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Correlates of misperception of breast cancer risk among Korean-American women

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Abstract

This study investigated the factors associated with misperception of breast cancer risk, including unrealistic optimism and unrealistic pessimism, among Korean-American women (KAW). Baseline data were collected between March 2010 and October 2011 from 421 KAW aged 40–65 years who participated in a community-based randomized intervention trial designed to promote breast and cervical cancer screening. Multivariate multinomial regression was performed to identify correlates of misperception of breast cancer risk among KAW. A total of 210 KAW (49.9%) had breast cancer risk perception consistent with their objective risk, whereas 50.1% of KAW in the study had some form of misperception of risk. Specifically, 167 participants (39.7%) were unrealistically optimistic about their own breast cancer risk; 44 (10.5%) were unrealistically pessimistic. In multivariate multinomial logistic regression analysis, living with a partner and higher education were significantly associated with higher odds of having unrealistic optimism. High social support was associated with a lower likelihood of having a pessimistic risk perception. Higher worry was associated with a higher likelihood of having unrealistic pessimism. Misperception of breast cancer risk among KAW and related factors must be considered when developing behavioral interventions for this population.

Keywords

behavior; breast cancer; uterine cancer; Asian; mammography; psychosocial

INTRODUCTION

While breast cancer incidence rates among Asian women tend to be low (age-adjusted incidence rates 92 per 100,000 vs. 127 for white women) (National Cancer Institute's Surveillance, Epidemiology, and End Results Program 2014), the rates seem to be increasing at a much higher speed for subgroups of Asian women. For example, using population-based cancer registry data from 1972 to 2007, Liu et al. (2012) found that the average annual percent increase of invasive breast cancer incidence was highest for Korean American women (KAW) (5.4%) than for any other ethnic groups included in the analysis. In contrast, the authors noted that the age-adjusted incidence rates for Hispanic women remained

unchanged since the late 1980s, and starting in 2000, non-Hispanic whites experienced a decline of breast cancer risk (annual percent change of -2.1%). Blacks also had a slight decrease in age-adjusted incidence rates of breast cancer (annual percent change of -0.7) (Liu et al., 2012).

Screening for breast cancer with mammography has long been considered to reduce the risk of dying from the disease (Smith. et al., 2009). Regular mammograms are recommended for women 40 years of age and older (National Cancer Society 2014). Nevertheless, Asian women in the United States are less likely to be screened for breast cancer than White women (American Cancer Society 2013). For example, in a population-based prospective cohort study of more than 1 million women, Smith-Bindman et al. (2006) found that Asian women were 1.4 times as likely as White women to have been inadequately screened for mammography (Smith-Bindman et al., 2006). Of all Asian women, screening rates were lower for KAW than for other Asian subgroups. For example, the proportion of never screened for mammography was higher among KAW (30.23%) than among Chinese (20.10%) or Vietnamese women (28.36%) (Ma et al., 2009). Lower screening rates for breast cancer among KAW—despite their having the steepest increase in breast cancer incidence rates—warrant further investigation as to why some KAW undergo a mammogram while others do not.

Perceived risk is a judgment about the probability that the health issue will be experienced (Kinsinger, McGregor, & Bowen 2009). A few popular models of health behavior (Health Belief Model [Rosenstock 1974], Protection Motivation Theory [Rogers 1975], and Theory of Planned Behavior [Ajzen 1985]) include perceived risk as one of the main determinants of health behavior. According to these models, perceived risk determines health protective behavior as the motivational power in combination with belief in the efficacy of the protective behavior. Indeed, perceived risk has been associated with a number of preventive behaviors, such as cancer screening (Katapodi et al., 2004). Women who believe that they have a higher risk of developing breast cancer are more willing to undergo mammography regularly (Ham 2006; Lee, Kim, & Han 2009). However, these studies only addressed subjective risk, regardless of the woman's objective breast cancer risk; it is unclear whether women who have a higher objective breast cancer risk accurately perceive their risk (Fagerlin, Zikmund-Fisher, & Ubel 2005).

When evaluating their own health risks, women can under- or overestimate their breast cancer risk. The discrepancy between personal risk perception and objective breast cancer risk is referred to as unrealistic optimism (UO) and unrealistic pessimism (UP), respectively (Katapodi et al. 2010; Waters et al. 2011). UO is defined as inaccurate thinking such that individuals claim that they are less likely than others to be affected by a particular problem (Weinert 1987). UO is an important public health issue because it can hinder efforts to promote risk-reducing behaviors (Weinstein 1989). If women with a higher objective breast cancer risk relative to average women subjectively underestimate their own risk, they are unlikely to comply with the associated medical recommendations, and thus any potential abnormality may not be detected sufficiently early (Katapodi et al. 2009).

On the other hand, UP is the state in which women subjectively overestimate their absolute risk of breast cancer relative to the average risk. In particular, women with a family history of breast cancer may experience excessive anxiety about their higher risk of developing the disease (Wellisch et al. 2013). UP may be beneficial if women respond productively to this anxiety (Norem & Cantor 1986); however, women who perceive a higher personal risk may examine themselves excessively (Brain et al. 1999) or may not associated with adherence of breast cancer screening (Waker et al., 2014).

Identifying correlates of misperception of risk can help to understand why some people choose to adopt a certain preventive health behavior while others do not; however, the literature is mixed in terms of factors associated with misperception of risk. For example, while one study found that older women were less likely to have UO (Katapodi et al. 2004), another study (Weinstein 1987) found that age was not a significant factor. Katapodi et al. (2004) reported that women with higher education were more likely to have UP; however, in Davids et al. (2004) study, less educated women had a greater tendency to have UP. A number of psychological variables were also studied in relation to misperception of risk which are also main determinants of health behavior in the health behavior models. For example, higher breast cancer knowledge, lower social support, or having fear (or anxiety) about cancer were all related to a less optimistic risk perception or UP (Facione 2002; Lipkus et al. 2000). In contrast, self-efficacy was positively associated with optimism (Karademas, Kafetsios, & Sideridis 2007).

Despite its significance in explaining breast cancer screening behavior, to the best of our knowledge, no systematic investigation has been conducted to examine the correlates of misperception of risk among Asian women. We found one recent study in which factors related to misperception of risk were examined using a nationally representative sample of 14,426 women (Waters et al. 2011); however, the majority of the study sample (>70%) were non-Hispanic White, nor was any subgroup analysis performed that targeted Asian women. Furthermore, potential correlates pertinent to ethnic minority women with a high proportion of immigrants, such as acculturation, were not explored. The purpose of the present study was to determine the correlates of breast cancer risk misperception among KAW, one of the fastest growing Asian subpopulations in the United States (Hoeffel et al. 2012). Especially, psychosocial characteristics, such as breast cancer knowledge, social support, self-efficacy, worry, will be investigated the functions of control or pump up misperception of breast cancer risk.

METHODS

Participants and Procedures

We used baseline data obtained from KAW who participated in a cluster-randomized community-based intervention study: Better Breast and Cervical Cancer Control for Korean American Women. The study was designed to promote breast and cervical cancer screening among KAW by providing a multifaceted intervention that consisted of a two-hour health literacy education followed by phone counseling and navigation assistance for six months. All of the intervention components were delivered by trained community health workers (CHWs) recruited from ethnic churches in the Baltimore-Washington Metropolitan Area. We

chose the churches based on the size of the congregation (100+) to ensure an adequate number of potentially eligible women. The study protocol was approved by the Johns Hopkins Institutional Review Board.

A total of 29 CHWs from 23 ethnic churches were trained to recruit KAW to participate in a six-month trial and deliver the study intervention. CHWs received training according to their church intervention group assignment (i.e., immediate intervention vs. wait-list control). CHWs in the intervention group received a three-day training; CHWs in the control group received a one-day training. Trained CHWs then used a variety of methods to advertise the study and recruit participants, such as postings on church bulletin boards or sending out newsletters to church membership, phone contacts using church membership lists, or verbal persuasion at varying venues (e.g., lunch meetings in and outside of the church). The following inclusion criteria were used: (1) self-identified as KAW, (2) 21–65 years of age for both type of screening (40 years and older for breast cancer screening), (3) had not had a mammogram or Pap test within the last 24 months, and (4) able to read and write Korean or English. A total of 680 women were initially approached, 651 of whom were eligible. The majority of those eligible ($N = 560$) agreed to participate in the study, with a response rate of 86%.

Once eligible women were identified, trained bilingual research assistants (RAs), in consultation with the CHWs, made a visit to each participating church to obtain informed consents and collect data. A total of 560 eligible women enrolled in the trial (intervention, $n = 278$; control, $n = 282$) completed the study survey at baseline between March 2010 and October 2011. Every participant provided written informed consent before data collection began. Study questionnaires were administered by trained RAs only to address the potential problem of social desirability that might develop from the relationship between CHWs and the women. For the purpose of the current analysis, we selected eligible KAW for breast cancer study, 40 years of age or older ($N = 423$) from the baseline sample. After excluding two women with incomplete responses, 421 KAW remained in the final analysis.

Sample size calculation

The general rule for sample size calculation to use multinomial logistic regression is a minimum ratio of 10 cases (number of study subjects) to each independent variable, with a minimum sample size of 100 to 50 (Peng, Lee, & Ingersoll 2002). We had eight independent variables included in the multivariate models. The ratio of our sample size to the number of independent variables was 52.6 to 1, which was greater than the minimum ratio required.

Measures

The baseline survey included questions about demographic and medical characteristics, worry about breast cancer, perceived susceptibility, and several established instruments measuring breast cancer knowledge (McCance et al., 1990), social support (Weinert 1987), and self-efficacy (Allen et al., 1998). Every study instrument, including the study questionnaire, was made available in Korean. When the Korean version was not available (Self-Efficacy), the original English version was translated into Korean and then back-

translated into English. We used an expert panel to confirm content validity of the translated version.

Misperception with respect to breast cancer risk—Subjective breast cancer risk was measured using the question, “My chances of getting breast cancer in the next few years are high.” The answers were categorized with 5 items (1 = strongly disagree; 5 = strongly agree). We categorized KAW into three groups based on the responses: low perceived risk (strongly agree and agree), mid-level perceived risk (kind of), and high perceived risk (strongly disagree and disagree).

Objective breast cancer risk was estimated using the Gail model (Gail et al., 1989). With this model, breast cancer risk can be calculated using the following known risk factors for breast cancer: age, race, age of menarche, age at first live birth, number of first-degree relatives with breast cancer, and history of breast biopsies and atypical hyperplasia. We used the National Cancer Institute’s Breast Cancer Risk Assessment tool (<http://www.cancer.gov/bcrisktool/>)—a web calculator based on the Gail model—to calculate each participant’s 5-year objective breast cancer risk in comparison to the average breast cancer risk for women of the same age in the same racial/ethnic category. Using this website, each participant’s objective risk was calculated. KAW whose breast cancer risk was higher than the average for other Asian-American women of the same age were assigned to the ‘above average’ risk group; those with average risk, were assigned to the ‘average’ risk group, and those whose risk was lower than the average risk, were assigned to the ‘below average’ risk group. Due to the information we collected, we used the history of breast disease, such as benign tumor or inflammation, in place of a history of breast biopsies. The median value of the KAW’s 5-year breast cancer risk was 0.5%.

To group participants according to their misperception of their breast cancer risk, their subjective and objective breast cancer risks were compared. Specifically, those who perceived their breast cancer risk as being high or medium but who had an objective breast cancer risk ‘below the average’ were categorized as UP. If the women’s objective breast cancer risk was ‘above the average’, but they felt that their risk was low or medium, this misperception was categorized as UO. If the level of subjective and objective breast cancer risk was consistent, these were categorized as congruent.

Demographic variables—A demographic questionnaire was created to establish the participants’ age, marital status, educational level, and length of stay in the US. The cohort was divided into three groups according to age and length of stay in the US, with 10-year intervals. Marital status (living with partner vs. living without partner) and educational level (high school graduate or lower vs. some college or more) were divided into two categories each.

Breast cancer knowledge—Breast cancer knowledge was measured by the Breast Cancer Knowledge (BCK) Test (McCance et al., 1990). Knowledge scores were calculated by counting the number of items with correct responses. A sample item is: “A woman who regularly feels her breasts is doing one of the most effective methods of breast cancer detection.” The instrument was translated into Korean and used for the KAW (Lee, Kim, &

Han 2009). Scores can range from 0 to 18, with higher scores indicating more knowledge. The internal consistency coefficient of the BCK was 0.88 in this sample. Participants were divided into two groups according to the median score of BCK: a low score (≤ 8) was categorized as 'low knowledge', and a score of ≥ 9 as 'high knowledge.'

Social support—The Personal Resource Questionnaire (PRQ) 85-Part 2 was used to measure social support. The PRQ 85-Part 2 is a 25-item, 7-point (1 = strongly disagree; 7 = strongly agree) Likert-type questionnaire designed to measure perceived social support (Weinert 1987). A sample question from this questionnaire is: "There is someone I feel close to who makes me feel secure." The Korean version of the PRQ 85-Part 2 has been validated (Han, Kim, & Weinert 2002) and used in a number of studies (Lee et al., 2010; Li et al., 2011). The scale yielded a Cronbach's alpha of 0.88 in this study. Scores can range from 25 to 175, with higher scores indicating more social support. Individuals with social support scores higher than the median score of 126 were categorized as 'high social support group', and those whose scores were lower than the median score as 'low social support group.'

Self-efficacy—Breast cancer screening self-efficacy was measured by a 4-item, 4-point Likert-type instrument developed for the purpose of this study. The items were modified from an existing questionnaire (Allen et al., 1998). Example questions are: "Do you feel confident that you could get a mammogram every year?" and "Do you feel confident that you can ask your health care provider for a referral to get a mammogram?" Cronbach's alpha was 0.91. Scores can range from 4 to 16, with higher scores indicating higher self-efficacy. Individuals with self-efficacy scores 12 and higher were categorized as 'high self-efficacy group', and those whose scores were lower than 12 as 'low self-efficacy group.'

Worry—Worry about breast cancer was measured with one question for measuring the level of fear (answers scored from 1 to 5, with: 1 = do not worry at all, 2 = worry a little, 3 = worry quite a bit, 4 = worry very much, 5 = worry about it so much that I do not want to have any test). Those who answered '1 = no worry' and '2 = worry a little' were considered as having a lower level of worry.

Data Analysis

We used descriptive statistics such as means, standard deviations, frequencies, and percentages to summarize breast cancer risk categories based on subjective and objective risks. Cross-tabulation tables and chi-square tests of association were used to examine whether any significant relationships were observed between study variables and risk perception categories. Multivariate multinomial logistic regression analyses were then used to investigate factors related to misperception of breast cancer risk, such as UO and UP. Statistical significance was determined at $p < 0.05$. Marital status and education were included in the multivariate model because these variables were significantly associated with breast cancer risk perception categories in chi-square analyses ($p < 0.05$). Although age and length of stay in the US were not significantly associated with misperception of breast cancer risk, they are included in the model because they present important characteristics of KAW. In addition, by comparing any discrepancy in findings between the chi-square test and multinomial logistic regression, we identified retained these variables because they didn't

affect the direction and the level of relationship between other variables and misperception of breast cancer risk. Finally, we tested the goodness-of-fit of the models to determine whether the model fit or not. The p value of Pearson goodness-of-fit was 0.196(>0.05) and this results means that our model adequately fits the data.

RESULTS

More than 4 out of 5 KAW (n = 350, 83.1%) subjectively rated their breast cancer risk as being low, whereas 65 women (15.4%) perceived their risk as being medium, and only 6 (1.4%) perceived their risk as being high (Table 1). Of the 421 KAW in the study, 239 (56.8%) had an objective risk for breast cancer 'below the average' risk for general women, and 104 (24.7%) had an objective risk 'above the average.' Based on their subjective and objective breast cancer risks, about half (n = 210, 49.9%) were determined to have risk perceptions congruent with their objective risk. In contrast, 44 women (10.5%) perceived their risk for breast cancer as unrealistically high (i.e., UP); 167 (39.7%) underestimated their risk (i.e., UO).

Chi-square analyses (Table 2) revealed that marital status, educational level, social support, and worry about breast cancer were significantly associated with risk misperceptions. Specifically, KAW living with a partner were more likely to have UO than those living alone ($\chi^2 = 6.868$, $p = 0.032$). Those who completed at least some college education were more likely than those with high school or less education to have UO ($\chi^2 = 16.983$, $p = 0.001$). Social support was also significantly associated with misperceptions: Those with high social support were less likely to have UP than those with low social support ($\chi^2 = 10.321$, $p = 0.006$). KAW with higher worry were more likely to have UP than those with lower worry scores ($\chi^2 = 6.379$, $p = 0.041$).

We used the congruent risk perception group as the referent group and adjusted ORs for age, marital status, education, length of stay in the US, breast cancer knowledge, social support, self-efficacy, and worry in the final model (Table 3). Both the Pearson and deviance statistics of this model indicated good fit in the goodness-of-fit test. Living with a partner was associated with 2.19 times higher odds (95% confidence interval [CI] = 1.11–4.32) of having UO. Higher education was significantly associated with a higher likelihood of having UO (OR = 2.09, 95% CI = 1.30–3.36). High social support was associated with a lower likelihood of having a pessimistic risk perception, UP (OR = 0.34, 95% CI = 0.16–0.73). Higher worry was associated with a 2.71 times higher likelihood of having UP (95% confidence interval [CI] = 1.16–6.33).

DISCUSSION

We found that about 50% of the KAW in this study had a risk misperception. Of those with misperception of risk, the proportion of KAW with UO was higher than those with UP (39.7% vs. 10.5%). According to community sample studies conducted in the United States, women tend to have more UO than UP, with sub-ethnic group variations. For example, Waters et al. (2011) found that the probability of UP was higher among non-Hispanic blacks than among other races, such as non-Hispanic whites. In contrast, in another study, no ethnic

group difference was observed in misperception of risk between Asian and Caucasian women (Katapodi et al., 2010).

Evidence is inconsistent as to how sociodemographic characteristics, particularly educational level, marital status or age, are associated with breast cancer risk misperception. Our finding of higher education being significantly associated with UO is consistent with that of studies of the general population (Waters et al., 2011), though another study in which sampling occurred in a clinical setting yielded no association (Liu et al., 2010). We were not able to identify any study directly addressing the relationship between marital status and breast cancer misperception of risk. Nevertheless, we speculate that living with a partner might have resulted in higher social support, which then may have led to a more optimistic perception (Kinsinger, McGregor, & Bowen 2009) in the KAW sample. Likewise, according to a meta-analysis (Katapodi et al., 2004), some studies have revealed that older women were more likely to perceive lower risk for developing cancer than were younger women, while other studies failed to find a significant relationship between age and misperception. Although direct comparison is difficult due to different study designs and sampling methods, our finding might have been an artifact of a small number of older women (60+ years) in the study sample due to our sample inclusion criteria. Further research is warranted to investigate these associations with a sufficient number of older women.

Neither breast cancer knowledge nor self-efficacy was associated with misperception of risk. Our findings are inconsistent with earlier studies in which higher breast cancer knowledge and lower self-efficacy were related to a less optimistic perception (Facione 2002; Karademas, Kafetsios, & Sideridis 2007). The literature is limited in addressing the relationship between disease knowledge and perception, yet Weinstein and Klein (1995) stated that disease knowledge alone has little impact on personal risk perception. In the context of self-efficacy, its relationship with misperception of breast cancer risk seems to be explained better by additional pathways. For example, one study found that the relationship between self-efficacy and misperception of risk was moderated by the individual's characteristics (Klein & Helweg-Larsen 2002) such that women with high risk (such as female sex workers visiting a clinic for sexually transmitted diseases) showed a weaker relationship between self-efficacy and UO than low risk samples. Further research is warranted to investigate the relationship between psychological factors and risk misperception by considering these characteristics and additional pathways.

Social support protects women against adverse emotional consequences, such as heightened breast cancer risk perceptions (Kinsinger et al., 2009), or reduces depression and improves quality of life among immigrant women (Lim, Yi, & Zebrack 2008). Indeed, the KAW in our study who had higher levels of social support were less likely to have UP. Higher social support among KAW may have mitigated the effect of heightened risk perception by disseminating information through interactions with social network actors (i.e., clubs, alumni associations, or religious groups). Networks may determine the level of risk perceptions (Kasperson et al., 1988) and an individual's risk perceptions are influenced by the risk perceptions of others in his/her social network (Scherer & Cho 2003). Social networks among Korean-Americans play an important role in their ethnic minority life due to language difficulties. Networking and exchanging information may help KAW balance

their cancer perceptions instead of overestimating breast cancer risk. Kinsinger et al. (2009) found that the relationship between worry and breast cancer risk misperception was stronger among women with lower social support. Future research should explore the mechanisms by which social support plays a role in shaping risk perceptions among KAW and address how best to promote social support to minimize risk misperception in the population.

While worry about breast cancer has been associated with heightened breast cancer risk perception (Katapodi et al., 2004; Lerman & Schwartz 1993; Lipkus et al., 2000), KAW reporting a greater level of worry were more likely to perceive their breast cancer risk pessimistically, higher than their actual risk. According to the curvilinear hypothesis of worry in the context of preventive health behaviors such as breast cancer screening, both very low and very high levels of worry have been associated with lower mammography adherence (Miller, Shoda, & Hurley 1996). To reduce risk misperception and promote preventive health behavior, our findings suggest that emotional support to reduce worry in a supportive environment needs to be considered for KAW. In addition, future research using diverse research methods, such as qualitative interviews, is needed to explore the role of worry and risk misperception in relation to breast cancer screening behavior among KAW.

This study's limitations should be noted. First, the study sample was obtained from participants in an intervention trial designed to promote cancer screening among non-adherent KAW (i.e., those who had not had a mammogram within the last 24 months) who were recruited by convenience sampling. In our sample, the proportion of KAW over 60 years of age was low due to the focus of the parent study on women younger than 65 years of age who would not be eligible for Medicare. While breast cancer incidence increases with age, it is possible that we might have missed the age effect on breast cancer risk perception due to a limited number of older women included in the study sample. Second, the convenience sample from churches in one metropolitan area could have resulted in selection and/or participation biases, potentially making the results less generalizable. Third, potential measurement bias also needs to be noted. For example, some of the study variables were measured by a single-item instrument (worry about breast cancer) or a new instrument developed for the purpose of this study (self-efficacy) instead of using standard instruments, which could have resulted in misclassification of information and/or lack of comparability of results to those of previous studies that have used standard instruments for these measures. In addition, the social support instrument (PRQ-85) measured general social support and not social support in a certain health context, such as cancer screening. Finally, data were all self-reported; thus, bias in recall or social acceptability bias might have occurred in reporting some of the information, such as a history of breast disease, which may have led to under- or overestimation of objective breast cancer risk. Together, these considerations in sampling design and data collection may limit the accuracy and applicability of the findings to the general KAW population. Nonetheless, our study offers useful information in understanding what characteristics may explain KAW's misperception of breast cancer risk. Future interventions should take methodologically address these limitations in assessing breast cancer risk misperceptions and related factors among KAW.

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Table 1Congruence between objective and subjective breast cancer risk categories ($N=421$)

Subjective risk	Objective risk		
	Below average (n = 239) n (%)	Average (n = 78) n (%)	Above average (n = 104) n (%)
Low risk (n = 350)	Congruent	UO	UO
	195 (81.6)	65 (83.3)	90 (86.5)
Mid-risk (n = 65)	UP	Congruent	UO
	40 (16.7)	13 (16.7)	12 (11.5)
High risk (n = 6)	UP	UP	Congruent
	4 (0.2)	0 (0.0)	2 (1.9)

UO, unrealistic optimism; UP, unrealistic pessimism.

Table 2

Characteristics of participants by breast cancer risk perception categories

		Total (N = 421) n (%)	Congruent (n = 210) n (%)	UO (n = 167) n (%)	UP (n = 44) n (%)	χ^2	p
Age	40-49 years	205 (48.7)	88 (41.9)	96 (57.5)	21 (47.7)	9.159	.057
	50-59 years	183 (43.5)	103 (49.0)	60 (35.9)	20 (45.5)		
	60-65 years	33 (7.8)	19 (9.0)	11 (6.6)	3 (6.8)		
Marital status	Living without partner	58 (13.8)	37 (17.6)	14 (8.4)	7 (15.9)	6.868	.032
	Living with partner	363 (86.2)	173 (82.4)	153 (91.6)	37 (84.1)		
Education	High school or less	169 (40.1)	99 (47.1)	47 (28.1)	23 (52.3)	16.983	<.001
	Some college+	252 (59.9)	111 (52.9)	120 (71.9)	21 (47.7)		
	<10 years	102 (24.2)	48 (22.9)	43 (25.7)	11 (25.0)	1.808	.771
Length of stay in the US	10-19 years	140 (33.3)	66 (31.4)	59 (35.3)	15 (34.1)		
	20+ years	179 (42.5)	96 (45.7)	65 (38.9)	18 (40.9)		
Breast cancer knowledge	Low	185 (43.9)	95 (45.2)	67 (40.1)	23 (52.3)	2.373	.305
	High	236 (56.1)	115 (54.8)	100 (59.9)	21 (47.7)		
Social support	Low	223 (53.0)	110 (52.4)	80 (47.9)	33 (75.0)	10.321	.006
	High	198 (47.0)	100 (47.6)	87 (52.1)	11 (25.0)		
Self-efficacy	Low	162 (38.5)	86 (41.0)	62 (37.1)	14 (31.8)	1.497	.473
	High	259 (61.5)	124 (59.0)	105 (62.9)	124 (68.2)		
Worry	Low	366 (86.9)	187 (89.0)	146 (87.4)	33 (75.0)	6.379	.041
	High	55 (13.1)	23 (11.0)	21 (12.6)	11 (25.0)		

UO, unrealistic optimism; UP, unrealistic pessimism.

Table 3Multivariate multinomial logistic regression results for UO and UP ($N = 421$)

	UO			UP		
	OR ^a	95% CI	OR ^a	95% CI	OR ^a	95% CI
Age (years)						
40~49	---	---	---	---	---	---
50~59	0.63	0.33	1.00	0.70	0.32	1.50
60~65	0.72	0.30	1.69	0.60	0.32	1.50
Marital status						
Living without partner	---	---	---	---	---	---
Living with partner	2.19	1.11	4.32	1.36	0.52	3.56
Education						
High school or less	---	---	---	---	---	---
College or more	2.09	1.30	3.36	0.88	0.43	1.82
Length of stay (years) ^b						
Low	1.20	0.86	1.68	1.15	0.66	1.98
Knowledge						
Low	---	---	---	---	---	---
High	1.11	0.71	1.72	0.82	0.41	1.65
Social support						
Low	---	---	---	---	---	---
High	0.93	0.60	1.43	0.34	0.16	0.73
Self-efficacy						
Low	---	---	---	---	---	---
High	1.10	0.71	1.72	1.81	0.87	3.75
Worry						
Low	---	---	---	---	---	---
High	1.16	0.60	2.26	2.71	1.16	6.33

UO, unrealistic optimism; UP, unrealistic pessimism.

OR, odds ratio; 95% CI, 95% confidence interval.

^a Adjusted with all listed variables in the models included; reference category in multinomial logistic regression=Congruent risk perception.^b log transferred.