [0.47, 1.23]	0.85 [0.57, 1.27]
Health literacy risks score[c]	0.50* [0.34, 0.73]	1.48 [0.94, 2.34]	0.90 [0.67, 1.17]
System risks score[c]	1.32 [0.95, 1.85]	1.03 [0.61, 1.74]	1.01 [0.76, 1.34]

[a]OR, multivariate logistic analyses, all of the above variables included in the models.
[b]OR, bivariate logistic analyses.
[c]For the additive scores, the associations with the outcomes are reported as OR per unit increase in the score.
*$p < 0.05$.

Physician recommendation, consistent with other studies, remains an important consideration to improve cancer screening rates for most women, regardless of race/ethnicity or screening test. Strategies to improve physician communication and address cultural barriers to screening have been shown to improve screening rates.[41] In a study of physician reported barriers to screening, 40% acknowledged the lack of time to discuss screening.[42] Given multiple health problems and appointment scheduling difficulties—common in our sample—providers may have focused on chronic and acute health problems versus addressing preventive care and health education. Reminder and recall systems for providers have been shown to increase screening mammography and pap tests.[43]

Many women had competing survival priorities; for example, 38% reported needing to reschedule health care appointments. This is problematic, as some practices are unwilling to care for patients who repeatedly fail to show for appointments. Competing survival priorities was associated with inadequate Pap test screening, over a 3-year period, for black and Arab women. This is of concern, as Pap test screening is often associated with other preventive and wellness services that are included in Affordable Care Act.[44] While addressing competing survival priorities at the individual level is challenging for providers, family or neighborhood focused interventions may increase participation in screening, especially in the context of long term, structural poverty solutions.[19]

Health literacy risk factors were associated with all screening tests for black women, but not for Arab or Latina women. Although most black women had a high school education or greater (90%), less than half had adequate breast or cervical cancer literacy and only 34% of black women had knowledge of their family cancer history. Only 33% of Latina women had a high school education and Latinas also had the lowest breast and cancer literacy scores; however, other than older age, lack of physician provider recommendation was associated with all three cancer-screening tests in Latina women. Confusion regarding screening recommendations has been documented,[45] which increases the need for literacy targeted interventions.

Our study has several limitations. This was an exploratory analysis of data collected at baseline in a randomized trial of women in three racial/ethnic groups and we did not have access to data for several risk factors that have been shown to be associated with screening rates, such as access to a primary care provider. Our measurement of the concept competing survival priorities was limited by the existing data set and additional work on defining and measuring the concept is warranted. We used self-report data for risk factors and prior cancer screening behavior. The sample size for the Latina women was small and we could not conduct multivariate regressions; however, we did report bivariate analyses. At the time of the study, immigration policies in the community of the study were being strictly enforced and many Latina women were fearful and refused participation in the trial study. Our study was developed prior to the release of the U.S. Preventive Services Task Force 2009 recommendations and we used the American Cancer Society and American Congress of Obstetricians and Gynecologists recommendations for breast and cervical cancer screening.

An additive approach has been used in other studies of vulnerable families[26] who are likely to have co-occurring risk factors. However, it has been rarely used in cancer screening research.[28] The additive model may have advantage as a parsimonious approach when considering multiple, cooccurring risk factors, although other analytic approaches, such as cluster analyses have also been used to analyze individual, provider, and system factors.[46]

In sum, characteristics associated with breast and cervical cancer screening behaviors differ among black, Latina, and Arab underserved women. While there are multiple, evidence-based, clinical interventions available to improve screening behavior, our study specifically illustrates the need for a better understanding how risks may vary by race/ethnicity and the importance of tailoring interventions that address the needs of women with multiple risks.[47] Although the Affordable Care Act will expand health care coverage for many low-income women,[44] improving access to preventive cancer screening, intervention models will need to need to address the multifactorial determinants of screening utilization. Particular attention should be given to risks associated with competing survival priorities[48] and health literacy issues,[49] risks factors that may be addressed through a community health worker[50,51] or patient navigation[52] interventions, and strategies to improve provider recommendations.

Disclosure Statement

No competing financial interests exist.

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