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# Korean American Women and Mammogram Uptake

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**Abstract** A high percentage of Korean American (KA) women have never had a mammogram, which puts them at greater risk for late-stage breast cancer. The aim of this study was to compare health beliefs and spousal support about breast cancer and screening between KA women with and without a history of mammogram completion. Cross-sectional data were obtained from 428 non-adherent married KA women. KA women who never had a mammogram were younger, had less access to health care, had less knowledge, and had lower perceived self-efficacy, benefits, and spousal support, and higher perceived barriers to breast cancer screening compared to women who had had a mammogram. Assessing differing characteristics between the two groups of KA women may lead to a better understanding of the variables influencing mammography screening in this population and possibly increase early screening.

**Keywords** Breast cancer · Mammography · Health beliefs · Korean American women · Spousal support

## Background

Breast cancer (BC) is the most commonly occurring cancer in Korean American (KA) women, with a prevalence of 53.5 per 100,000 [1]. The BC incidence rate for KA women almost doubled between 1990 and 2008 [2]. The rising BC incidence in KA women could be due, in part, to their immigrant status, as there is evidence that BC rates increase over time for immigrants living in the United States [3]. About three quarters of KAs in the United States (78 %) are immigrants [4], making them an important population to target for early detection of BC via regular screening.

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Breast cancer screening rates for KA women, however, are comparatively low. Only 22–39 % of KA women reported having had a mammogram within the previous year, whereas more than 50 % of White, African American, and Hispanic women had yearly mammograms [5–7]. More notably, 22–52 % of KA women have *never* had a mammogram [8–16], placing them at greater risk for detecting BC in later stages. The alarmingly high rate of unscreened KA women indicates an urgent need to understand this vulnerable subgroup of KAs and to develop targeted interventions for them.

### Theoretical Framework

The framework that guided this study was drawn from the health belief model (HBM) [17, 18]. Based on the HBM, people change their health behaviors if they have greater perceived susceptibility, seriousness, and benefits of the outcome; if they believe that the costs of their course of action (perceived barriers) are outweighed by its benefits; and if they feel confident in their ability to take action (perceived self-efficacy) [18]. In general, knowledge of cancer and mammograms influences screening participation among women [19–23]. KA women are known to have a relatively low level of knowledge about BC and mammograms [24, 25]. Knowledge of BC and screening appears to influence beliefs about seriousness, susceptibility, and benefits of screening in KA women. When KA women had limited knowledge about BC, they had inaccurate beliefs [26]. For example, most KA women believed family history was the *only* risk factor for BC, leading them to perceive they were not susceptible to BC because they did not have a family history of the disease.

Self-efficacy is related to mammogram attainment among Korean women living in Korea [27]. In a study of Caucasian and African American women, self-efficacy was positively related to adherence to regular mammograms in Caucasian women but negatively related to adherence in African American women, although the relationship in the latter case was not significant [28]. To the best of our knowledge, no published study has examined self-efficacy for mammography in KA women.

It is generally acknowledged that social support from significant others positively correlated with BC screening utilization, especially among minority women [29–31]. Specifically, KA women who received support from family members were almost four times more likely to have had a mammogram than those who did not receive such support [25]. Korean women who had American husbands reported higher levels of support from their husbands and were more likely to practice breast self-examination than were women married to KA men [25]. These findings demonstrate the

need for understanding the relationship between support received from husbands and BC screening behaviors among their KA wives.

Although some KA women have specific beliefs that hinder them from obtaining routine mammograms, such as the perception that they are at low risk for BC as long as they stay healthy, exercise, or have a positive attitude [26], it is not known whether such beliefs differ between KA women who have or have not had a mammogram. Understanding the sociodemographic factors (age, employment, education, income, level of acculturation, and health care access) and beliefs related to BC and screening of these two groups is necessary to develop more sophisticated targeted screening interventions for those never screened.

Therefore, we analyzed pre-intervention data from the Korean Immigrants & Mammography–Culture-specific Health Intervention (KIM–CHI), a large randomized controlled trial focused on improving mammography adherence among non-adherent KA women, to compare sociodemographic factors and health beliefs about BC and screening between adherent and non-adherent KA women [32]. Based on the American Cancer Society’s recommendations for annual mammograms for women aged 40 and older [33], we defined non-adherent to be if one had not been screened within previous year of data collection. We also compared baseline data for husbands’ knowledge about BC and screening, and their perceptions of support provided to their wives for BC screening between the two groups of KA women.

Our hypotheses were:

- 1) KA women who had had a mammogram would report more desirable levels of social demographics, health care access, health beliefs (knowledge, susceptibility, seriousness, benefits, barriers, and self-efficacy), and spousal support than would KA women who had never been screened.
- 2) Husbands of KA women who had had a mammogram would report higher levels of knowledge and spousal support than would husbands of KA women who had never been screened.
- 3) Women’s health beliefs, husbands’ and women’s perceived spousal support, and husbands’ knowledge would predict KA women’s mammography utilization after statistically controlling for demographics and health care access.

### Methods

This study compared groups of KA women who had had a mammogram with women who had never had one using

baseline cross-sectional data from the KIM-CHI trial. The baseline data were collected from August 2008 to June 2009 from 428 KA couples residing in Cook County, Illinois.

### Participants

Korean churches were approached as culturally acceptable data collection sites. Research shows that 78 % of KAs are Christian and 63 % participate in religious activities at least once a month, suggesting that churches were good sites for recruiting samples representing KAs living in urban areas [34]. Invitation letters were sent to all 210 religious organizations in the *Chicago Korean Business Directory*. Of those, we were able to contact 100 organizations by phone and found that 32 were ineligible due to not having eligible study participants in their congregations. About a quarter ( $n = 18$ , 26.5 %) of the remaining 68 eligible organizations chose to not participate in the study. Study participants were recruited from the remaining 50 KA religious organizations. To avoid bias in participant responses, we chose cluster sampling so that organizations were randomly assigned to one program or the other. The characteristics of religious organizations (location and size) were compared to ensure that the two groups were not significantly different after the randomization.

Participants were recruited at each organization on Sundays after the religious organization leader announced our program during the service. Participants were included if they were immigrant women aged 40 years or older, able to communicate in Korean, and married to a KA immigrant man who also could communicate in Korean. Participants were limited to first-generation KA immigrants because attitudes and perceptions about cancer-screening services could differ substantially between first- and second-generation KA women. Women who had had a mammogram within the previous year or who had been diagnosed with BC were excluded for the purpose of providing the intervention to non-adherent KA women.

### Measures

The primary outcome of having or never having had a mammogram was measured by self-report. Sociodemographic information (age, employment, education, income, and level of acculturation) was obtained from both wives and their husbands. The level of acculturation was measured by the Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA), which has good internal consistency reliability and established concurrent and construct validity [35, 36]. The higher the total score, the higher the level of acculturation. One item about generation was removed because all of the couples in our sample were first-

generation KA immigrants. The words “Asian” and “Oriental” in the original instrument were also changed to “Korean.” KA women also responded to questions on health care resources and utilization; for example, whether they had health insurance and a usual source of care (a regular clinic or doctor to visit) and whether they had a physical examination in the previous two years. One question asked whether they had relatives who had been diagnosed with BC.

Knowledge about BC and screening was measured in both the women and their husbands. Twelve items from Champion’s original 20-item scale measuring knowledge about BC (6 items) and mammography (6 items) were used for this study. The items had multiple choice and yes/no responses, with each response coded as correct or incorrect.

We used Champion’s original Breast Health Survey to measure perceived susceptibility, seriousness, benefits, barriers, and self-efficacy of KA women, as these scales have demonstrated good internal consistency, reliability and validity [37, 38]. The survey was adapted to make it culturally appropriate and translated into Korean in our previous studies [32, 39]. All of the subscales used Likert-type ratings, with a higher score indicating a higher perceived level of belief. The internal consistency reliability for the modified Champion’s Breast Health Survey subscales on health beliefs of perceived susceptibility (4 items), seriousness (9 items), benefits (7 items), and barriers (16 items) from our baseline data were 0.84, 0.81, 0.73, and 0.88, respectively.

We developed five items measuring encouragement and support received or provided from husbands to wives, with a higher score indicating a higher level of support. To assess the different types of support received, the items had 4- and 5-point Likert-type responses.

### Data Collection and Analysis

Data were collected after religious services from 50 KA religious organizations after the research was approved by the University of Illinois at Chicago’s Institutional Review Board. Couples who were interested in participating in the study were asked to gather in a designated room to ensure that both husbands and wives participated. Each couple signed consent forms and then completed a Korean-language questionnaire.

For the first and second hypotheses, Fisher’s exact tests were used to assess statistical differences between groups for categorical variables.  $F$  tests from fitting generalized linear models were used to test differences between groups for continuous variables. For the third hypothesis, multiple logistic regression models were fit to predict the likelihood of KA women having ever had a mammogram. Predictors in the initial model included all independent variables that

were significantly associated with mammogram uptake in preliminary bivariate analyses at the  $\alpha = 0.15$  level. The final model included all covariates that were significant at the 0.10 level. Goodness-of-fit was assessed using Hosmer–Lemeshow chi-square test, as well as the area under the receiver operating characteristic (ROC) curve. All statistical analyses were performed using SAS version 9.3 and STATA 9.

## Results

Table 1 presents the characteristics of the 428 KA women in the study. A total of 321 women had previously undergone mammography screening (75 %), and 107 women had never been screened (25 %). The overall sample was primarily middle-aged ( $M = 52.3$  years,  $SD = 9.0$ ). The majority was employed, and 55 % reported an average annual household income greater than \$40,000. About half of the participants had health insurance (59 %), a regular clinic or doctor for health care (54 %), and regular wellness checkups in the previous two years (51 %). About one fifth (22 %) of the participants reported having BC in their family.

The first hypothesis stated that those KA women who had a mammogram would report more desirable levels of social demographics, health care access, health beliefs and spousal support than would KA women who had never been screened. Age, health insurance, having a regular clinic for health care, having regular checkups without symptoms, and health beliefs of knowledge, benefits, barriers, self-efficacy, and spousal support were different between the two groups of women (Table 1). Women who had at least one mammogram in their lifetime were significantly older ( $M = 54$  years,  $SD = 8.6$ ) than were those who had never had a mammogram ( $M = 48$  years,  $SD = 9.3$ ,  $p < 0.001$ ). All the measures of health care access differed significantly between the two groups. A significantly higher proportion of those who had a mammogram reported having health insurance compared with those who had not ( $p < 0.001$ ), and similar proportions reported having a regular doctor or clinic for health care ( $p < 0.001$ ). Women who had had a mammogram were also more than twice as likely to have visited a doctor within the previous two years even when they did not have any symptoms (for the purpose of screening only) compared with women who never had one ( $p < 0.001$ ). There was no difference in family history of BC between the two groups.

Those who had a mammogram were significantly more knowledgeable about BC than were those in the other group ( $p < 0.001$ ). Significant differences were seen between the two groups in the areas of perceived benefits of a mammogram, barriers, and self-efficacy ( $p = 0.001$ ,  $< 0.001$ , and

$< 0.001$ , respectively). Those who had a mammogram reported greater support received from their spouses than did those who were never screened ( $p < 0.01$ ).

Hypothesis 2 stated that husbands of KA women who had been screened would report higher levels of knowledge and spousal support than would husbands of KA women who had never been screened. This hypothesis was rejected because the level of husbands' knowledge about BC and screening was not significantly different between the two groups of women. When spouses were asked about the support they had provided their wives, spouses of women who had a mammogram reported a marginally higher perception of providing support than did the spouses those never screened.

The third hypothesis stated that women's health beliefs, husbands' and women's perceived spousal support, and husbands' knowledge would predict KA women's mammography utilization. Table 2 shows the results of a logistic regression model predicting mammography uptake over a lifetime (at least one versus none). Significant predictors were health beliefs, controlling for age and whether one had a regular checkup without being sick in the previous two years. All other factors being constant, a 1-point positive difference in seriousness was associated with twice the odds for that person to have had a mammogram ( $p = 0.001$ ). Similarly, every 1-point positive difference in self-efficacy was associated with three times the odds of being screened ( $p < 0.01$ ). 1-point positive difference in perceived support from a spouse was associated with twice the odds of being screened ( $p < 0.05$ ). A 1-point decrease in barriers was associated with an 83 % increase in the odds of being screened ( $p < 0.0001$ ). The area under the curve of the associated ROC curve was 0.86, showing evidence of good fit of the model. The Hosmer–Lemeshow goodness-of-fit statistic resulted in a chi square = 4.87 ( $df = 8$ ,  $p = 0.77$ ), which also indicated good model fit.

## Discussion

Our results demonstrate that perceived health beliefs and perceived spousal support are crucial components of non-completion of mammograms in non-adherent KA women. This underscores the importance of understanding the relationship between KA women's health beliefs and their health behaviors of ever or never having had a mammogram. These results can provide important guidance to the development and revision of interventions to promote BC screening among the subpopulation of KA women who have never had a mammogram.

It is very important to understand Asian American women's BC screening behaviors, not just those of KA women, since 70 % of Hmong [39], 36 % of Chinese [40],

**Table 1** Baseline characteristics of Korean American women by mammogram history

Characteristics	Overall (N = 428)	Screened (n = 321)	Never Screened (n = 107)	p Value*
Age in years, mean (SD)*	52.25 (9.03)	53.61 (8.55)	48.46 (9.31)	<0.001
Level of acculturation, mean (SD)	2.02 (0.29)	2.02 (0.29)	2.00 (0.30)	
<i>Employed, % (n)</i>				
Yes	69.50 (297)	68.12 (219)	73.27 (78)	
No	30.50 (131)	31.88 (102)	26.73 (29)	
<i>Education, % (n)</i>				
< High school	39.86 (171)	40.91 (131)	36.79 (39)	
≥ High school	60.14 (257)	59.09 (190)	63.21 (68)	
<i>Annual household income, % (n)</i>				
< \$40,000	45.28 (194)	42.41 (136)	53.01 (57)	
≥ \$40,000	54.72 (234)	57.59 (185)	46.99 (50)	
<i>Health care access, % (n)</i>				
<i>Health insurance, % (n)</i>				
Yes	59.34 (254)	64.79 (208)	44.33 (47)	<0.001
No	40.66 (174)	35.21 (113)	55.67 (60)	
<i>Regular healthcare provider, % (n)</i>				
Yes	53.59 (229)	61.61 (198)	30.56 (33)	<0.001
No	46.41 (199)	38.39 (123)	69.44 (74)	
<i>Checkup in previous 2 years, % (n)</i>				
Yes	51.31 (220)	59.49 (191)	27.78 (30)	<0.001
No	48.69 (208)	40.51 (130)	72.22 (77)	
<i>Health beliefs, mean (SD)<sup>c</sup></i>				
Participant knowledge	3.73 (1.27)	3.85 (1.26)	3.39 (1.24)	<0.001
Husband knowledge	3.45 (1.25)	3.49 (1.26)	3.31 (1.22)	
Susceptibility	2.36 (0.75)	2.34 (0.75)	2.44 (0.74)	
Seriousness	2.87 (0.69)	2.89 (0.69)	2.82 (0.68)	
Benefits	3.79 (0.48)	3.84 (0.43)	3.66 (0.60)	<0.001
Barriers	2.24 (0.61)	2.12 (0.59)	2.58 (0.54)	<0.001
Self-efficacy	3.70 (0.47)	3.77 (0.46)	3.50 (0.44)	<0.001
<i>Spousal support, mean (SD)<sup>c</sup></i>				
Participant perception of spousal support received	2.84 (0.51)	2.88 (0.50)	2.72 (0.52)	<0.001
Husband spousal support provided	3.01 (0.35)	3.03 (0.35)	2.96 (0.34)	<0.05

N = 428

\* p values are associated with F-tests from fitting generalized linear models for continuous variables; all other p values are associated with Fisher’s exact tests

**Table 2** Logistic Regression Model for Predicting Mammogram Use

Predictor	Estimated AOR (95 % CI)	p Value
<i>Demographic characteristics</i>		
Age	1.12 (1.07, 1.16)	<0.0001
Regular access to health care (yes vs. no)	2.44 (1.34, 4.64)	0.004
<i>Health beliefs and spousal support</i>		
Seriousness	2.25 (1.40, 3.63)	0.001
Barriers	0.17 (0.09, 0.32)	<0.0001
Self-efficacy	3.07 (1.48, 6.38)	0.003
Wives’ perceived support received	1.99 (1.14, 3.48)	0.02

AOR adjusted odds ratio.  
Hosmer–Lemeshow goodness-of-fit chi square = 4.87 (df = 8) and associated p value = 0.77

and 61 % of Southeast Asian and Pacific Islander (Cambodian, Laotian, Thai, Vietnamese, Chamorro, Samoan, and Tongan; [41, 42] women have never had a mammogram. Our findings may help health care professionals and researchers to understand the characteristics associated with mammography completion in KA women as well as apply this knowledge to other Asian American women because most Asian Americans come from similar cultures [43–46].

It is well known that problems with health care access are related to KA women's BC screening behaviors [6, 10, 14, 15]. Our findings indicate that the negative impact of not having health care access has more of an effect on women who have never had a mammogram than on their counterparts who have had one in the past. Such programs should include education and training of community partners to publicize sites where people can obtain free or low-cost health care on a regular basis.

Although knowledge and awareness of the benefits of mammography were significantly different, while the perceived seriousness of cancer was not different between the two groups of KA women in bivariate relationships, the final model did not include knowledge and benefits, but included seriousness. The individual effect of knowledge and awareness of benefits could have been reduced when they were put into one model, or knowledge and awareness of benefits could have perhaps mediated the influence of perceived seriousness.

KA women's perceptions of spousal support were related to their having had a mammogram, as hypothesized. To the best of our knowledge, this is the first published report testing spousal support in promoting BC screening. The way social support positively contributes to cancer screening utilization is not clear, but it could be speculated that social support motivates women to learn about cancer screening, provides women with assistance to overcome barriers, and influences women's knowledge and beliefs about BC and screening by having this discussion with their spouses. Based on our preliminary review of recordings of the husband-wife interactions post-intervention in a subset of the sample, we see trends that support our speculation (manuscript under development). KA women have traditionally been raised to sacrifice their own needs to meet those of their families. They need to hear from their family members, especially from husbands, that maintaining their own health is important and that using the family's resources such as time and money for disease prevention is important so that they can care for their family.

The results of this study need to be interpreted with caution. We compared women who never had a mammogram with those who had a mammogram in the past but not in the previous year. Had we compared those who had

never had a mammogram with those who had annual mammograms, the differences could have been broader than those we found.

Our study has several limitations. The findings of this study may not be generalizable to KA women who live in different geographical locations, who are unmarried, and who do not attend religious organizations. As reported for other cultures [47], KA religious organizations also function as social organizations that provide fellowship, help to maintain traditional culture, to receive social services, and to be recognized for their social status or position [48, 49]. Further, providing health-related assistance is a core component of their ministry [34]. However, women living in geographical areas where there are no KA religious organizations could have different health beliefs than the KA women in this study. In addition, the outcome of having versus never having had a mammogram is based on self-report, which could be biased or inaccurate.

#### New Contribution to the Literature

We found that KA women who had never had a mammogram had different characteristics than their counterparts who had previously had a mammogram. Interventions targeting those differences could be helpful in decreasing disparities within the KA population. Further, considering that Asian American women in general have a higher prevalence of not having a mammogram in their lifetimes, continued attempts should be made to understand their characteristics and develop culturally sensitive and targeted interventions to decrease health disparities. Most Asian Americans come from cultures in which family members and significant others have a very substantial influence on women's cancer screening behaviors [43–46]; therefore, these factors warrant deeper study if we are to facilitate adherence of Asian American women to current recommendations for BC screening.

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