

# Assessing Decisional Balance toward Mammography Screening in Korean Women

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This cross-sectional survey was carried out to assess the decisional balance of Korean women toward mammography screening. A sample of 1,903 naturally postmenopausal women was selected from the community-based social groups in town or city hall auxiliaries in seven metropolitan areas and six provinces in Korea. The classification of women according to the stage of adoption of mammography was 54.9% in pre-contemplation, 31.9% in contemplation, 7.8% in action, and 5.5% in maintenance. The mean differences of pros, cons, and the decisional balance by the stage of mammography adoption were statistically significant. There were significant mean differences between the stages of adoption according to a woman's experience with and intention for mammography and the pros score, the cons score, and the decisional balance score. Results provide the empirical evidence for the Transtheoretical model. An association between stages of mammography adoption and decisional balance exists.

**Key Words:** Decisional Balance; Mammography Screening, Korean Women; Transtheoretical model

## INTRODUCTION

Among Korean women breast cancer has the third highest relative frequency of cancer by site. An estimated 4 out of 100,000 women died of breast cancer in 1995 (Ministry of Health & Welfare, 1997). From 1987 to 1996, the mortality rate of breast cancer increased 10.7% (National Statistical Office, 1997). Under the influence of rapid economic development and westernized life style and diet pattern, increasing incidence of breast cancer has been reported in the Korean medical journals (Han, 1993). Survival is closely related to stage at detection of breast cancer and mammography screening has been recognized as the most effective technique available for the early detection of breast cancer (Sapiro, 1989; Tabar & Dean, 1987). In the US, for asymptomatic women turning 40 years of age, mammograms are

recommended at least every other year, then yearly after age 50 (American Cancer Society, 1990). In Korea, mammography was evaluated as a pertinent method for early detection of breast cancer in medical research (Lee, Baik, & Choi, 1996).

Nursing scholars have researched the preventive breast cancer behavior such as breast self-examination emphasizing the nurses' role in providing information about how to perform proper breast self-examination (Chapados, 1999; Clarke & Savage, 1999; Leight & Leslie, 1998; Budden, 1998). But in the medical field, mammography is increasingly recommended as a preventive method for breast cancer. Ismail (1999) conducted case-control, retrospective and prospective studies to examine the efficacy of mammography, breast self-examination and physical examination by trained personnel in reducing breast cancer mortality. As the results show, mammography screening in postmenopausal women is

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an effective means of reducing breast cancer mortality. In Western medical practice, motivational and cognitive elements related to adoption of mammography screening have been investigated (Burack & Liang, 1987; Fox, Klos, & Tsou, 1988; Rimer et al., 1990). Based on the Transtheoretical model, research studies to assess the decisional balance for adopting mammography were done (Rakowski et al., 1992; Pearlman et al., 1997; Rakowski et al., 1997).

This study examines the potential for extending a theory of behavior change based on the Transtheoretical model proposed by Prochaska and DiClemente (1982, 1983, 1984) as a general model of intentional behavior applied to the area of mammography screening in Korea. The Transtheoretical model presumes that all persons are not at the same point of adopting a specified health-related activity, such as mammography. Therefore, the model proposes a sequence of stages along a continuum of behavioral change from pre-contemplation (not intending to adopt the target health practice), to contemplation (considering adoption of the practice), to action (initiating the new behavior), to maintenance (sustaining the change over time).

An additional feature of the definition of stages of adoption is that a report of current behavior status is augmented by a statement of intention to continue or change that behavior (Rakowski et al., 1992). Complementing the stage of adoption elements are elements of decision-making regarding the adoption of target behavior. One of these is a pair of perceptual or judgmental factors - the pros and cons - along with a decisional balance measure derived from them (Velicer et al., 1985). Decisional balance is derived by comparing the strength of perceived positive aspects of the new behavior (pros) with perceived negative aspects (cons). The decisional-balance strategy of the model was drawn from the theoretical approach to decision making developed by Janis and Mann (1977). The model hypothesizes that persons in action and maintenance should have a decisional balance favoring the positive features of the target behavior (pros), that persons in pre-contemplation should have a decisional balance reflecting reasons not to change (cons), and that persons in contemplation should have a decisional balance falling between that of persons in pre-contemplation and that of persons in action.

Velicer et al. (1985) applied the concept of decisional balance in behavioral change of smoking cessation.

Results show there was a difference in pros and cons according to stage of change. Persons in the action and maintenance stages showed pros-dominated decisional balance while persons in pre-contemplation showed cons-dominated decisional balance, and persons in contemplation and preparation showed equaled pros - and cons - decisional balance. In a longitudinal study of smoking cessation, the decisional balance was suggested as a useful variable to predict the transition of stage from pre-contemplation to contemplation (Prochaska et al., 1991).

Grimley et al. (1993) assessed the stages of change and decision making for contraceptive use for prevention of pregnancy and AIDS. The result revealed that balance of pros and cons for contraceptive use was closely related to behavioral change for contraceptive and condom use.

Rakowski et al. (1992) assessed elements of women's decisions about mammography. Results show that the pros plus cons and pros minus cons were associated with stage of mammography adoption. In an extended study, through confirmatory analysis of opinions regarding the pros and cons of mammography, Rakowski et al. (1997) recommended that future researches examine whether opinions regarding the cons of mammography are more individually specific than the pros.

Rimer et al. (1990) studied the predictors of adherence to cancer screening. The result revealed that a measure of person's beliefs about the pros and cons of complying with screening test is associated strongly with adherence. Findings of several related studies suggest that behavioral interventions that target decisional balance can effectively promote adherence to preventive behaviors. The knowledge about how elements of decisions relate to behavior would be helpful to find conceptual strategies for organizing nursing preventive intervention research.

#### *The purpose of the study and the research question*

This study was aimed to investigate the element of decision making of Korean women about mammography screening in different stages of adoption for mammography based on the Transtheoretical model. Therefore, the following research questions were addressed.

1. How do Korean women perceive the elements of decisional balance toward mammography?
2. How does the decisional balance relate to stage of adoption for mammography in Korean women?
3. How does the decisional balance relate to experi-

ence and plans for mammography by Korean women?

## METHODS

### *Design and Sample*

This cross-sectional survey was conducted using convenience sample recruited from community-based social groups such as community centers for women in town or city hall auxiliaries. The participants were 1,903 naturally postmenopausal women aged 41 to 65 years living in seven metropolitan areas and six provinces. A total sample of 2,807 women was obtained for the study, of which 1,903 respondents completed the questionnaires used for the analysis, giving the response rate of 67.8%. They were provided with informed consent form as prescribed by the committee as human subjects.

### *Instrument*

A decisional balance scale toward mammography developed by Rakowski et al. (1992) was used to measure the decisional balance regarding the adoption of mammography screening. It consists of 18 items with two dimensions: pros (perceived positive aspects of obtaining a mammogram) and cons (perceived negative aspects of obtaining a mammogram). It was translated into Korean by research team and a bilingual Korean who had not seen the English version of the instrument, back-translated the Korean items into English. In addition, the researchers to fit the Korean situation modified the vocabulary. In this study we reevaluated each item using factor analysis with varimax rotation. The 18 items of the scale were distributed into 7 Pros and 11 Cons by factor analysis. The internal consistency reliability, Cronbach's alpha, was .79 for 7 Pros and .78 for 11 Cons.

A single item used by Rakowski et al. (1992) was used to assess their current stages of adoption for mammography. Subjects were required to endorse one of five descriptions, placed orderly labeled as a pre-contemplation, contemplation, action, and maintenance phase.

### *Procedure*

From Dec. 20, 1998 to Apr. 30, 1999, data were collected by thirty-nine research assistants using a self-report questionnaire. The research assistants were undergraduate nursing students in 'K' university. They were educated for data collection by data collection protocol. Potential women subjects were contacted by thirty-nine research assistants residing in different regions of the

country, and consents to participate in the study were obtained from 2,807 women. The research assistants met the subjects on a one-to-one basis and explained the purpose of this study. All subjects gave written informed consent. A research assistant distributed a questionnaire in person to each consenting woman for completion, and the research assistant collected the completed questionnaire on site.

### *Data Analysis*

Data were analyzed using SAS programs. The demographic characteristics and the decision balance were analyzed using descriptive statistics. The mean difference of the decisional balance (pros and cons indices) according to the stages of adoption was analyzed by one-way ANOVA with Duncan's multiple range test.

## RESULTS

### *Sample Characteristics*

A sample of 1,903 women whose data were used for analyses in this study represents 45.1% from seven urban cities including Seoul, and 54.9% drawn from the six provinces. The mean age of the sample was 55.6 years. The age distribution of the sample was from 41 to 49 years, 216(11.4%); 50 to 59 years, 1,211(64.6%); and 60 to 65 years, 476(25.0%). The average number of children was 3.1. The average educational level was 9.5 years; 9.1% had no schooling, 34.3% were primary school graduates, 47.0% were middle and high school graduates, and 9.6% had more than 13 years of education. For the perceived economic status, 4.2% of the sample reported as high, 75.3% of the sample reported as moderate, and 20.5% of the sample reported as low. For marital status, of the sample, 80.6% were married, 1.4% were divorced, 16.7% were widowed, and 1.4% were separated. 41.7% of the sample had a present job, and of the sample, professional and skilled occupations made up 18.6%, clerical positions made up 3.4% and semi-skilled, labor positions made up 78.0%.

### *The Stages of Adoption*

The results from the classification of individuals according to their readiness to adopt mammography were as follows; (a) 1,044 (54.9%) were classified as women in the pre-contemplation phase, women who had no prior mammogram and have no plan for one in coming year. (b) 606 (31.9%) were classified as women in the

contemplation phase, women who had no prior mammogram but are planning for one in the coming year, or who had one or more prior mammograms but have no plan for one in the coming year. (c) 149 (7.8%) were classified as women in the action phase. These women had one prior mammogram and are planning for one in the coming year. (d) 104 (5.5%) were classified as women in the maintenance phase. These women had more than one prior mammogram and are planning for one in the coming year.

Table 1 shows the mean and the standard deviation and the factor loading of each item of the decisional balance scale.

**The Difference in Pros, Cons, and the Decisional Balance According to the Stage (Phase) of Mammography Adoption**

Table 2 and Figure 1 present the means of the pros and cons, and the decisional balance according to the stage of mammography adoption. The mean difference of pros according to the stage of mammography adoption was statistically significant,  $F(3, 1842) = 88.09, P < .0001$ . Based on the pairwise comparison between two groups using Duncan's multiple range test, the pros score was in order highest for women in the action phase ( $M = 4.29$ ), in the maintenance phase ( $M = 4.13$ ), in the con-

templation phase ( $M = 3.90$ ), and the pre-contemplation phase ( $M = 3.58$ ).

The mean difference of cons according to the stage of mammography adoption was statistically significant,  $F(3, 1844) = 129.74, p < .0001$ . Based on the pairwise comparison between two groups using Duncan's multiple range Test, the cons score was significantly, in order, lowest for women in the maintenance phase ( $M = 2.39$ ), in the action phase ( $M = 2.59$ ), in the contemplation

**Table 2.** The Mean Difference Between Pros, Cons, and the Decisional-Balance According to Stage of Mammography Adoption

Scale	Stage	n	M	SD	F
Pros	Maintenance	101	4.13 <sub>b</sub>	0.56	88.09***
	Action	149	4.29 <sub>a</sub>	0.60	
	Contemplation	595	3.90 <sub>c</sub>	0.62	
	Pre-contemplation	1001	3.58 <sub>d</sub>	0.63	
Cons	Maintenance	103	2.39 <sub>d</sub>	0.62	129.74***
	Action	146	2.59 <sub>c</sub>	0.68	
	Contemplation	593	2.96 <sub>b</sub>	0.58	
	Pre-contemplation	1006	3.29 <sub>a</sub>	0.59	
Decisional-Balance	Maintenance	101	1.74 <sub>a</sub>	0.91	191.54***
	Action	146	1.69 <sub>b</sub>	1.04	
	Contemplation	593	0.95 <sub>c</sub>	0.90	
	Pre-contemplation	1000	0.28 <sub>d</sub>	0.87	

Note. Means with different subscripts differ significantly at  $p < .05$  by the Duncan's multiple range test.  
\*\*\*  $p < .001$

**Table 1.** Descriptive statistics and Factor Loadings of the Decisional-Balance Scale

Statement Wording	M	SD	Factor loading
<b>Cons scale</b>			
If I eat a healthy diet, I will lower my cancer risk enough that I provably not need to have a mammogram	3.05	1.23	0.46
Mammograms have a high risk of leading to unnecessary surgery	3.09	1.21	0.66
I would probably not have a mammogram if the mammography facility were more than a few minutes drive a way	3.69	1.08	0.57
Having mammogram cost me too much money	3.45	1.13	0.53
I would probably not have a mammogram unless I had some breast symptoms or discomfort	3.37	1.21	0.57
I do breast self-examination every month, so I probably do not need to have a mammogram	2.68	1.13	0.56
If a mammogram finds something, then whatever is there will be too far along to do anything about anyway	3.06	1.20	0.65
I am too busy to have mammogram every year	3.07	1.12	0.46
Mammogram has a high risk of leading to unnecessary radiation	2.98	1.12	0.50
I have too many discomforts all over the body, so I can't think of having mammogram despite of not having any breast symptoms	2.91	1.16	0.53
I don't have any desire to live long enough to have routine mammogram	2.45	1.12	0.50
<b>Pros scale</b>			
Mammograms are most helpful when you have one every year	3.77	0.98	0.62
I would be more likely to obtain a mammogram if I had some breast symptoms or discomfort	4.08	0.97	0.62
Having a yearly mammogram will give me a feeling of comfort over the anxiety of breast cancer	3.80	0.97	0.71
Mammograms are safety screening measure when you have one every year	3.59	0.90	0.65
Mammograms are necessary screening test in my age group	3.63	1.01	0.72
Having a yearly mammogram will give me a feeling of control over my health	3.58	1.03	0.70
Mammograms are mandatory routine medical test if you have breast cancer family history	3.90	1.06	0.59

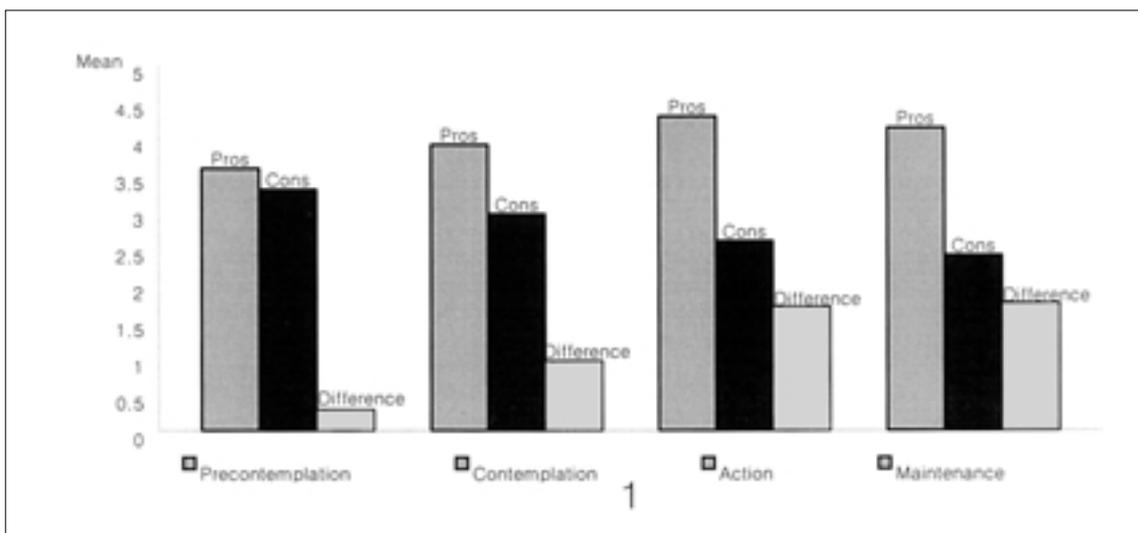
phase (M = 2.96), and in the pre-contemplation phase (M=3.29).

The mean difference of the decisional balance (pros minus cons) according to the stage of mammography adoption was statistically significant,  $F(3, 1836) = 191.54, p < .0001$ . Based on the pairwise comparison between two groups using Duncan's multiple range test, the decisional balance score was significantly greater for women in the maintenance phase (M=1.74) or in the action phase (M=1.69) than for women in the contemplation phase (M=0.95) and in the pre-contemplation phase (M=0.28). But, there was no significant difference in the decisional balance score between women in the maintenance phase and women in the action phase. This means that women in the pre-contemplation and contemplation phase have less favorable views of mammography

screening.

**Decisional Balance according to the experience and the intention for mammography**

Table 3 shows the decisional balance according to the experience and the intention for mammography screening. Women who had had a mammogram as a routine screening test had significantly higher pros score,  $t=6.60, p < .0001$ , lower cons score,  $t=-11.65, p < .0001$ , and positive decisional balance,  $t=11.84, p < .0001$ , compared to women who had never had a mammogram. And, women who had had a mammogram more than once had significantly higher pros score,  $t=11.12, p < .0001$ , lower cons score,  $t=-14.54, p < .0001$ , and positive decisional balance,  $t=16.14, p < .0001$ , compared to women who had never had a mammogram.



**Figure 1.** The Means of Pros, Cons, and the Decisional-Balance by Stage of Mammography Adoption

**Table 3.** The Mean Difference of the Pros, Cons, and the Decisional Balance According to the Experience with and Intention for mammography

Question	Pros Scale		Cons Scale		Difference	
	M	F	M	F	M	F
Had mammography routinely						
Yes (n = 101)	4.13	6.60***	2.39	-11.29***	1.74	10.89***
No (n = 1,745)	3.75		3.12		0.62	
Had one or more mammograms, not routinely						
Yes (n = 513)	4.04	11.20***	2.72	-14.54***	1.31	16.14***
No (n = 1,333)	3.67		3.22		0.45	
Plan to have mammography in the next year						
Yes (n = 582)	4.06	13.42***	2.78	-13.93***	1.28	17.99***
No (n = 1,264)	3.64		3.22		0.42	

Note. Difference means the decisional balance (Pros minus Cons).  
\*\*\*  $p < .001$

Women who express a positive intention for mammography in the next year have a higher pros score,  $t=13.69$ ,  $p<.0001$ , lower cons score,  $t=-13.88$ ,  $p<.0001$ , and positive decisional balance,  $t=17.82$ ,  $p<.0001$ , compared to women who do not express a positive intention.

## DISCUSSION

These results show that an association between stages of mammography adoption and decisional balance exists. That is, based on the four stages of mammography adoption, the degree of positive decisional balance toward mammography screening was higher in women in the action phase who had one prior mammogram and are planning for one in the coming year or women in the maintenance phase who had more than one prior mammogram and planning for one in the coming year. This is interpreted as evidence that a woman's report of her mammography history corresponds to beliefs about the usefulness of the procedure.

The results also provide empirical evidence of the Transtheoretical model. That is, these results demonstrate the utility of the main concepts of this model in health practice. As Rakowski et al. (1992) pointed out, the decisional balance can be utilized as a methodology for analyzing perception type data.

Nonetheless, this research study suggests that 54.9 percent of this sample have never had a mammogram and do not intend to have a mammogram in the future. Only 13.3 percent of this sample plans to have a mammogram in the coming year. This rate reflects a considerably lower rate than previous studies in other developed countries (Mayer et al., 1992). Among Korean women breast cancer has the third highest relative frequency of cancer by site (Ministry of Health and Welfare, 1997). Considering that mammography is a significant method for early detection of breast cancer, there is a need to apply various strategies, such as education, to promote mammography screening as a preventive behavior. As it were, King et al. (1999) reported that a program of peer volunteer intervention had a significant positive effect on attendance at the mammography education presentations. Pearlman et al. (1997) also suggested that a woman's information environment is important in her decision to have a mammogram. Especially in the Korean sociocultural context, preventive health behavior such as mammography, or Pap smear may be influenced by peer group dissemination of information.

On the other hand, the definition of stages of mammography adoption needs to be refined in future work. That is, as pointed out previously, mammography is not widely practiced among Korean midlife women. Accordingly, as mammography becomes more widely practiced and as repeated mammograms are obtained more regularly by women and recommended as a standard practice in Korea, the timing between mammograms will probably become more crucial. Therefore, a culturally specific definition of an action and maintenance phase is needed.

In addition, each of the items of the pros and cons scale can provide information about Korean women's thoughts or information status such as perceived benefits versus barriers, perceived risk versus susceptibility, safety, cost, and the implications for the family of mammography. Accordingly, the in-depth analysis of each item can provide the basic data for planning intervention for Korean women's health beliefs and health behaviors. A major challenge for nurses and health professionals conducting cancer education and screening programs is that of encouraging attendance and participation in those programs. Assessing the decisional balance regarding mammogram and stages of mammography adoption seems to have the potential of refining the picture of the screening status of the whole population.

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