

Factors related to the Performance of Mammography Screening among Women with a Family History of Breast Cancer in Korea

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Purpose: Early diagnosis is the primary method aimed at controlling breast cancer. The purpose of this study was to analyze some factors affecting the performance of mammography screening among women with a family history of breast cancer in Korea. **Methods:** This study applied a descriptive design method through structured self-report questionnaires. The Care Seeking Behavior Theory provided a theoretical framework for the study. Factors measured in this study represent demographic, clinical, and psychosocial variables including anxiety, barriers, utility, habits, perception, and facilitators. A total of 212 participants, of at least 20 years old, were sampled from April 8, 2010 to March 31, 2011. The data was analyzed by logistic regression method using the Statistical Package for the Social Science 18.0 software. **Results:** Of the 212 participants, 122 women (57.5%) went through mammography screening. The results of the analysis showed that (a) age (Odds Ratio [OR]=1.10, $p < .001$), (b) facilitating influences (OR=1.83, $p = .008$), (c) perception of mammography importance (OR=1.92, $p = .011$), (d) barriers to mammography (OR=0.60, $p = .031$), and (e) utility of mammography (OR=2.01, $p = .050$) significantly affect mammography screening. **Conclusion:** The results underscore the impact that psychosocial variables in obtaining mammography have on adherence to screening. Women with a family history of breast cancer should be given accurate information and recommendation about mammography by healthcare provider and a regular source of healthcare.

Key Words: Breast neoplasms, Mammography, Early detection of cancer, Health behavior, Women's health

INTRODUCTION

A. Backgrounds and Objects

Breast cancer in women is the most frequently diagnosed cancer (Lopez, Khoury, Dailey, Hall, & Chisholm, 2009), it has occupied the number one cancer afflicting Korean women since a decade ago (Ministry for Health, Welfare and Family Affairs [MHWFA], 2011), only surpassed by thyroid cancer since 2008 (National Cancer Information Center [NCIC], 2010-a). In 2009, regarding the diagnosis of breast cancer in Korea, 66.5% of newly detected breast cancer patients were between 40~50 years old while 15.5% were between 20-29 (MHWFA, 2011). The relatively young age with new breast cancer shows a larger distribution than any

other country and the number of young breast cancer patients has been gradually increasing (Health Insurance Review & Assessment Service, 2010). However, due to the development of curing technologies, the five-year survival rate of Korean breast cancer patients showed 89.9% (NCIC, 2010-a) and the breast cancer mortality has been steadily decreasing (Kim, Jeong, & Kim, 2004). Calonge and his colleagues (2009) and Kopans (2010) remarked that early detection and treatment are not solely an important focus of comprehensive breast cancer management, but it plays a major role in its prevention.

Routine women's health screening using mammography is known for assisting in early detection of breast cancer (Peters, 2010). Although mammography screening does not detect all breast cancers, as it is the

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major tool available, and women should not be denied its access (Kopans, 2010). According to the U.S. Preventive Service Task Force [USPSTF] (Calonge et al., 2009), mammography screening should be made on regular, biennial basis for women over age 50. According to the recommendation of the National Cancer Center in Korea, women over age 30 should perform breast self-examination [BSE] every month, women over age 35 should have a breast screening by a doctor every two years, and women over age 40 should undergo a mammography for one or every other year (NCIC, 2010-b).

A large number of epidemiological studies have been carried out to attempt to quantify the risks of breast cancer associated with a positive family history, and nearly all of them have found elevated relative risks to female relatives of breast cancer patients (Pharoah, Day, Duffy, Easton, & Ponder, 1997). A family history of breast cancer in first-degree relatives is an important risk factor for breast cancer (Welsh, et al., 2009). Pharoah et al. (1997) reported that women with a family history of breast cancer in first- and second-degree relatives are more at risk of breast cancer twice and 1.5 times respectively. Therefore female relatives of breast cancer patients need to undergo mammography screening more often than the average woman.

Although mammography has been widely promoted (NCIC, 2010-b), the results of the National Health and Nutrition Examination in 2008 (Korea Centers for Disease Control and Prevention [KCDCP]) showed that the detection rate of mammography was only about 28.7~21.8% (KCDCP, 2010), a discrepancy between recommendation and actual use rates remained. Traditionally, women's compliance rates for health screening are lower than desired because of multiple barriers (Peters, 2010). The sensitive nature of women's health screening being primarily concerned with women's breast further add to multiple barriers (Benjamins, 2006). However, there are few studies on determining whether women with a family history of breast cancer faithfully participated in recommended mammography and what factors affects their performance of mammography screening. Thus, it is necessary to establish a method for implementing early detection because women with a family history of breast cancer are more vulnerable to it.

The aim of this study was to determine factors related to the performance of mammography screening among women with a family history of breast cancer in Korea. The specific objectives of this study were to in-

vestigate the rate of mammography screening, to investigate the differences in mammography screening according to demographics, clinical, and psychosocial variables, and to determine factors on mammography screening among women with a family history of breast cancer.

B. Theoretical framework

This study was guided by the theoretical framework, the Care Seeking Behavior Theory [CSBT] developed by Lauver (1992), which was derived from Triandis' (1977) intrapersonal behavior theory. The CSBT designed to explain health behaviors as a roadmap or a guideline for directing research to provide an understanding of such behaviors more efficiently (Lauver, Nabholz, Scott, & Tak, 1997). This theory can help identify where an intervention may become the most effective factor (Heit, Blackwell, & Kelly, 2004). According to the CSBT, variables that influence behaviors are psychosocial variables (affect, utility, norms, and habits) and facilitators (Lauver et al., 1997). The understanding of care seeking behaviors in women with relatives of breast cancer patients is viewed as a prerequisite for facilitating the early detection, diagnosis, and treatment of breast cancer. The concepts of this study include anxiety, barriers, utility, habits, facilitator, clinical, and demographic variables, and their proposed relationships are presented in Figure 1.

METHODS

A. Participants

The age of participants in this study was determined as women over age 20 who never had breast cancer but had a mother, daughter, grandmother, sister, or aunt with breast cancer.

B. Data collection and sample size

The data used in this study were collected from April 8, 2010 to March 31, 2011. First, the list of breast cancer patients registered at the Paik Hospital Breast Cancer Clinic was obtained. Then, the addresses of the women relatives were requested from the patients, and then the relatives were contacted regarding their interests in participating in the study by telephone. Finally, a letter with the objective of the study, a consent form, and the survey questionnaire requiring ap-

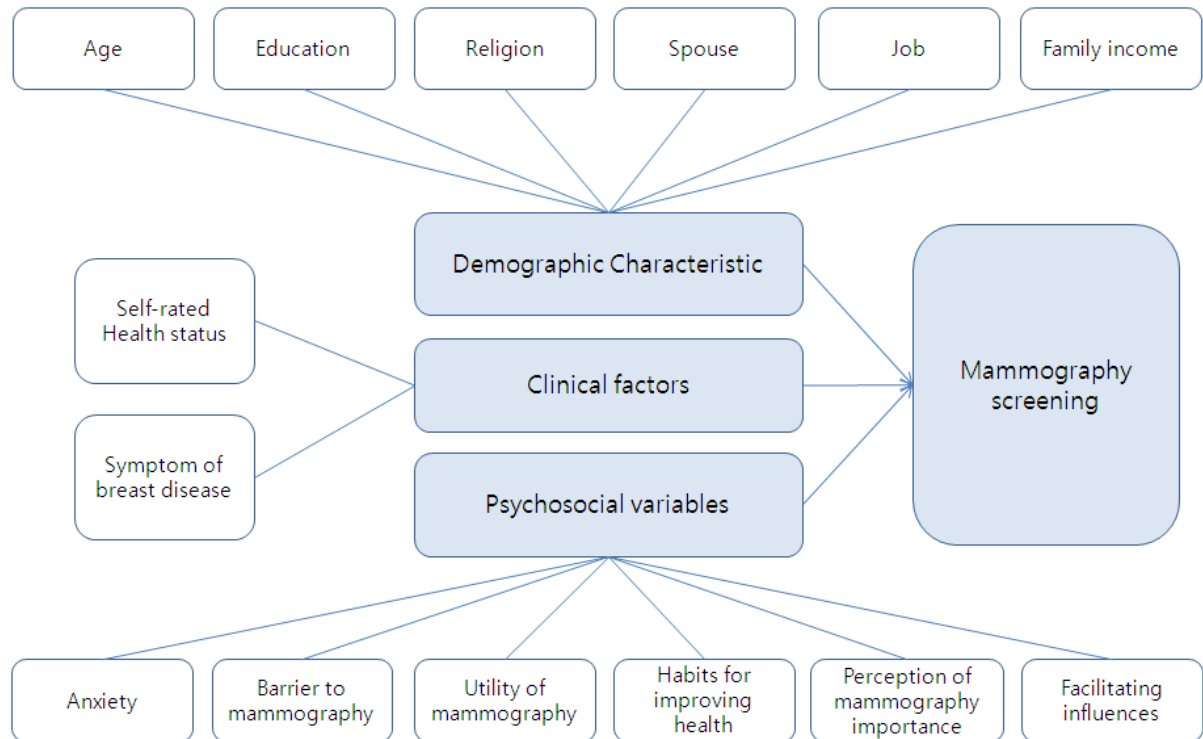


Figure 1. Conceptual framework.

proximately 10 minutes to complete were delivered.

The questionnaires were delivered to 260 women with a family history of breast cancer and 240 (92.3%) of them were returned. Data from 28 surveys were subsequently eliminated due to incomplete items on the questionnaires. A total of 212 surveys were analyzed. Using the G*Power software, the sample size required in logistic regression method was 183 as the effective size, significance level, power, and degree of freedom were determined by 0.3, 0.05, 0.9, and 5, respectively (Faul, Erdfelder, Buchner, & Lang., 2009). Thus, it was considered that the sample size used in this study was good enough.

C. Ethical considerations

Ethics approval was obtained from the Paik Hospital Institutional Review Board Center (No.10-020) prior to conducting the survey in April, 2010 and extension approval of this study was obtained in July, 2011. Potential participants were informed of their right to withdraw from the study at any time and the survey data were collected anonymously. Participants' consent was obtained, and a little remuneration was given to them.

D. Measures

After the initial selection of the measurements were composed, ten women between the ages of 20~50 years were pre-tested as a pilot survey and items were modified, re-evaluated, and validated with experts including two nursing professors, two surgeons, two nurses, and a statistician. Cronbach's α were computed to estimate the internal consistency of the instruments used.

a. Mammography screening

Whether or not they received mammography screening since breast cancer diagnosis of their relative was assessed by yes or no.

b. Psychosocial variables

Anxiety was determined as 20 items of state anxiety presented by the Korean-State Trait Anxiety [K-SAI] scale (Hahn, Lee, & Chon, 1996) derived by Spielberger (1983). Items were rated on a 4-point Likert scale and the Cronbach's α of K-SAI was .92. In this study the Cronbach's α was .88.

Barriers to and utility of mammography were determined by four and five items respectively based on Champion's Health Belief Model Scale [CHBMS] Korean

scale (Chong, 2000; Lee, Kim, & Song, 2002) and modified by the researcher, Champion (1993). Barriers to mammography screening were composed of worry, concern and fear about painful procedure, high costs, or lengthy procedure time. Utility of mammography consisted of effectiveness and usefulness of mammography screening. Items were rated on a 5-point Likert scale. The Cronbach's α s for this study were .65 for barriers and .68 for utility.

The scale of habits, perception, and facilitators were derived from the literature and modified by the researchers. The items were evaluated and validated by experts. Each scale that reached more than 90% agreement among all reviewers were retained. Habits for improving health were measured by 6 items based on the answers of the participants about what they considered for their healthy life. Items were rated on a 5-point Likert scale and the Cronbach's α was .74. The perception of the importance of mammography screening was made up of 2 items and rated on a 5-point Likert scale (Cronbach's α = .81). Facilitators were contributed as a supporter for facilitating influences on mammography screening and were measured by 3 items.

c. Demographic and clinical variables

The age of the participants was taken as a continuous variable in years and classified by decade. The education of the participants was measured by their highest grade of school. Also, religion, presence of participants' spouse, job and family income were investigated.

The self-rated health status was a single item evaluating the subjective awareness of health and showed one item of five degrees. Symptoms of breast disease represent self-detection that included pain, lump, heat, and discharge on breast.

E. Data analysis

The data were stored in a database of the Statistical Package for the Social Sciences SPSS/WIN 18.0 and screened for missing data and outliers. Screening for normality using histogram plots revealed that all variables were normally distributed. A bivariate data analysis using χ^2 -tests was conducted with mammography screening status. For each variable, logistic regression was used to calculate odds ratios [OR] and 95% confidence intervals [CI] at each level of mammography screening status for establishing its significance.

RESULTS

A. Comparison of participants' demographic and clinical characteristics

Table 1 shows the results of the mammography screening with demographic and clinical characteristics. Of the 212 participants, 122 women (57.5%) participated in mammography screening of which 97 participants (80.8%) were over the age of 40.

Regarding the age of the participants, the mean age of women who performed mammography screening was higher than women who didn't ($t=9.83$, $p<.001$). Regarding the education ($\chi^2=7.43$, $p=.024$), religious life ($\chi^2=12.30$, $p=.015$), spouse ($\chi^2=21.86$, $p<.001$), and job ($\chi^2=47.78$, $p<.001$) of participants, there were significant differences in performing mammography screening. In addition, there were significant differences in performing mammography screening according to the symptom of the breast disease ($\chi^2=9.82$, $p=.002$) and the relatives of the breast cancer relative type ($\chi^2=14.18$, $p=.001$). However, there were no specific differences in performing mammography screening according to the family income and self-rated health status.

B. Comparison of participants' psychosocial variables

In the comparison of the performance of mammography screening with psychosocial variables, there were significant differences in performing mammography screening according to perception ($t=7.55$, $p<.001$), family ($t=2.11$, $p=.036$), health care provider ($t=6.08$, $p<.001$), and health care center ($t=6.53$, $p<.001$) (Table 2).

C. Factors Related to the Performance of Mammography Screening

The results of logistic regression analysis for mammography screening indicated significances ($\chi^2=113.20$, $p<.001$) and the factors of age (OR=1.10, $p<.001$), facilitating influence of a health care provider (OR=1.83, $p=.008$), perception of mammography importance (OR=1.92, $p=.011$), barriers to mammography (OR=0.60, $p=.031$), and utility of mammography (OR=2.01, $p=.050$) affected the mammography screening. Regarding Odds ratios related to the mammography screening, an increase in age by one year increased its performance 1.1 times, an increase in score by one for the facilitating influence of a health care provider increased its performance

Table 1. Comparison of Demographic Characteristics as Performance of Mammography Screening

(N=212)

Characteristics	Categories	Total (n=212)	Yes (n=121)	No (n=91)	χ^2 or t (p)
		n (%) or M \pm SD	n (%) or M \pm SD	n (%) or M \pm SD	
Age (year)		41,3 \pm 13,82	48,0 \pm 10,7	32,4 \pm 12,4	9,83 (< .001)
Age	Twenties	50 (23,6)	5 (10,0)	45 (90,0)	77,17 (< .001)
	Thirties	42 (19,8)	19 (45,2)	23 (54,8)	
	Forties	61 (28,8)	51 (83,6)	10 (16,4)	
	Fifties	35 (16,5)	25 (71,4)	10 (28,6)	
	Sixties	24 (11,3)	21 (87,5)	3 (12,5)	
Education	\leq Middle school	25 (11,8)	20 (80,0)	5 (20,0)	7,43 (.024)
	High school	102 (48,1)	59 (57,8)	43 (42,2)	
	\geq College	85 (40,1)	42 (49,4)	43 (50,6)	
Religious life	Deep devotion	76 (35,8)	33 (43,4)	43 (56,6)	12,30 (.015)
	Diligent	29 (13,7)	17 (58,6)	12 (41,4)	
	Midium	70 (33,0)	43 (61,4)	27 (38,6)	
	Based	29 (13,7)	23 (79,3)	6 (20,7)	
	None	8 (3,8)	5 (62,5)	3 (37,5)	
Spouse	Yes	85 (40,1)	32 (37,6)	53 (62,4)	21,86 (< .001)
	No	127 (59,9)	89 (70,1)	38 (29,9)	
Job	House wife	88 (41,5)	67 (76,1)	21 (23,9)	47,78 (< .001)
	Full time employee	53 (25,0)	29 (54,7)	24 (45,3)	
	Part time employee	45 (21,2)	25 (55,6)	20 (44,4)	
	Students	26 (12,3)	0 (0,0)	26 (100,0)	
Family income (10,000 won per month)	< 100	27 (12,7)	16 (59,3)	11 (40,7)	6,15 (.188)
	100~199	40 (18,9)	16 (40,0)	24 (60,0)	
	200~299	50 (23,6)	32 (64,0)	18 (36,0)	
	300~399	49 (23,1)	29 (59,2)	20 (40,8)	
	\geq 400	46 (21,7)	28 (60,9)	18 (39,1)	
Self-rated health status		3,37 \pm 0,85	3,31 \pm 0,83	3,46 \pm 0,87	-1,33 (.186)
Symptom of breast disease	Yes	74 (34,9)	53 (71,6)	21 (28,4)	9,82 (.002)
	No	138 (65,1)	68 (49,3)	70 (50,7)	
Relatives type of breast cancer patient	Mom, daughter	75 (35,4)	40 (53,3)	35 (46,7)	14,18 (.001)
	Grandmom, sister	87 (41,0)	24 (27,6)	63 (72,4)	
	Aunt	50 (23,6)	27 (54,0)	23 (46,0)	

1.83 times, an increase in score by one for the perception of mammography screening importance increased its performance 1.92 times, and an increase in score by one for the utility of mammography increased performance 2.01 times. In addition, an increase in score by one for the barriers to mammography decreased its performance 0.6 times.

DISCUSSION

This study emphasizes the importance of perform-

ing mammography screening for women with a family history of breast cancer who are considered as a high risk group. In the analysis using logistic regression method, the most influencing factor on the performance of mammography screening for women with relatives of breast cancer patients was participants' age. In this study, it was shown that 80.8% of women with a family history of breast cancer and aged between 40 and 69 years underwent mammography screening. Because such mammography screening has been actively recommended for women over 40 based of the

Table 2. Comparison of Psychosocial Variables for Mammography Screening

(N=212)

Variables	Total	Yes (n=121)		No (n=91)		t (p)
		M±SD	M±SD	M±SD	M±SD	
Anxiety	2.16±0.46	2.12±0.47	2.21±0.46			-1.32 (.188)
barriers	2.71±0.86	2.66±0.89	2.76±0.83			-0.81 (.415)
Utility	3.60±0.57	3.65±0.56	3.52±0.57			1.65 (.100)
Habit	3.00±0.71	3.06±0.89	3.26±0.84			1.40 (.164)
Perception	3.25±1.16	3.72±1.01	2.64±1.05			7.55 (<.001)
Facilitator	Family	2.73±1.36	2.90±1.34	2.51±1.36		2.11 (.036)
	Health care provider	2.15±1.26	2.55±1.34	1.62±0.90		6.08 (<.001)
	Health care center	2.19±1.30	2.63±1.37	1.60±0.91		6.53 (<.001)

Table 3. Factors Related to the Performance of Mammography Screening

(N=212)

Variable	B	SE	Wald (p)	OR	95% Confidence interval	
					Lower	Upper
Age	0.09	.02	28.10 (<.001)	1.10	1.06	1.14
Facilitator (Health care provider)	0.61	.17	7.08 (.008)	1.83	1.30	2.58
Perception	0.65	.19	6.47 (.011)	1.92	1.31	2.82
barriers	-0.51	.25	4.67 (.031)	0.60	0.37	0.97
Utility	0.70	.36	3.85 (.050)	2.01	1.00	4.03
χ^2 (p)	113.20 (<.001)					
Cox & Snell R ²	.41					

recommendation of NCIC (NCIC, 2010-b), the rate of mammography screening in the age group over 40 was higher than in younger age groups. However, based on the statistics of MHWHA (2011), 15.5% of breast cancer patients since 2008 were diagnosed at the younger age of 20~30s compared to Western society. There is a report that 50% of breast cancer patients in the 20s were caused by a genetic factor (Henderson et al., 2008). Thus, a safe and accurate screening method to detect breast cancer in the early age of 20 to 30 is required.

Experts have disagreed on when to start and end breast screening, the schedule on which tests should occur, and the effectiveness on different screening modalities (Meissner, Klabunde, Han, Benard, & Breen, 2011). The evidence was insufficient to recommend mammography for women without consideration of age. However, USPSTF suggested routine screening mammography in women aged 40 to 49. This led to

the USPSTF advising that decisions about screening mammography for women in this age group should be made on an individualized basis (Calonge et al., 2009). Even though mammography screening does not find all cancer early enough to result in a cure, it is still a major advance (Kopans, 2010). More than all, effective screening method including mammography is needed for young women and a campaign to motivate young women with family history of breast cancer to perform BSE is needed.

As the psychosocial variables were considered as important factors in the CSBT, the most important factor influencing mammography screening in this study played as a facilitator. In this study the facilitator included family, health care provider and health care center. A close look at these results show that health care providers were more influential on mammography screening than family. It showed how important nurse and physician advice and comments are to

women with relatives who have or had breast cancer. This supports other studies that reported access to health care providers, such as recommendation from physician and having a primary care provider (Schueler, Chu, & Smith-Bindman, 2008). Also, according to the study on factors affecting periodic screening behaviors for breast cancer among hospital nurses (Lee, Sim, & Ahn, 2010), nurses can use themselves effectively as health care providers for women. This further emphasizes access to education and training that supports nurses to become specialized.

In this study the perception of mammography importance, barriers, and utility of mammography were influencing factors on the performance of mammography screening for women with a family history of breast cancer. Lauver and her colleagues (1997) reported that high rates in performing mammography screening followed the high perception, low barriers, and high utility of mammography screening. It's no wonder that high perception of mammography importance deducted high rates of mammography screening. On the other hand, the barriers of mammography in this study included long period of procedure time, fear of painful procedure, and concern about high costs. Lee-Lin and her colleagues (2007) also reported barriers such as painful procedure and concern of being exposed to x-ray, and in particular, breast exposure. Considering these and recommendations for "woman friendly and woman-centered service" (Peters, 2010) woman-centered care that can facilitate modesty and minimize shame with exposure of breasts for mammography screening is much needed. Moreover, other emotional barriers to mammography were caused by a lack of accurate information about the mammography process (Lee-Lin et al., 2007; Peek, Sayad, & Markwardt, 2008). Fortunately, NCIC (2010-b) has offered the free cancer examination project since 2005 for all Korean women over age 45, so women can participate in breast cancer screening regardless of family income and job status. Therefore, it is important to give precise information about the harmfulness and efficacy of mammography screening to women who have misconception in mammography screening.

CONCLUSION

In this study, age and psychosocial variables including facilitating influences, perception of mammography importance, barriers to mammography, and utility of mammography played a role in affecting the

mammography screening among women with relatives of breast cancer patients. The results underscore the impact that psychosocial variables in obtaining mammography have on adherence to screening. As shown in the study of the CSBT, in this study, it was verified that the understanding of psychosocial variables, which affect the performance of mammography screening for women with a family history of breast cancer is important.

Based on the results of this study, we attempt to propose some issues. It is necessary to develop a health promotion program that provides accurate information and focuses on shaping positive perceptions, to better promote psychological pathways that affect greater screening rates for women with breast cancer relatives. It is necessary to conduct experimental studies for providing a health promotion program for women with relatives of breast cancer patients and for verifying its effects.

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