

RESEARCH ARTICLE

Editorial Process: Submission:10/21/2017 Acceptance:03/29/2018

Predictors of Breast Cancer Screening Among Korean American Women: Is Having an Annual Checkup Critical?

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Abstract

Objective: Korean American (KA) immigrant women underutilize breast cancer screening. This study examined factors predicting breast cancer screening behavior among KA women in the United States. **Methods:** 233 KA women aged 19 to 85 were recruited in the metro area of Atlanta, Georgia. Andersen's behavioral model theoretically guided the study. **Result:** Of the predisposing factors, age (OR=1.043, $p<.01$, 95% CI [1.017, 1.069]) and marital status (OR=2.154, $p<.05$, 95% CI [1.022, 4.539]) were significantly associated with clinical breast exam (CBE), while income (OR=2.289, $p<.05$, 95% CI [1.060, 4.945]) and annual checkup (OR=2.725, $p<.01$, 95% CI [1.342, 5.533]) were linked to CBE as enabling factors. For the receipt of mammographic screening, annual checkup was only significantly associated among enabling factors (OR=4.509, $p<.05$, 95% CI [1.263, 16.102]), while family cancer history was identified as the only significant need factor (OR=.112, $p<.01$, 95% CI [.023, .552]). **Conclusion:** Differing factors explained the receipt of CBEs and mammographic use among KA women. Specifically, the findings shed light on the importance of having an annual checkup for the uptake of both CBEs and mammographic use. Intervention strategies should focus on promoting health accessibility for KA women to adhere to recommended breast cancer screening.

Keywords: Early detection of cancer- Korean American women- immigrants- health services accessibility

Asian Pac J Cancer Prev, **19** (5), 1281-1286

Introduction

Breast cancer is the "sixth most commonly diagnosed cancer in Korean American (KA) immigrant women" (Miller et al., 2008; Lee, 2015). Occurring in about 70 out of every 100,000 KA women, breast cancer is a significant health concern for this population (Gomez et al., 2013). Data collected between 1990-1994 and 1998-2002 reveal that the incidence rate of breast cancer is on the rise, and has increased approximately 1.5 times during this period (Gomez et al., 2013). Breast cancer is also twice as prevalent among KA women as it is among Korean women, indicating that KA women face unique risk factors related to this disease (Lee et al., 2007).

Despite the prevalence of breast cancer among this group, KA women utilize preventive breast cancer screening measures less than other population groups in the U.S., including other female subgroups of Asian Americans (Eun et al., 2009). Research indicates that only 48% to 78% of KA women have ever received mammographic screening in their lifetime, while only 15% to 50% have received one within the past year (Eun et al., 2009; Sadler et al., 2001). Conversely, an average of about 70% of the general population of

U.S. women have received a mammographic screening within the past 2 years (American Cancer Society, 2017). This disparity between KA women's breast cancer screening behaviors and those of the general population is staggering and demands further investigation.

There are a variety of factors that impact breast cancer screening behaviors among KA women. In one 2015 study, Lee et al., (2015) found that those who had never received mammographic screening were younger; had less access to health care; had lower perceived self-efficacy, benefits, and spousal support of mammographic use; and perceived more barriers to the screening compared to those who had utilized mammograms. Comparably, those who had never received CBEs did not have health insurance coverage; lacked knowledge of accessing screening services; and perceived the cost of CBEs to be high (Choi et al., 2017).

Because KA women's needs, perspectives, and circumstances are unique, there is a need for research that specifically examines the health behaviors and outcomes of this group (Kang et al., 2016). However, their breast cancer screening behaviors have previously been understood collectively, either within the population of Asian American women (Chawla et al., 2015; Kagawa-Singer et al., 2007) or within the cancer screening behaviors of

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the general population (Sohn, 2004; Lee et al., 2012). Additionally, most applied theoretical frameworks are not diverse enough to understand KA women's breast cancer screening behaviors, although a few studies have applied the more adequate Health Belief Model (Lee et al., 2015).

Another framework, The Andersen Healthcare Utilization Model (Andersen, 1995; Babitsch et al., 2012), can be used to conceptualize determinants of breast cancer screening behaviors by examining the predisposing, enabling, and need factors that exist among KA women. Predisposing factors are pre-owned personal characteristics before health care utilization; enabling factors are connecting methods to obtaining health care; and need factors describe the necessity of utilizing a care service (Kang et al., 2016; Andersen, 1995). The purpose of the current study was to investigate the predisposing, enabling, and need factors that predict KA women's breast cancer screening behaviors in the United States.

Materials and Methods

Research method and data collection

This study was approved by the principle author's university IRB and was part of a larger research project to better understand cancer literacy and cancer-related behaviors of KA immigrant women in the metro area of Atlanta, Georgia. KA immigrant women aged 19 to 85 were recruited by a quota sampling strategy to ensure that women of all ages were adequately represented in the sample. A quota was set to include 25 to 35 women in the following age categories: 19-29, 30-39, 40-49, 50-59, 60-69, and 70-85. All participants received \$10 as an incentive.

One survey was used to collect study data via two methods: (1) self-administration with those aged <60, and (2) face-to-face interviews with those aged ≥60. Face-to-face interviews were utilized to prevent any potential misunderstanding of used terminologies. The interviews took one hour, and self-administered surveys took 20-25 minutes. Data were collected at Korean ethnic churches and Korean parents' meetings at local public schools.

Instruments

Dependent variable-Receipt of breast cancer screening-including clinical breast exam (CBE) and mammographic use-was assessed by questions about whether the respondents had ever received them during their lifetime (0=have not received, 1=have ever received).

Independent variables-This study employed predisposing, enabling, and need factors to predict the receipt of breast cancer screening in accordance with Andersen's Healthcare Utilization Model.

Predisposing factors

Age was measured as a continuous variable. At the time of data collection, the breast cancer screening guidelines of the American College of Obstetricians and Gynecologists' recommended CBEs for those aged 20 and over, while mammographic screening is recommended by the American Cancer Society for those aged 40 to 79.

This study utilized the same age criteria for data analysis for CBEs and mammographic screening. Marital status (0=other, 1=married or partnered) was dichotomized.

Enabling factors

English proficiency was assessed by a 4-point Likert scale, then dichotomized (0=not at all/not well/well, 1=very well). Monthly income was dichotomized (0 = less than \$5,999, 1=more than \$6,000). Answers (0=false, 1=true) to a 5-item questionnaire derived from cancer screening guidelines (American Cancer Society, 2017) and breast cancer risk factors (American Cancer Society, 2016) were summed to measure breast cancer literacy. Cronbach's alpha of breast cancer literacy was .412. Participants' receipt of an annual health checkup was assessed using a yes/no question (0=no, 1=yes).

Need factors

Family cancer history was measured by a yes/no question. Health status was assessed by a 5-point Likert scale, then dichotomized (0=very poor/poor/fair and 1=good/very good/excellent). Depression was assessed using a 4-point Likert scale from a short-form version of the CES-D (Andersen et al., 1993), and the mean score was counted as depression level. Cronbach's alpha of the 10 depression items was .804.

Data analysis

Using SPSS 24.0, the study employed univariate analyses to examine sociodemographic characteristics of the sample and breast cancer screening rates by age; bivariate analyses to identify the relationship between sociodemographic characteristics and breast cancer screening; and binary logistic regression analyses to estimate the effects of significant predictors of breast cancer screening. Participants aged 40 and over were selected for the binary logistic regression analysis on receipt of mammographic screening, in accordance with the American Cancer Society's criteria on who should receive regular screening.

Results

Sociodemographic characteristics of sample and bivariate analyses by breast cancer screening receipt

Approximately 40.8% of the participants were aged 20 to 39, more than a third (35.2%) were 40 to 59 years of age, and about 24% were aged 60 or over (M=45.83, SD=16.83). About 67.5% of the participants were married or partnered, while 32.5% were divorced, widowed, or never married. Approximately 69.6% of participants reported having a bachelor's degree or higher level of education.

Among the participants, 48.9% indicated having good or very good English proficiency, whereas 51.1% reported their English as not good or that they had no proficiency at all. The monthly household income for 16.7% was over \$10,000, while 4.1% made between \$8,000 and \$9,999; 10.8% made between \$6,000 and \$7,999; 18.9% made between \$4,000 and \$5,999; 22.5% made between \$2,000 and \$3,999; and about 27.0% made \$1,999 or less. About 46.3% of participants had an annual

Table 1. Sociodemographic Characteristics and Bivariate Analyses by Breast Cancer Screening (N=233)

Characteristic	n (%)	CBE Receipt		Mammographic Receipt	
		n (%)	p-value	n (%)	p-value
Age (M=45.83, SD=16.83)					
20-29	44 (18.90)	15 (6.44)	0.000	37 (15.88)	0.000
30-39	51 (21.90)	21 (9.01)		34 (14.59)	
40-49	57 (24.50)	39 (16.74)		10 (4.29)	
50-59	25 (10.70)	20 (8.58)		2 (0.86)	
≥60	56 (24.00)	39 (16.74)		6 (2.58)	
Marital status					
Married or partnered	156 (67.50)	105 (45.06)	0.000	108 (46.35)	0.000
Never married/divorced/widowed	75 (32.50)	28 (12.02)		30 (12.88)	
Education					
<Bachelor's degree	70 (30.40)	37 (15.88)	0.252	49 (21.03)	0.012
Bachelor's degree	160 (69.60)	95 (40.77)		88 (37.77)	
English proficiency					
Very well	32 (14.10)	18 (7.73)	0.056	7 (3.00)	0.000
Well	79 (34.80)	43 (18.45)		46 (19.74)	
Not well	107 (47.10)	68 (29.18)		77 (33.05)	
Not at all	9 (4.00)	2 (0.86)		6 (2.58)	
Income					
≤\$1,999	60 (27.00)	26 (20.47)	0.002	31 (23.48)	0.230
\$2,000-\$3,999	50 (22.50)	24 (30.00)		25 (31.25)	
\$4,000-\$5,999	42 (18.90)	23 (44.23)		28 (48.28)	
\$6,000-\$7,999	24 (10.80)	15 (11.81)		17 (12.88)	
\$8,000-\$9,999	9 (4.10)	7 (10.14)		6 (8.22)	
≥\$10,000	37 (16.70)	32 (49.23)		25 (37.31)	
Breast cancer literacy, M (SD)	4.17 (1.02)	4.3 (0.83)	0.047	4.27 (0.85)	0.130
Annual checkup					
Yes	107 (46.30)	80 (34.33)	0.000	80 (34.33)	0.000
No	124 (53.70)	52 (22.32)		58 (24.89)	
Family cancer history					
Yes	137 (58.80)	69 (29.61)	0.009	73 (31.33)	0.009
No	96 (41.20)	65 (27.90)		67 (28.76)	
Depression level, M (SD)	0.84 (0.50)	0.79 (0.50)	0.189	0.86 (0.50)	0.440
Health status					
Fair/good/excellent	211 (92.50)	125 (53.65)	0.307	128 (54.94)	0.942
Very poor/poor	17 (7.50)	7 (3.00)		9 (3.86)	

*p<.05, **p<.01, ***p<.001; t-tests were performed for breast cancer literacy and depression; all other variables were analyzed using Chi-square tests.

checkup and 58.8% had family cancer history. 92.5% of participants classified their health status as fair, good, or excellent, whereas only 7.5% reported having poor or very poor health.

Table 1 presents that the participants' breast cancer screening rates differed according to sociodemographic characteristics. CBE receipt was significantly associated with age ($\chi^2=31.276$, $p=.000$), marital status ($\chi^2=16.613$, $p=.000$), income ($\chi^2=15.131$, $p=.002$), breast cancer literacy ($t=1.996$, $p=.047$), annual checkup ($\chi^2=28.289$, $p=.000$), and family cancer history ($\chi^2=6.791$, $p=.009$), but was not significantly

correlated to education, English proficiency, depression level, and health status. On the other hand, the use of mammographic screening had significant association with age ($\chi^2=93.758$, $p=.000$), marital status ($\chi^2=17.515$, $p=.000$), education ($\chi^2=6.248$, $p=.012$), English proficiency ($\chi^2=27.473$, $p=.000$), annual checkup ($\chi^2=19.433$, $p=.000$), and family cancer history ($\chi^2=6.902$, $p=.009$), but did not have significant correlation with income, breast cancer literacy, depression level, and health status.

Receipt of clinical breast exam

As presented in Table 2, 57.5% of the participants

Table 2. Receipt of Clinical Breast Exam (N=233) and Mammographic Screening (N=138) by Age and Time Frame

		20-39 (n=95)		40-59 (n=82)		60 and over (n=56)		Total	
		n	%	n	%	n	%	n	%
Clinical Breast Exam	Ever had	36	37.9	59	72.0	39	69.6	134	57.5
	<1 year	15	15.5	29	35.4	15	26.8	59	25.1
	≥1, <2 years	9	9.3	11	13.4	11	19.6	31	13.2
	≥2, <3 years	8	8.2	8	9.8	1	1.8	17	7.2
	≥3 years	5	5.3	12	14.6	8	14.3	25	10.7
Mammographic Screening	Ever had	-	-	68	82.9	49	87.5	117	84.8
	<1 year	-	-	32	39	27	48.2	59	42.8
	≥1, <2 years	-	-	12	14.6	10	17.9	22	15.9
	≥2, <3 years	-	-	10	12.2	0	0	10	7.2
	≥3 years	-	-	14	17.1	10	17.9	24	17.4

Table 3. Binary Logistic Regression Analysis on Receipt of Breast Cancer Screening (N=233)

Factors Variables	CBE Receipt		Mammographic Screening Receipt	
	OR	95% CI	OR	95% CI
Predisposing				
Age (20~82 & 40~82)	1.043	[1.017, 1069]	1.022	[0.963, 1.084]
Marital status (Ref=not married or partnered)	2.154	[1.022, 4.539]	3.26	[0.593, 17.934]
Enabling				
English proficiency (Ref=no)	1.415	[0.664, 3.015]	1.636	[0.398, 6.734]
Income (Ref=less than \$6,000 per month)	2.289	[1.060, 4.945]	0.662	[0.154, 2.844]
Breast cancer literacy (0~7)	1.334	[0.956, 1.862]	1.535	[0.897, 2.629]
Annual check-up (Ref=no)	2.725	[1.342, 5.533]	4.509	[1.263, 16.102]
Need				
Family cancer history (Ref=no)	0.585	[0.296, 1.154]	0.112	[0.023, .552]
Depression level (0~3)	0.937	[0.470, 1.870]	1.307	[0.422, 4.044]
Health status (Ref=very poor/poor)	1.306	[0.359, 4.747]	0.349	[0.024, 5.156]
Constant	0.02		0.711	

OR, odds ratio; According to American Cancer Society’s suggestion regarding each screening’s criteria age, age from 20 to 82 were applied as an independent variable of CBE receipt; Age only from 40 to 82 were applied as an independent variable of mammogram receipt.

had received CBE at least once in their lifetime. However, analysis of the ratio by age revealed that only 37.9% of women aged 20–39 had received at least one CBE, while 72% of the women aged 40–59 and 69.6% of those aged 60 and over had utilized CBE. Most women in each age group who had ever received CBE had the screening within the past three years (84.2% for aged 20-39, 88.9% for aged 40-59, and 69.23% for aged 60 and over).

Receipt of mammographic screening

Table 2 shows that 84.8% of the participants aged 40 and over had received mammographic screening in their lifetime. Analysis of the ratio by age revealed that 82.9% of the women aged 40–59 and 87.5% of those aged 60 and over had received mammographic screening. Of these participants, 79.41% aged 40–59 and 75.51% aged 60 years and older received the screening within the past three years.

Binary logistic regression on receipt of breast cancer screening

Table 3 presents results of binary logistic regression

analysis on CBE ($\chi^2=60.926, p<.001, \text{Pseudo } R^2=0.255$) and mammogram receipt ($\chi^2=25.514, p<.01, \text{Pseudo } R^2=.187$). Regarding CBE, age (OR=1.043, $p<.01, 95\% \text{ CI } [1.017, 1.069]$) and marital status (OR=2.154, $p<.05, 95\% \text{ CI } [1.022, 4.539]$) were significant predisposing factors. Income (OR=2.289, $p<.05, 95\% \text{ CI } [1.060, 4.945]$) and annual checkup (OR=2.725, $p<.01, 95\% \text{ CI } [1.342, 5.533]$) were significant enabling factors. No need factors significantly predicted the CBE receipt.

No predisposing factors significantly predicted the receipt of mammographic screening. However, the enabling factor of annual checkup (OR=4.509, $p<.05, 95\% \text{ CI } [1.263, 16.102]$) and the need factor of family cancer history (OR=.112, $p<.01, 95\% \text{ CI } [.023, .552]$) were significantly associated with the receipt of mammographic screening.

Discussion

Participants tended to utilize mammographic screening more than CBEs. A total of 84.8% of participants had received a mammogram during their lifetime, while 57.9%

of them have received a CBE. Fewer women had received a mammogram (42.8%) or CBE (25.1%) within the past year. Only 15.5% of women aged 20-39 received a CBE within the past year.

Predictors of receiving CBEs included age, marital status, income, and annual checkup. Predictors of receiving mammograms were annual checkup and family cancer history. English proficiency, breast cancer literacy, depression level, and health status did not predict breast cancer screening.

Like other minority women in the U.S., KA women underutilize breast cancer screening and are at risk of detecting breast cancer at later stages (Miranda et al., 2011; Sarna et al., 2001). As with other races and ethnicities (Haber et al., 2012), family cancer history appears to predict breast cancer screening among KA women (Anderson et al., 2007), but the role of such genetic factors in KA women is uncertain. Health belief-related variables, such as breast cancer susceptibility and perceived benefits of breast cancer screening, also determine breast cancer screening in this population (Lee et al., 2009).

This study illuminates the predisposing, enabling, and need factors that may determine KA women's use of preventive breast cancer screening. Participants' age and marital status as predisposing factors were associated only with lifetime CBE. The findings were aligned with research evidence that women aged 40 years or older are more likely to receive CBEs (Lee et al., 2015), and that a clinical recommendation at age 40 is a critical reason that women opt to receive breast cancer screening (CDC, 2016). Spousal support was confirmed as an important predictor of CBE receipt, which is consistent with prior evidence (Lee et al., 2015).

Annual checkup was an enabling factor of both CBE and mammographic screening among participants. Along with the Pap test, breast cancer screening is a standard part of an annual checkup for women (CDC, 2015). Consequently, an annual checkup facilitates regular breast cancer screening (Ogedegbe et al., 2005). Monthly income greater than \$6,000 enabled CBE receipt among KA women. The predictability of income to perceive breast cancer risk was not valid based on a meta-analysis (Katapodi et al., 2004). The relation between income and breast cancer screening needs further examination among KA women. English proficiency and breast cancer literacy did not enable both types of breast cancer screening. Limited English proficiency and a lack of knowledge about breast cancer screening were minimal to minor reasons for not receiving CBEs or mammographic screening among KA women (Choi et al., 2017).

Family cancer history as a need factor predicted mammographic screening only. There is a strong genetic risk factor associated with female breast cancer (Anderson et al., 2007), and family cancer history enabled mammographic screening among KA women, much like it does within the general U.S. population (Haber et al., 2012). Depression and health status did not predict breast cancer screening among KA women.

This study adds crucial evidence to promote breast cancer screening for KA women. Future interventions

and studies should emphasize the importance of annual checkup and promote CBE receipt and mammographic use equally, especially for younger women and women who are single.

Nonprobability sampling limits generalization of this study. Recruiting women in their 20s was most challenging, as most KA women attending Korean churches are older, first-generation immigrants. This study was insufficient to explain culturally distinctive factors related to breast cancer screening. In addition to English proficiency, KA women's acculturation level, length of stay, and relationship with a primary care physician of the same ethnicity could be assessed (Chawla et al., 2015; Ashing et al., 2003; Lee et al., 2014).

KA women tended to underutilize breast cancer screening, especially regarding the receipt of CBEs compared to that of mammographic screening. Annual checkups enabled them to receive CBEs and mammographic screening, and family cancer history made them perceive the need to screen for breast cancer through mammograms. To promote CBEs, any future intervention could target KA women who are younger than 40 years of age and single. Future research should explore in depth why CBEs are underutilized through KA women's narratives as well as the effectiveness of suggested intervention directions to promote breast cancer screening.

Acknowledgements

This work was jointly supported by the University of Georgia School of Social Work, the Owens Institute for Behavioral Research, and the endowed research fund by the University of Alabama School of Social Work.

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