Perceived risk of breast cancer among Korean women

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ABSTRACT

Risk perception is an important motivator of a number of health-related behaviours. In many cases optimistic perceptions called comparative optimism prove wrong and are thought to hinder clients from taking preventive health service such as regular breast cancer screening using mammography. Therefore, it is important to understand the determinants of perceived risk when health professionals plan strategies to change health behaviour of their clients. However, only a few studies have been conducted on factors associated with perceived risk of breast cancer, and the study in which correlates of risk perception were the primary focus and study participants were extracted from general population is rare. This study was conducted to explore perceived risk of breast cancer among Korean women and to investigate factors associated with perceived risk. A telephone survey using random digit dialing was conducted with an age and region-stratified random sample of women in Korea. The study population consisted of 1,000 women who participated in telephone survey in which a 21-item questionnaire was used.

This study showed a significant level of comparative optimism in breast cancer risk perception in Korean women with an average risk of breast cancer. About 69% of women thought that their chances of getting breast cancer were lower than other women of their age. 22.1% thought it was about the same, and 8.5% thought their risk was higher. In the bivariate analysis, age was inversely associated with perceived comparative risk, and women with graduate education were more likely than women with lower level of education to perceive their risk as high. Women who had a family history of breast cancer, those who had a history of benign breast disease, and those who got a mammogram within the past year were more

likely to perceive their risk as high. However, marital status, employment status, age at first live birth, age at menarche, number of breast biopsies, vegetable consumption, alcohol consumption, number of birth, age at menopause, current use of birth control pills, and obesity showed no association with perceived comparative risk. According to the multivariate analysis, younger age, having a family history of breast cancer, and having a history of benign breast disease were the factors associated with higher perceived comparative risk of breast cancer. Perceived comparative risk was associated with intention to get a mammogram. Women who had lower perceived comparative risk showed lower intention to get a mammogram. Other factors significant in the multivariate analysis include age, marital status, history of benign breast disease, and past history of getting a mammogram.

The finding that a limited number of breast cancer risk factors were related to perceived risk of breast cancer is worrying because women who had other risk factors of breast cancer may believe themselves to be at low risk. And it can be suggested that many Korean women do not perceive their risk of getting breast cancer even though they have certain risk factors of breast cancer. The finding of this study suggests that sophisticated risk communication strategies for helping women perceive their risk on the basis of objective risk profile are needed.

Keywords: Perceived risk, Breast cancer, Mammography, Comparative optimism, Communication

1. INTRODUCTION

Perceptions of risk are subjective assessments of their vulnerability (1). Perceived risk is regarded as a key construct in a number of theories of health behaviour such as the Health Belief Model (2), the Precaution Adoption Model (3, 4), the Transtheoretical Model of Stress and Coping (5, 6), the Self-regulation Model of Health Behavior (7), and the Protection Motivation Theory (8).

According to a recent nation-wide survey (9), the most common reason (54.6%) for not taking breast cancer screening was “I feel confident about my health.” In many cases those optimistic perceptions prove wrong and are thought to hinder clients from taking preventive health service such as regular breast cancer screening using mammography. Bias which has been called comparative optimism operates when individuals estimate the likelihood of a future life event (10).

Comparative optimism refers to the tendency for people to believe that they are less likely to experience negative events and more likely to experience positive events than other people (11-13). Comparative optimism occurs when people perceive their own personal outcomes as being more positive than those of other people in similar circumstances. Three other terms used in the literature to describe the same phenomenon are unrealistic optimism (11), optimistic bias (11) and illusions of unique invulnerability (14). Each of these terms implies that the difference between risk judgments made for the self and the risk judgments made for the average person arises from a distortion of personal judgments. The magnitude of

comparative optimism varies from hazard to hazard, but it is particularly large for problems, like lung cancer, that are believed to be preventable by individual action.

Optimism in risk perception may be psychologically functional by protecting people from anxiety (15-17), but part of the interest in comparative optimism stems from its potential consequences for mental health and health-related behavior. For example, Taylor and Brown (15) have proposed that comparative optimism is a type of positive illusion associated with mental well-being. They argue that a positively biased view of one's future carries a variety of psychological benefits such as self-reports of happiness and contentment, increased motivation and persistence, and ultimately better performance and greater success. More importantly, they argue that normal individuals possess unrealistically positive views of the future and that accurate self-knowledge may be negatively related to psychological health. According to this argument, being unrealistic about one's personal risk is normal and good for mental health. However, this argument has not gone unchallenged (18).

Some researchers have argued that comparative optimism is not beneficial to mental health (19). Regarding health-related behaviors, a common thought is that underestimating one's risks is problematic because it may induce people to engage in risky behavior or to take inadequate health precautions (13, 20, 21). Most health behaviour models are saying that people must perceive that they are personally vulnerable to a negative event before they take precautionary action (22-25). Several studies of comparative optimism provide evidence consistent with these models. For example, people who believed that they were more likely than the average person to cause an automobile accident were more likely to report intentions to take precautions when driving and to make use of public transportation (26, 27). Conversely, Burger & Burns (28) found that women who believed their risk of an unwanted pregnancy was less than the risk of others were less likely to use appropriate contraceptive methods. These

findings suggest that comparative optimism may be more than a distortion in judgment. It may place people at an increased risk for negative outcomes.

Some studies of comparative optimism have assessed perceived personal risk in relation to a series of negative outcomes including susceptibility to illness, serious injury in an automobile accident, and alcohol problems (13, 29, 30) and concluded that such optimism occurs in relation to a variety of unrelated potential risks. Other researchers have focused on a single risk, such as developing smoking-related illnesses (31, 32), developing skin cancer from sunbathing (33), contracting AIDS (34), or being involved in a serious automobile accident (35).

Researchers have demonstrated comparative optimism for both positive and negative events (36), the evidence suggests that the effect is stronger for negative events than for positive events (37). Hoorens (37) proposed that comparative optimism can have different consequences depending on whether the event is positive or negative. For positive events, the consequences may more often be feelings of well being and self-esteem; for negative events, the consequences may more often be instrumental behaviour such as engaging in risky behavior or failing to take precautions. The majority of studies examining comparative risk judgments focus exclusively on negative events, perhaps because distortions in judgments for negative events pose greater health problems and, as just noted, thus may be more consequential. Hoorens (37) suggests that comparative optimism for positive versus negative events may arise from different psychological processes, perhaps because negative events often represent a loss of resources whereas positive events represent a gain, and research shows that people view losses and gains quite differently (36).

Comparative optimism is generally assessed by using either comparative (13, 30, 31, 35) or absolute (29, 32, 33) judgments. When using comparative judgments, participants are

typically asked, “Compared with the average person of your age and sex are you more, equally, or less likely to experience x?” where x is a specified outcome. When using absolute judgments, participants are typically asked to make two judgments, where the first judgment is to assess the probability of the average person of the same age and sex experiencing x, and the second judgment is the probability of personally experiencing x. These two ratings are later compared by the researcher, and comparative optimism is deemed to exist if the mean rating for the self is more favourable than the mean rating for the other persons.

Because risk perception may be an important motivator of a number of health-related behaviours, it is important to understand the determinants of perceived risk. Factors associated with perceived risk can be taken into account as valuable information when health professionals plan strategies to change health behaviour of their clients. For example, if women with certain characteristics or those with risk factors for breast cancer do not perceived that they are at high risk, interventions could be designed to alter their perceptions.

However, only a few studies (38-40) have been conducted on factors associated with perceived risk of breast cancer, and the study in which correlates of risk perception were the primary focus and study participants were extracted from general population is rare.

2. OBJECTIVES

The goal of this study is to explore perceived risk of breast cancer among Korean women and to investigate factors associated with perceived risk. In order to achieve the goal, this study was conducted with the following aims.

(1) To measure the perceived risks of breast cancer among Korean women

(2) To explore factors associated with perceived risk of breast cancer

(3) To explore whether the perceived risk is a predictor of prevention behaviour (i.e., intention to get a mammogram)

3. MATERIALS AND METHODS

Participants

A telephone survey using random digit dialing was conducted with an age and region-stratified random sample of women in Korea. A total of 3,630 women were contacted. Eligible women included those who age 40 and over, without a breast cancer diagnosis and able to be contacted by telephone, and forty-two percent of the women contacted were eligible (n= 1,519). Of 1,519, 1,000 women (65.8%) agreed to participate. Trained telephone interviewers contacted these women. Once a woman was deemed age eligible, interviewers provided a brief description of and assessed interest in being in a study. Consenting participants then completed a 21-item questionnaire (Appendix II and III).

Measures

Sociodemographic characteristics

Sociodemographic variables included age, marital status, education, and employment status.

Breast cancer risk factors and screening related variables

Variables included those which comprise the Gail (41) model factors (age, number of first degree relatives with breast cancer, number of previous breast biopsies, age at menarche, and age at first live birth) and other risk factors for breast cancer (42). Nulliparous women were included with the group who were aged 25-29 years at the time of their first live birth, because they share a similar risk profile according to the Gail model (43). In case that respondents didn't remember the exact age at menarche, categorized question ($\leq$ 14 yrs or $\geq$15 yrs) was used for survey instead (44). Screening related variables consist of history of getting a mammogram, intention to get a mammogram, and expected time of getting next mammogram.

Risk perception

Comparative risk perception was assessed using the following measure. “Compared to other women your age, how likely are you to get breast cancer in your lifetime?” 1, very much lower; 2, much lower; 3, about the same; 4, much higher; 5, very much higher). As the number of women who rated their comparative risk as “very much higher” was too small (0.2%), “much higher” and “very much higher” were merged into category “much/very much higher.”

Data Analysis

Bivariate comparisons were tested for statistical significance with Chi-square statistics to examine the association between demographic and breast cancer risk factors and the perceived risk of breast cancer. Multivariate proportional odds model was used to explore factors associated with the perceived risk of breast cancer. Chi-square test and multivariate proportional odds model were conducted to explore the association between perceived risk of breast cancer and intention to get a mammogram. Variables significant at $p<0.1$ in the bivariate analysis were entered into the model. All analyses were conducted using SPSS 11.0 statistical software (SPSS Inc., Chicago, IL).

4. RESULTS

4-1. Characteristics of Study Participants

Demographic characteristics

Ages ranged from 40 to 69, with a median of 49 years (Table 1). About 92 % were currently married and about 80% of the sample was women with up to a high school education (65 %). One-third of the sample was employed.

Breast cancer risk factors and screening related variables

Eighteen percent had a first full-term pregnancy after age 30 yr, and 52% had menarche before age 16 (Table 1). Sixteen percent had undergone a breast biopsy one or more times for benign conditions. Only three percent had one or more first degree relative with breast cancer. Fifty-eight percent didn't eat at least 3 servings of vegetables a day, and 6 % had more than one drink a day. The percentage of women who have less than 2 children was 14%, and 34% went through menopause at the age of 55 or older. Less than 1% of the women were taking birth control pills, and 10% had haven benign breast disease such as cysts, fibroadenomas, and hyperplasia. According to the classification of body mass index (BMI)

categories for Asia proposed by International Obesity Task Force (IOTF) (45), 20.3% were obese (BMI≥ 25).

Twenty-five percent never got a mammogram. Among those who have an experience of getting a mammogram, 44% got a mammogram within the past year, and 17% more than 2 years ago. Seventy-eight percent of the study participants have intention to get a mammogram in the future. Of those women, sixty-six percent of women intended to get a mammogram in a year, and 30% between one and two years.

Table 1. Demographic characteristics, breast cancer risk factors, and screening related variables of study population (N=1,000)

Variables	n (%)
Age (yr)	
40-49	521 (52.1)
50-59	297 (29.7)
60+	182 (18.2)
Marital status	
Never married	10 (1.0)
Married	918 (91.8)
Divorced/separated	18 (1.8)
Widowed	54 (5.4)
Education	
≤ Middle school	349 (34.9)
High school	440 (44.0)
College	193 (19.3)
Graduate school	18 (1.8)
Employment status	
Not employed	723 (72.3)
Employed	277 (27.7)
History of a previous live birth	
Yes	971 (97.1)
No	29 (29.0)
Age at first live birth (yr)	
14-19	11 (1.2)
20-24	241 (24.8)
25-29	543 (55.9)
≥ 30	176 (18.1)
Age at menarche (yr)	
≤ 14	526 (52.6)
≥ 15	474 (47.4)
No. of breast biopsies	
0	841 (84.1)
1	98 (9.8)
≥ 2	61 (6.1)
No. of first degree relatives with breast cancer	
0	971 (97.1)
≥ 1	29 (2.9)

(To be continued)

Table 1. Demographic characteristics, breast cancer risk factors, and screening related variables of study population

Variables	n (%)
Vegetable consumption (serving / day)	
≤ 2	578 (57.8)
≥ 3	422 (42.2)
Alcohol consumption (drink / day)	
≤ 1	940 (94.0)
≥ 2	60 (6.0)
No. of birth	
≤ 1	139 (13.9)
≥ 2	861 (86.1)
Menopause	
Yes	413 (81.8)
No	587 (18.2)
Age at menopause (yr)	
≤ 54	338 (92.5)
≥ 55	75 (7.5)
Current use of birth control pills	
No	994 (99.4)
Yes	6 (0.6)
History of benign breast disease	
No	901 (90.1)
Yes	99 (9.9)
Obesity	
Non-Obese (BMI < 25)	797 (79.7)
Obese (BMI ≥ 25)	203 (20.3)
History of getting a mammogram	
(Time since previous mammography, yr)	
No history	246 (24.6)
< 1	437 (43.7)
1-2	151 (15.1)
> 2	166 (16.6)
Intention to get a mammogram	
No	217 (21.7)
Yes	783 (78.3)
Expected time of the next mammography (yr)	
< 1	514 (65.6)
1-2	237 (30.3)
>2	32 (4.1)

4-2. Perceived Risk of Breast Cancer

About 69% of women thought that their chances of getting breast cancer were lower than other women of their age. 22.1% thought it was about the same, and 8.5% thought their risk was higher (Figure 1).

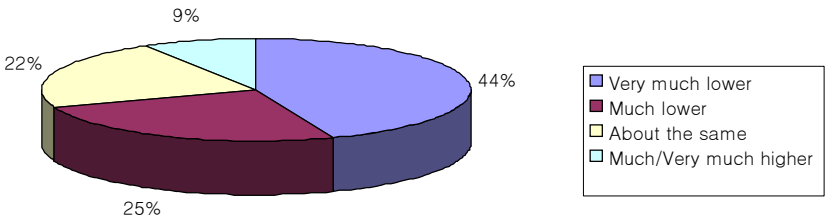

Figure 1. Perceived comparative risk of breast cancer

4-3. Factors Associated with the Perceived Comparative Risk of Breast Cancer

Age was inversely associated with perceived comparative risk (Table 2); women aged 40 to 49 years were more likely than women aged 50 years and older to perceive their risk of getting breast cancer as high. Although not statistically significant (p=0.051), women who have never married were more likely than women with other marital status to perceive their risk as high.

Women with graduate education were more likely than women with lower level of education to perceive their risk as high. Employment status, age at first live birth, age at menarche, number of breast biopsies, vegetable consumption, alcohol consumption, number of birth, age at menopause, current use of birth control pills, and obesity showed no association with perceived comparative risk.

Women who had a family history of breast cancer, those who had a history of benign breast disease, and those who got a mammogram within the past year were more likely to perceive their risk as high.

Table 2. Perceived comparative risk of breast cancer by demographic and breast cancer risk factors (%)

Variables	Perceived comparative risk				P Value
	Very much lower n = 441	Much lower n = 253	About the same n = 221	Much/Very much higher n = 85	
All respondents	44.1	25.3	22.1	8.5	
Age (yr)					
40-49	39.5	23.6	25.7	11.2	
50-59	44.1	29.0	19.2	7.7	
60+	57.1	24.2	16.5	2.2	0.000
Marital status					
Never married	60.0	20.0	0.0	20.0	
Married	42.6	26.3	22.4	8.7	
Divorced/separated	72.2	11.1	16.7	0.0	
Widowed	57.4	14.8	22.2	5.6	0.051
Education					
≤ Middle school	47.0	26.7	18.8	7.5	
High school	46.4	24.7	20.0	8.9	
College	33.7	25.9	32.6	7.8	
Graduate school	44.4	5.6	27.8	22.2	0.002
Employment status					
Not employed	44.4	26.6	20.1	9.0	
Employed	43.3	22.0	27.4	7.2	0.061
Age at first live birth (yr)					
14-19	54.5	27.3	9.1	9.1	
20-24	45.2	27.0	21.2	6.6	
25-29 + nulliparous	44.1	24.0	23.1	8.8	
≥ 30	42.0	27.3	21.0	9.7	0.902
Age at menarche (yr)					
≤ 14	40.9	25.5	24.9	8.7	
≥ 15	47.7	25.1	19.0	8.2	0.084

(To be continued)

Table 2. Perceived comparative risk of breast cancer by demographic and breast cancer risk factors (%)

Variables	Perceived comparative risk				P Value
	Very much lower n = 441	Much lower n = 253	About the same n = 221	Much/Very much higher n = 85	
No. of breast biopsies					
0	45.7	25.1	21.2	8.0	
1	35.7	24.5	25.5	14.3	
≥2	36.1	29.5	27.8	6.6	0.148
No. of first degree relatives with breast cancer					
0	44.8	25.4	22.0	7.8	
≥1	24.1	20.8	24.1	31.0	0.000
Vegetable consumption (serving / day)					
≤2	43.3	25.1	23.8	7.8	
≥3	45.3	25.6	19.6	9.5	0.388
Alcohol consumption (drink / day)					
≤1	44.4	25.6	21.9	8.1	
≥2	40.0	20.0	25.0	15.0	0.224
No. of birth					
≤1	38.9	25.9	22.3	12.9	
≥2	44.9	25.2	22.1	7.8	0.187
Age at menopause (yr)					
≤54 + not menopausal	42.6	25.8	23.1	8.5	
≥55	47.0	24.3	20.1	8.6	0.546
Current use of birth control pills					
No	44.2	25.1	22.1	8.6	
Yes	33.3	50.0	16.7	0.0	0.530
History of benign breast disease					
No	45.8	26.1	21.0	7.1	
Yes	28.3	18.2	32.3	21.2	0.000
Obesity					
Non-Obese	44.4	25.6	21.8	8.2	
Obese	42.9	24.1	23.1	9.9	0.825
History of getting a mammogram (Time since previous mammography, yr)					
No history	43.1	29.3	20.3	7.3	
< 1	43.9	20.8	24.0	11.3	
1-2	42.4	31.8	17.9	7.9	
> 2	47.6	25.3	23.5	3.6	0.021

Multiple proportional odds model was used to identify the independent predictive effects of each of the variables while controlling for the other factors (Table 3). Younger age, having a family history of breast cancer, and having a history of benign breast disease were the factors associated with higher perceived comparative risk of breast cancer.

Table 3. Results of multivariate analysis using proportional odds model for factors associated with perceived comparative risk of breast cancer

Variables		Odds ratio for higher risk perception	Confidence interval
Age (yr)	40-49	2.22	1.50-3.28
	50-59	1.64	1.12-2.40
	60+	1.00	
Marital status	Never married	0.46	0.12-1.77
	Married	0.96	0.55-1.69
	Divorced/separated	0.36	0.11-1.13
	Widowed	1.00	
Education	≤ Middle school	1.49	0.61-3.61
	High school	1.19	0.82-1.72
	College	0.80	0.60-1.08
	Graduate school	1.00	
Employment status	Not employed	1.02	0.78-1.32
	Employed	1.00	
Age at menarche (yr)	≤ 14	1.12	0.87-1.44
	≥ 15	1.00	
No. of first degree relatives with breast cancer	≥ 1	4.01	2.03-7.92
	0	1.00	
History of benign breast disease	Yes	2.64	1.79-3.91
	No	1.00	
Past history of getting a mammogram (Time since previous mammography, yr)	<1	1.02	0.75-1.37
	1-2	1.07	0.73-1.57
	> 2	0.82	0.56-1.19
	No history	1.00	

4-4. Association between the Perceived Risk of Breast Cancer and the Intention to Get a Mammogram

Perceived comparative risk was associated with intention to get a mammogram. Women who had lower perceived comparative risk showed lower intention to get a mammogram (Table 4). This tendency still existed, even after adjusting for other confounding variables (Table 5). Other factors significant in the multivariate analysis include age, marital status, history of benign breast disease, and past history of getting a mammogram. Younger women showed a greater intention to get a mammogram. Being married, history of benign breast disease, and recent history of breast cancer screening using mammography were significant predictors of breast cancer screening in the nearer future.

Table 4. Association between perceived comparative risk of breast cancer and intention to get a mammogram (%)

Variables	Intention to get a mammogram (yr)				P Value
	< 1	1-2	> 2	No intention	
All respondents	51.4	23.7	3.2	21.7	
Age (yr)					
40-49	55.9	24.4	4.6	15.1	
50-59	52.5	26.6	2.4	18.5	
60+	36.8	17.0	0.5	45.7	0.000
Marital status					
Never married	40.0	20.0	10.0	30.0	
Married	52.5	24.7	3.4	19.4	
Divorced/separated	38.9	27.8	0.0	33.3	
Widowed	38.9	5.5	0.0	55.6	0.000
Education					
≤ Middle school	46.4	21.2	2.3	30.1	
High school	52.3	25.2	3.2	19.3	
College	59.6	24.9	4.6	10.9	
Graduate school	38.9	27.8	5.5	27.8	0.000
Employment status					
Not employed	50.8	24.8	2.8	21.6	
Employed	53.1	20.9	4.0	22.0	0.538
Age at first live birth (yr)					
14-19	45.5	18.1	0.0	36.4	
20-24	48.1	22.4	0.8	28.7	
25-29 + nulliparous	52.8	24.0	3.6	19.6	
≥ 30	51.7	25.0	5.1	18.2	0.051
Age at menarche (yr)					
≤ 14	55.3	24.0	3.6	17.1	
≥ 15	47.0	23.4	2.7	26.9	0.002
No. of breast biopsies					
0	49.1	25.2	3.2	22.5	
1	64.3	15.3	2.0	18.4	
≥2	62.3	16.4	4.9	16.4	0.043

(To be continued)

Table 4. Association between perceived comparative risk of breast cancer and intention to get a mammogram (%)

Variables	Intention to get a mammogram (yr)				P Value
	< 1	1-2	> 2	No intention	
No. of first degree relatives with breast cancer					
0	51.1	24.1	3.1	21.7	
≥1	62.1	10.3	6.9	20.7	0.241
Vegetable consumption (serving / day)					
≤2	54.0	21.2	4.0	20.8	
≥3	47.9	27.0	2.1	23.0	0.040
Alcohol consumption (drink / day)					
≤1	51.3	23.7	3.4	21.6	
≥2	53.4	23.3	0.0	23.3	0.538
No. of birth					
≤1	56.1	23.0	5.8	15.1	
≥2	50.6	23.8	2.8	22.8	0.064
Age at menopause (yr)					
≤54 + not menopausal	51.8	24.4	3.2	20.6	
≥55	48.0	14.7	2.6	34.7	0.025
Current use of birth control pills					
No	51.3	23.8	3.1	21.8	
Yes	83.3	0.0	16.7	0.0	0.061
History of benign breast disease					
No	49.1	25.3	3.3	22.3	
Yes	72.7	9.1	2.0	16.2	0.000
Obesity					
Non-Obese	52.1	24.5	3.2	20.2	
Obese	48.8	20.6	3.0	27.6	0.143
History of getting a mammogram (Time since previous mammography, yr)					
No history	35.0	21.5	7.3	36.2	
< 1	58.1	25.4	2.1	14.4	
1-2	64.9	21.9	2.0	11.2	
> 2	45.8	24.1	1.2	28.9	0.000
Perceived comparative risk					
Very much lower	42.4	24.3	1.6	31.7	
Much lower	54.5	24.5	4.0	17.0	
About the same	59.3	24.9	4.5	11.3	
Much/Very much higher	68.2	15.3	5.9	10.6	0.000

Table 5. Results of multivariate analysis using proportional odds model for the factors associated with intention to get a mammogram

Variables		Odds ratio for intention	Confidence interval
Perceived comparative risk	Very much lower	0.44	0.26-0.73
	Much lower	0.74	0.43-1.27
	About the same	0.85	0.49-1.46
	Much/Very much higher	1.00	
Age (yr)	40-49	2.58	1.71-3.92
	50-59	2.06	1.40-3.04
	60+	1.00	
Marital status	Never married	1.15	0.29-4.56
	Married	1.88	1.07-3.32
	Divorced/separated	1.36	0.49-3.79
	Widowed	1.00	
Age at first live birth (yr)	≥ 30	0.94	0.28-3.15
	25-29 + nulliparous	1.05	0.32-3.41
	20-24	1.06	0.33-3.46
	14-19	1.00	
Age at menarche (yr)	≤ 14	1.28	0.98-1.68
	≥ 15	1.00	
No. of breast biopsies	≥ 2	1.31	0.76-2.27
	1	1.13	0.71-1.79
	0	1.00	
Vegetable consumption (serving / day)	≤ 2	1.15	0.89-1.48
	≥ 3	1.00	
No. of birth	≤ 1	1.26	0.85-1.86
	≥ 2	1.00	
Age at menopause (yr)	≥ 55	0.86	0.53-1.40
	≤ 54 + not menopausal	1.00	
Current use of birth control pills	No	3.88	0.46-32.98
	Yes	1.00	
History of benign breast disease	Yes	1.73	1.06-2.84
	No	1.00	
Education	≤ Middle school	0.40	0.16-1.05
	High school	1.28	0.85-1.95
	College	1.09	0.79-1.50
	Graduate school	1.00	
Past history of getting a mammogram (Time since previous mammography, yr)	<1	3.31	2.40-4.56
	1-2	4.70	3.07-7.21
	> 2	1.84	1.25-2.70
	No history	1.00	

5. DISCUSSION

This study showed a significant level of comparative optimism in breast cancer risk perception in Korean women with an average risk of breast cancer. About 70% of the participants perceived their risk of getting breast cancer as lower, compared to other people of their age. Only 9% of the women showed comparative pessimism. In the study conducted in American (46-50), United Kingdom (51-53), Australia (54), and Canada (55), most women considered themselves at average or low risk for breast cancer as compared to other women their age. These finding support earlier research showing that people tend to be generally optimistic when estimating their risks for various hazards (11, 13, 20, 56-59).

It is interesting that the level of comparative optimism varies according to study population. For example, Asian Pacific Islanders were reported to be less likely than white women to overestimate their risk (60). A study conducted among Finnish women (61) reported that 43.8% of the participants perceive their risk of getting breast cancer as lower, and only 5.3% as higher. In a study conducted by Honda et al. (62) that used data from the Sample Adult file of the 2000 National Health Interview Survey (NHIS), about half (52.9%) of adults without cancer diagnosis rated their risk of cancer as low, while 8.7% perceived high.

The difference in the risk perception profile among various countries or peoples could be explained by the Cultural Theory launched by Douglas and Wildavsky (63). There are a few studies on cultural difference in risk perception among countries (64-66). When American and Danish college students were asked about comparative risk for unplanned pregnancy, sexually transmitted disease, and HIV, Americans were much more optimistically biased than

Danes (65). Studies comparing levels of optimism between West and East, represented by North America and Japan, have also found North Americans to display more optimism (64, 66). One study (67) reported that African American women were significantly less likely than white women to report heightened perceptions of personal risk after their relative was diagnosed with breast cancer. Although more studies are needed, the finding on the perceived comparative risk described above indicates that Korean women might have comparative optimism of higher level than women living in some Western countries.

When this study explored the breast cancer risk factors in relation to perceived risk of breast cancer, younger age, having a family history of breast cancer, and having a history of benign breast disease were the factors associated with higher perceived comparative risk of breast cancer.

There are a few studies that addressed the influence of demographic characteristics on perceived risk of breast cancer, and results were not conclusive. While younger age has been reported to be related with higher perceived risk of breast cancer in many studies (40, 67-70), result of this study has different meaning from the results of other studies conducted in many Western countries. Since the incidence of breast cancer in Korea is higher in younger ages (i.e., 40s and 50s) than in older ages, no discrepancy between age and perceived risk was found in this study. However, the accordance between the perception and the age range can not be totally fortunate, because the age range with peak incidence may be shifted toward older ages in the near future. Therefore, follow-up studies for risk perception of each birth cohort would be necessary as a dimension of the monitoring of population health.

In terms of a family history, most studies have shown that having a family history of breast cancer was positively correlated with a higher perceived risk of breast cancer (39, 40, 68, 70-77), consistent with the finding that optimistic biases are less likely to occur if a person

has some personal experience with the hazard (12, 78). The odds ratio for a family history was the highest among other variables those were related with perceived risk of breast cancer in this study. As expected, women who have experienced benign breast cancer ever showed higher perceived risk of breast cancer. This finding is consistent with previous reports (40, 68, 75, 79). There are several reports that showed inconsistent findings (48, 67, 73, 75, 80, 81), but in most studies researchers concluded that women with lesser education were more likely to be either unaware of their risk or overestimate their risk. Even though women with lesser education showed slightly higher perceived risk of breast cancer, there was no statistical significance.

In order to find out whether perceived comparative risk is a predictor of preventive behaviour, this study investigated the association between perceived comparative risk and intention to get a mammogram. The results of this study suggested that women whose perceived comparative risk was lower were more likely to have no intention to get a mammogram. This tendency still existed, even after adjusting for other confounding variables, and was consistent with the results from meta-analyses which shown that stronger perceived risk judgments were associated with higher levels of mammography screening (82, 83). Similarly, increased susceptibility was reported to be predictive of several types of cancer screening (84, 85).

The finding that a limited number of breast cancer risk factors were related to perceived risk of breast cancer is worrying because women who had other risk factors of breast cancer may believe themselves to be at low risk. And it can be suggested that many Korean women do not perceive their risk of getting breast cancer even though they have certain risk factors of breast cancer. Moreover, the breast risk factors found to be associated

with the perceived risk of breast cancer were limited to variables which can be directly perceived as risk by experiencing the events.

The finding of this study suggests that sophisticated risk communication strategies for helping women perceive their risk on the basis of objective risk profile are needed. In one study, 25% of the women were unaware of their increased risk due to family history or other risk factors (86). It is necessary to let women understand the risk factor profile in their past and present life in order that they could avoid either biased optimism or pessimism. Given that the perceived risk of developing breast cancer contributes to woman's preventive behaviour, it is important that health professionals have a deeper understanding of perceived risk. However, there are some problems to solve in reality. Most health professionals have used so-called fear-arousing communication (87), especially in clinical setting. Although fear-arousing communication could get a certain degree of success, a number of studies on fear-arousing communications have shown that messages arousing high levels of fear are less effective in changing attitudes and behaviour than those arousing moderate fear (88). Another problem is health literacy of client, which has already been regarded as big problem since the early report (89). Although huge amount of information on health such as cancer risk factors are provided to clients through mass media, neither the amount nor the exposure rate of provided information can guarantee the effectiveness of health communication. Every kind of information provided should be client-centered through considering the literacy or education level of client especially in a clinical setting. Finally, monitoring of risk perception among women of different birth cohort should be conducted so that strategy to induce women to prevention behaviour can be an interactive and timely one.

The one of the strengths of this study include its representative. Many previous studies were conducted among women who were affected with breast cancer or using a convenient

sample. On the other hand, since the participants in this study used random sampling method, the results could be interpreted as those of women with average risk of breast cancer. Another strength is that this study took into account more risk factors for breast cancer than other studies (50, 60, 62), which explored breast cancer risk factors as a possible predictors of risk perception. Therefore, it was possible to explore wider spectrum of breast cancer risk factor as a predictor of risk perception.

This study has some limitation to be considered. Psychological constructs such as self-esteem and anxiety were not considered in the scheme of this study. That was because psychological aspect was not a concern in this study, and because the amount of items in questionnaire had to be limited in conducting telephone survey while guaranteeing some level of response rate. Therefore, psychological factors were not taken into consideration when the variables were explored to find out factors associated with perceived risk of breast cancer.

In this study, perceived absolute risk using numerical scale from 0 to 100% was also measured to explore whether there is a difference in relationship to the surrogate variables for prevention behaviour between comparative and absolute risk perception (Appendix I). Perceptions of absolute risk were assessed using numerical measures in lifetime ["What do you think your chance is of developing breast cancer in your lifetime? Please choose a number between 0% (no chance of breast cancer) and 100% (definitely will get breast cancer)"]. On a scale from 0 to 100 (0 represents no risk and 100 represents certain development of cancer), participants rated their perceived lifetime breast cancer risks. The mean±standard deviation of the perceived absolute risk of breast cancer was 18.5±20.6 (%). When the level of risk was transformed into categorical (order) variable according to quartile values, about thirty-eight

percent of the participants fell into the first quartile, in which all cases have the value of 0. The fourth quartile, which has the range, mean and standard deviation of values 35 to 100%, 50.7±9.6, had the second largest number of the participants (23.3%). The range, mean and standard deviation were 13 to 30%, 24.6±5.3, 0.1 to 10% and 8.5±2.7 in the third and second quartile, respectively.

Like perceived comparative risk, Korean women who participated in this study showed more optimistic absolute risk perception of breast cancer than Western women. In a Canadian study (90), perceived absolute risk of breast cancer was 27.8 to 32.3%. Another intervention study (91) showed that the mean risk perception at baseline was 40.3% for control participants and 39.4% for intervention participants. Unlike the perceived comparative risk, these differences seem to be due to the fact that the incidence of breast caner is low compared with most Western countries. Therefore, the lower perceived absolute risk of breast cancer found in this study can be thought to be natural.

This study showed that perceived absolute risk was not associated with intention to get a mammogram. This result might be explained by the fact that lay people have great difficulty understanding and assessing probabilities of risk and risk-related information when that information was presented to them in a quantitative, numerical format (92, 93).

6. CONCLUSION

This study showed a significant level of comparative optimism in breast cancer risk perception in Korean women with an average risk of breast cancer. And specifically, Korean women might have comparative optimism of higher level than women living in other countries.

Younger age, having a family history of breast cancer, and having a history of benign breast disease were the factors associated with higher perceived comparative risk of breast cancer, indicating that a limited number of breast cancer risk factors were related to perceived risk of breast cancer. The breast risk factors found to be associated with the perceived risk of breast cancer were limited to variables which can be directly perceived as risk by experiencing the events. It seems that many Korean women do not perceive their risk of getting breast cancer even though they have certain risk factors of breast cancer.

Perceived comparative risk of breast cancer was associated with intention to get a mammogram. Women who had lower perceived comparative risk showed lower intention to get a mammogram, and exemplified the harmful effect of optimistic bias.

APPENDIX I. Perceived Absolute Risk

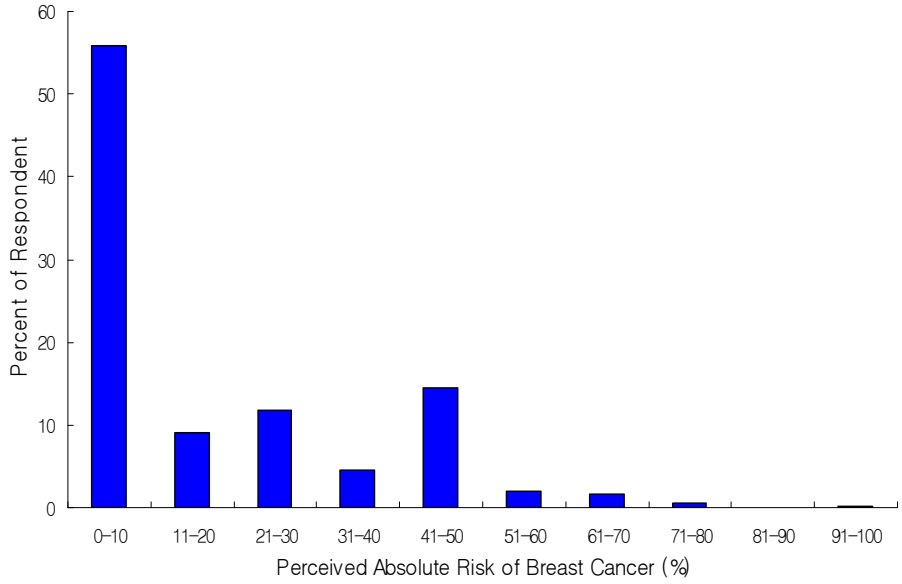

Figure 2. Perceived absolute risk of breast cancer

Table 6. Association between perceived absolute risk of breast cancer and intention to get a mammogram (%)

		Intention to get a mammogram (yr)				P Value
		< 1	1-2	> 2	No intention	
Perceived absolute risk (quartile)	0	48.9	22.6	2.7	25.8	0.277
	0.1-10	48.9	25.3	2.7	23.1	
	13-30	57.4	23.4	3.3	15.8	
	35-100	51.9	24.5	4.3	19.3	

APPENDIX II. Questionnaire

1. What is your age?
2. Have you ever had breast cancer?

   a. Yes

   b. No
3. What is your height?
4. What is your weight?
5. Do you eat 3 or more servings of vegetables except kimchi a day? 1 serving is about 1 cup of raw leafy greens or ½ cup of other vegetables, raw or cooked.

Example:	
2 large stalks of celery	1 dish boiled spinach
1 large sweet potato	1 medium potato
2 medium carrots	5 broccoli florets

   a. Yes

   b. No
6. How many servings of alcohol do you have on a typical day? One serving is a can of beer, a glass of wine or a shot of hard liquor (e.g., soju).

   a. Yes

   b. No

7. What is your marital status?

   a. Never married

   b. Married

   c. Divorced/separated

   d. Widowed

8. How many children have you given birth to?

9. What was your age at the time of the first live birth of a child?

10. Compared to other women your age, how likely are you to get breast cancer in your lifetime?

    a. Very much lower

    b. Much lower

    c. About the same

    d. Much higher

    e. Very much higher

11. What do you think your chance is of developing breast cancer in your lifetime? Please choose a number between 0% (no chance of breast cancer) and 100%.

12. How many of the woman's first-degree relatives - mother, sisters, daughters have had breast cancer?

13. Have you ever had benign breast disease?

    Benign breast disease is a large group of noncancerous conditions of the breast that includes cysts, fibroadenomas, and hyperplasia.

14. Has the woman ever had a breast biopsy?

a. Yes

b. No

15. What was the woman's age at time of her first menstrual period?

If you don’t remember the exact age, please choose among the following categories.

a. ≤ 14

b. ≥ 15

16. Are you menopausal?

a. Yes. I became menopausal before the age of 55

b. Yes. I became menopausal at the age of 55 or older

c. No

17. Are you currently taking birth control pills?

a. Yes

b. No

18. Have you ever had a mammogram?

a. No

b. Yes. I had a mammogram within the past year

c. Yes. I had a mammogram between one and two years ago

d. Yes. I had a mammogram more than two years ago

19. Do you plan to have a mammogram in the future?

a. Yes (if so, when?)

b. No

20. Do you have a job or a business (except housewife)?

    a. Yes

    b. No

21. What is your education level?

    a. Graduate school

    b. College

    c. High school

    d. Less than high school

APPENDIX III. Questionnaire in Korean

1. 귀하는 몇 년도에 태어나셨습니까? 년

2. 귀하께서는 현재 유방암에 있거나 걸리신 적이 있습니까?

① 있다 (→ 조사 중단) ② 없다

3. 키와 몸무게가 어떻게 되십니까?

키 cm 몸무게 kg

4. 김치를 제외하고 하루 3 번이상 채소류를 드십니까? 단, 한 번 드실 때의 양은 일정 수준 이상이 되어야 합니다. 예를 들어보면 다음과 같습니다

- 샐러리 : 큰 것 2 개
- 삶은 시금치 나물 : 작은 접시로 하나
- 고구마 : 큰 것 1 개
- 감자 : 중간 크기 1 개
- 당근 : 중간 크기 2 개
- 브로컬리 : 5 개

① 아니오 ② 예

5. 하루 한 잔 이상의 술을 드십니까?

(☞ 한 잔이란? : 맥주 1 캔, 와인 1 잔, 양주나 소주 1 잔)

① 예 ② 아니오

6. 귀하는 결혼을 하셨습니까?

① 네 ② 아니오

7. 귀하는 결혼을 하셨습니까?

① 동거혼 ② 이혼 또는 별거 ③ 사별

8. 아이를 낳으신 적이 있으십니까?

① 있다 (그렇다면, 몇 명을 낳으셨습니까? 명)

② 없다

9. 첫 아이를 몇 살 때 낳으셨습니까? 세

10. 귀하와 같은 연령의 여성과 비교해서 귀하께서 유방암에 걸릴 확률이 어느 정도 된다고 생각하십니까?

① 매우 낮음 ② 다소 낮음 ③ 비슷함 ④ 다소 높음 ⑤ 매우 높음

11. 그렇다면, 귀하께서는 언젠가 유방암에 걸릴 확률은 몇 %나 된다고 생각하십니까? % (0-100%)

12. 어머니, 자매, 딸 중에 유방암 환자가 있으십니까? (돌아가신 분 포함)

① 있다 ② 없다

13. 예전에 유방에 악성 종양이 아닌 양성 종양이 생긴 적이 있습니까?

(양성 종양이란 악성종양인 암이 아닌 기타 물혹, 덩어리 등을 말합니다)

① 예 ② 아니오

14. 이전에 유방에 조직검사를 받아보신 적이 있습니까?

① 있다 (횟수 : 번) ② 없다

15. 월경을 몇 살 때 시작하셨습니까? (초경연령) 세

(→정확한 연령을 모를 경우) ① 16 세 미만 ② 16 세 이후 중 택일

16. 현재 월경이 있으신 상태이십니까? (폐경여부)

① 56 세가 되기 전 폐경되었음

② 56 세 이후 폐경되었음

③ 아직 월경이 있음

17. 현재 피임약을 복용하고 계십니까?

① 예 ② 아니오

18. 유방 단순촬영술을 받으신 것이 언제입니까? 유방 단순촬영술이란 유방암 검진을 위해 유방을 납작하게 누른 상황에서 엑스선으로 촬영하는 것을 말합니다.

① 받은 적 없음 ② 1 년 이내 ③ 1 년에서 2 년 사이 ④ 2 년보다 오래 전에

19. 향후 유방암 검진을 받을 의향이 있으십니까?

① 있다 (년 내에 받겠다) ② 없다

20. 귀하께서는 직장 즉, 정규직, 비 정규직 또는 아르바이트 등을 수입을 목적으로 일을 하고 있습니까?

① 있다 ② 없다 (전업주부 포함)

21. 귀하의 학력은 어떻게 됩니까?

① 대학원 이상 ② 대졸 ③ 고졸 ④ 고졸 이하

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ABSTRACT IN KOREAN

위험에 대한 인식은 건강과 관련한 많은 행태에 있어 중요한 영향을 주며, 특히 상대적 낙관론이라고도 하는 비현실적인 낙관적 인식은 유방 촬영술을 통한 유방암 검진과 같은 예방적 건강 행태에 있어 저해요인으로 작용한다. 그러므로, 건강과 관련한 개인의 행태를 바람직한 방향으로 바꾸기 위해서는 위험에 대한 인식 및 관련 요인을 이해하는 것이 매우 중요하다. 그러나 유방암 위험 인식 및 관련요인에 대한 많지 않으며 선행연구의 경우 일반인구집단을 대상으로 한 경우가 드물어 연구의 제한점으로 지적되어 왔다. 본 연구는 일반 인구집단을 대상으로 한국 여성의 유방암 위험 인식 및 관련요인을 구명하기 위하여 시행되었다.

본 연구에서는 무작위 전화 걸기 방법을 이용하여 연구 대상자를 모집하여 총 1,000 명의 여성에게 설문조사를 실시하였다. 응답자의 약 69%가 동일한 연령의 다른 여성에 비하여 유방암에 걸릴 위험이 낮다고 응답하여 상당한 수준의 상대적 낙관론을 보였으며 22.1%는 같다, 8.5%는 위험이 더 높다고 응답하였다. 단변량 분석에서는 연령이 높을수록 낮은 상대적 위험인식을 보였으며 학력이 높을수록 높은 상대적 위험인식을 보였다. 또한, 유방암 가족력, 양성 유방 질환력이 있는 경우와 지난 1 년 이내에 유방촬영술을 받은 경우 높은 상대적 위험인식을 보였다. 반면 결혼상태, 직업유무, 첫 출산시 연령, 초경연령, 유방 생검 횟수, 채소 식이, 음주, 출산 횟수, 폐경 여부, 피임약 복용여부, 비만 등은 상대적 위험인식과 유의한 관련성을 보이지 않았다. 다변량 분석에서는 보다 젊은 연령, 유방암 가족력, 양성 유방 질환력이 보다 높은

위험인식과 유의한 관련성이 있었다. 유방암에 대한 상대적 위험인식은 유방촬영술에 대한 의도와 유의한 관련성을 보였다. 낮은 상대적 위험인식을 보이는 여성은 유방촬영술에 대한 의도가 더 낮았다. 유방촬영술에 대한 의도와 유의한 연관성이 있었던 기타 요인으로는 연령, 결혼상태, 양성 유방 질환력, 과거 유방촬영술의 경험이 있었다.

본 연구에서 많은 유방암 위험 요인들 중 매우 일부만이 유방암 위험 인식과 유의한 관련성을 보인 것은, 이러한 위험요인을 가진 여성들이 자신의 위험을 상대적으로 저평가 하고 있음을 알 수 있는 것으로 우려되는 결과라 할 수 있다. 여성들이 자신이 가지고 있는 객관적 유방암 위험요인을 이해하고 그에 기반하여 유방암에 대한 자신의 위험을 인식할 수 있도록 도와줄 수 있는 정교하고 세련된 건강 위험 커뮤니케이션 전략이 개발되어야 하겠다.

핵심되는 말 : 위험 인식, 유방암, 유방촬영술, 상대적 낙관론, 커뮤니케이션