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Relationships between Decisional Balance and Stage of Adopting Mammography and Pap Testing among Chinese American Women

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Abstract

Background—The Transtheoretical Model has not been applied to explain cancer screening behavior among a large sample of Chinese Americans. This study examines the stage of adopting mammography and Pap testing in relation to women's decisional balance of cancer screening.

Methods—We surveyed a sample of 507 Chinese American women aged 50 and older in the D.C. area in 2003 and 2004. We categorized women into 6 screening stages (pre-contemplation, contemplation, action, relapse, risk of relapse, and maintenance) based on the frequency and regularity of past screening behaviors and future intentions. We measured women's attitudes toward mammography and Pap testing by 22 pro and con statements. Decisional balance was calculated by the mean difference between pro and con scores. Multinomial regression analyses were used to examine the associations between decisional balance and stage of adoption, controlling for sociodemographics, English fluency, and physician and family recommendations.

Results—Maintenance was the largest group among 6 stages (45% for mammography; 44% for Pap testing). Women in the maintenance group had the highest decisional balance scores, indicating more positive attitudes toward screening. Decisional balance was significantly related to stages of adopting mammograms and Pap testing after adjusting for other covariates.

Conclusions—This study demonstrated that Chinese American women's cancer screening behavior was associated with decisional balance, as described in the Transtheoretical Model. Cancer screening messages should be tailored to the needs of women in different stages of adopting mammography and Pap testing.

Keywords

Mammogram; Pap testing; Chinese American Women; Transtheoretical Model; Stage of change; Decisional balance; Cancer screening; Health disparity; Breast cancer; Cervical cancer

Introduction

Breast cancer had the highest incidence rate and third highest mortality rate among Chinese American women in a recent nationwide cancer surveillance report (1). Cervical cancer, although not as prevalent as breast cancer, still affects 193 per 100,000 Chinese American women every year and is the cause of death for 93 per 100,000 Chinese Americans (1). Studies have found that Asian American women have lower screening rates for breast and cervical cancer compared to white women and other ethnic groups (2). The low cervical cancer screening pattern was confirmed among Chinese Americans across various regions and samples (3,4).

Previous research has identified factors explaining the lower cancer screening rates among Chinese American women. Using the PRECEED-PROCEED framework, factors can be summarized as predisposing, reinforcing, and enabling (5). Predisposing factors include lower perceived risk (6), cultural views (7), and attitudes regarding cancer (8). Doctor's recommendations (9) and peer influence were considered reinforcing factors; enabling factors included environmental barriers, such as insurance coverage (10), level of acculturation as indicated by English fluency or years of immigrated (4,7,9), and health care access (11). Although similar to what has been found in general populations, attitudes toward cancer screening may play an important role in Chinese American women's cancer screening behavior; there is a paucity of data on how attitudes differ by stages of screening adoption in this minority population.

The Transtheoretical Model (TTM) has been widely used to examine relationships between attitudes and cancer screening stages. TTM proposes that behavior change is a process that can be categorized into the following stages by people's intention and actual action: pre-contemplation, contemplation, preparation, action, and maintenance (12). Decisional balance, a measure of attitudes, captures how people weigh pros and cons of changing a behavior. Using six stages of adopting cancer screening (pre-contemplation, relapse, relapse risk, contemplation, action, and maintenance), Rakowski et al. applied TTM to mammography and Pap testing (13,14). They found that for mammography, women in pre-contemplation and relapse had the most negative decisional balance scores, while maintenance and action had the most positive scores, indicating a positive attitude toward screening (13). When examining the associations of decisional balance and regularity of mammography and Pap testing, they found that women with regular screenings had the most positive decisional balance scores (14).

TTM has been used to explain cancer screening behavior among a few populations, yet it is seldom used to examine the barriers to cancer screening for Chinese Americans. Several studies examined the TTM on Asian American's mammography screening behaviors, including Cambodian, Korean, and Asian Indians (15,16). In a sample of Asian Indian and Filipino American women, researchers found supporting evidence of TTM constructs applying to mammography adoption (16). They found that decisional balance was associated with stages of adoption after controlling for age, education, barriers, and acculturation levels. Most of the studies applying TTM to cancer screening behavior tested mammography behavior (17). Among the very few studies examining TTM in Pap testing among Asian Americans, Tung et al. (2008) found that women in a maintenance group were more likely to report less perceived barriers and higher perceived benefits in a sample of Vietnamese women (18).

To fill the gap in knowledge, this study examines the stage of adopting mammography and Pap testing in relation to women's decisional balance of cancer screening in a population of Chinese Americans. There were two objectives in this study: (1) To explore the prevalence

of the six stages of changes of adopting mammography and Pap testing cancer screening among Chinese American women; (2) To examine the stage of changes in relation to Chinese American women's decisional balance of mammography and Pap testing. We hypothesized that decisional balance would predict Chinese American women's cancer screening behavior after considering other predisposing, reinforcing, and enabling factors related to cancer screening behaviors.

Methods

Study sample

The study sample of women came from a randomized controlled trial study to improve cancer screening use among Chinese American women in the metropolitan D.C. area. Between 2003 and 2004, we recruited a sample of Chinese American women aged 50 and older from Chinese churches, other Chinese organizations, senior centers, health fairs, and Chinese print media or friend referrals (19). Women were surveyed with a 30-minute computer-assisted telephone interview in languages they felt comfortable using, such as Mandarin, Cantonese, Taiwanese, Fuzhou, or English. After excluding people who had breast or cervical cancer or had cancer screening due to known site-specific health problems (i.e., receiving diagnostic or follow-up screening as opposed to routine screening), the final sample sizes were 483 and 482 for breast and cervical cancer screening analyses, respectively.

Measures

Study measures included stage of adoption as the outcome variable, decisional balance as the main predictor, and sociodemographics, predisposing (cancer worry and perceived susceptibility), reinforcing (physician recommendations and family or friends' encouragement), and enabling factors (English fluency, health insurance and perceived access barriers) as control variables.

Outcome variable: Stage of adoption

We categorized women into 6 stages ranging from pre-contemplation, contemplation, action, relapse, risk of relapse, and maintenance, based on the frequency and regularity of current screening behaviors and future intentions, separated for mammography and Pap testing (Table 2)(20). Frequency of screening was measured by whether participants ever had a mammogram/Pap testing, when their most recent mammogram/Pap testing was, and the interval between the two most recent mammograms/Pap testing. Regular screenings were defined as having had a mammogram/Pap testing in the past two years and another mammogram/Pap testing within two years prior to the most recent test (21). Current screening was defined as having a mammogram/Pap testing in the past two years. We defined women in pre-contemplation stage to be those who never had a mammography/Pap test and had no intention to obtain the screening in the following year. Women in contemplation stage were those who had screening before and had intention to obtain screening in the following year, although they had not been screened in the two years prior to the interview. Women in the action stage were those who had current screening and had intention for the following year, although they had not reported regular screening. Women in the maintenance stage were those who had regular screening and had intention for the following year. Women in both the relapse and relapse risk stages had no future intentions for screening, but those in the relapse stage were overdue for screening and those in the relapse risk stage had current or regular screening at the time of the interview.

Predictor variable: Decisional balance

Pros and cons of mammography and Pap testing were adapted from Rakowski et al. for the Chinese American population (14) (Table 1). Items were answered on a 5-point Likert scale from strongly disagree to strongly agree. To calculate pros and cons scores for mammography, we used both general items and mammography-specific items; we used general items and Pap testing items for Pap testing. Pros and cons scores were first standardized by the group mean and standard deviation. We calculated decisional balance by subtracting the standardized cons score from the standardized pros score. Higher decisional balance score indicated that participants had a more favorable attitude toward cancer screening.

Control variables

Sociodemographics—Sociodemographic variables used in the analysis were dichotomized: age (older than 50 years or not), education (higher than high school or not), and current employment.

Predisposing factors—For predisposing factors, we assessed a few questions to understand women's cancer worry and perceived susceptibility. We assessed cancer worry by asking the women to rate how worried they were that they might get breast cancer or cervical cancer someday (22). The responses were dichotomized into “worried” and “not worried at all.” To measure perceived susceptibility, we asked the women to rate how often they thought about their own chances of getting breast cancer or cervical cancer (22). The responses were dichotomized into low (not at all or rarely) and high (sometimes, often, or a lot).

Reinforcing factors—We included two indicators to control for physician and close network's influence on cancer screening: whether their physician recommended them to have any cancer screening in the past two years, and whether their family, relatives, or friends ever encouraged them to get mammography or Pap testing.

Enabling factors—Women's barriers to medical care were assessed in various aspects, including transportation, ability to get an appointment, lack of time, language and financial problems. Their responses were dichotomized to *yes* (report problem with any of the aspect) and *no* (no problems in all of the aspects). We also asked whether women had insurance coverage (yes vs. no). Women's English fluency was assessed by four items asking them to rate their ability to read, speak, write in English, and understand spoken English on a 5-point scale. A mean score was obtained and used as a continuous variable for the analysis. English fluency was used as an indicator of acculturation level.

Data analysis

Data were analyzed using STATA statistical software version 10.0 (23). Decisional balance score and standard error by six stages are presented in Table 2. To make interpretations more understandable, we grouped participants into three groups: (1) action (stage 3) and maintenance (stage 6), (2) contemplation (stage 2), and (3) pre-contemplation (stage 1), relapse (stage 4), and relapse risk (stage 5). This grouping was based on sample size and characteristics. Some stage groups were too small to be analyzed independently. For example, we only had less than 10% of women categorized into the Action stage and Relapse Risk stage for both mammography and Pap testing. Stage 3 and 6 had similar patterns in sociodemographics and were considered later stages of adoption. We separated stage 2 from stages 1, 4 and 5 because stage 2 reported future intention for cancer screening and may have different decisional balance and characteristics from stages that do not have

future intention. Sample descriptions by stages and overall were generated to describe the frequencies of the variables.

For bivariate analysis, sociodemographics, pro and con scores, and decisional balances were compared between three groups (stage 1, 4, 5 vs. stage 2 vs. stage 3,6) using chi-square and *t* tests. For multivariate analysis, we used multinomial logistic regression to understand how decisional balance was associated with stage of adopting mammography and Pap tests in consideration of other PRECEED and sociodemographic variables. We used stage 3 and 6 together as the reference group to compare separately with stage 1/4/5 and stage 2.

Results

Sociodemographic Characteristics of the Sample

In this sample, even though only about 40% of the women were currently employed, more than three quarters were covered by insurance. The mean age of the participants was 64.5 years (ranged from 49.8 to 89 years of age). About half of the women were 65 years old or older. Women reported high education attainment: about two thirds had college degree or above. About half of the women reported been recommended by their physician for cancer screenings, yet only a quarter of the sample reported being encouraged to have cancer screenings by their friends or families.

Distributions of screening stages and decisional balance scores

For both mammography and Pap testing, most of the sample was categorized in the maintenance stage (45% for mammography; 44% for Pap testing; Table 2). For mammography, the maintenance stage was followed by contemplation (15%), relapse (13%), pre-contemplation (13%), relapse risk (9%), and action (5%) stages. Stage distribution for Pap testing was similar to that of mammography. People in the action and maintenance stages for both screenings had positive decisional balance scores, whereas other stages showed either negative or close to zero decisional balance scores. We found that the women in the maintenance group had the highest scores followed by the action group, and those in the pre-contemplation stage had the lowest scores (Table 2).

Bivariate results

When grouping action and maintenance stages together, some sociodemographic characteristics were found to be significantly associated with the stages in both screenings (Table 4). For both mammography and Pap testing, we found that women in the action and maintenance group were more likely to be younger (<65 years of age), employed, had a higher educational level (college or higher), were covered by insurance, and were more fluent in English ($p < 0.0001$). Decisional balance scores were significantly related to the stages ($p < 0.01$), while the action and maintenance groups favored cancer screening and the other groups had negative or close to zero scores, indicating negative attitudes toward cancer screening.

Multivariate results

For one unit increase of decisional balance score in both mammography and Pap testing, women were about half as likely to be in a pre-contemplation/relapse/relapse risk group than to be in an action/maintenance group (for mammography, odds ratio: 0.49, 95% CI: 0.39–0.60; for Pap testing, odds ratio: 0.44, 95% CI: 0.35–0.55) and 32% (95% CI: 0.54–0.86) and 44% (95% CI: 0.44–0.72), and as likely to be in contemplation stage than to be in an action/maintenance stage for mammography and Pap testing, respectively. We found that in addition to decisional balance score, health insurance, English fluency, doctors

recommendation, and cancer worry still significantly influenced women's being in an action/maintenance group of mammography or in a pre-contemplation/relapse/relapse risk group. However, only health insurance and decisional balance significantly predicted a woman's stage in contemplation group against in the action/maintenance group. In Pap testing, doctor recommendations and cancer worry were no longer significant considering other factors, whereas health insurance and English fluency still came out strong in predicting women's behaviors in the pre-contemplation/relapse/relapse risk group against the action/maintenance group. Decisional balance score was the only significant predicting factor in the regression model to distinguish contemplation group and action/maintenance group.

Discussion

This study was one of the first studies describing the stages of mammography and Pap testing among Chinese American women. This study also demonstrated that Chinese American women's cancer screening behavior was associated with their decisional balance, as described in the Transtheoretical Model, and the patterns of associations were similar between mammography and Pap testing. Higher decisional balance scores were associated with action and maintenance, and these associations were robust after controlling for sociodemographics and other factors from the PRECEDE-PROCEED framework. The predictability of decisional balance on cancer screening across screening types among Chinese American women was present in our sample as other populations in the literature, which also found decisional balance to be a significant factor associated with stages of adopting cancer screening (16,18,24,25).

Comparing our results and those from other Asian American studies, we found that the stage distribution varied by region and ethnic groups. For example, maintenance stage was also the largest group in a sample of high SES and acculturated Filipino and Asian Indian women (16). Other studies examining Asian American's mammography adoption behavior did not find maintenance to be the largest group. Tu et al. (2002) found that in a sample of Cambodian American women, pre-contemplation had the highest percentage, followed by the relapse, maintenance, action, and contemplation group (26). Another study examined ethnic differences in relation to mammography adoption and found that in their sample of 199 Chinese American women, about one third of the sample were in the relapse stage and only a quarter of the sample were in the maintenance stage (24). They found Chinese Americans had higher likelihood to be in the pre-contemplation and relapse stage compared to other ethnicities. For Pap testing, we had almost half of women in the maintenance stage, which was comparable to other studies of Asian Americans (18,27). This variation of distribution of stages could be due to different SES background of sample across studies or could be explained by decisional balance and other factors indicated by our analysis.

Besides the strong influence of decisional balance, our data indicated some factors (such as acculturation and lack of insurance) were associated with mammography and Pap testing as the literature indicated (28). For mammography, decisional balance and insurance were significant for people both at the contemplation stage (stage 2) and people without future intentions (stage 1/4/5). However, cancer worry, physician recommendation, and English fluency were only significant for people without future intentions (stage 1/4/5), suggesting that cancer worry, physician recommendations, and English fluency may play a more important role in women without intentions than those with intentions for future mammography. For those having intentions, improving their attitudes and insurance coverage will likely move them to the action and maintenance group and the program does not necessarily need to involve physicians or be clinic-based. On the other hand, for those having no intentions, language-appropriate information may also be needed to overcome barriers to obtaining health care information, and physician recommendations are especially

crucial as a reinforcing factor. Both strategies will benefit from addressing issues to reduce cancer worry. The differentiating patterns between people with or without intentions suggest stage-tailored interventions for Chinese American women. Studies in other populations have demonstrated the effectiveness of stage-tailored interventions (29,30). For instance, Rakowski et al. (1998) found that women who received stage-matched materials had higher screening rates than those who received standard education materials (30).

For Pap testing, besides the effect of decisional balance, the result of factors associated with stages 1/4/5 against stages 3/6 was consistent with previous findings about Chinese American women's cervical cancer beliefs and Pap testing behaviors in that age and acculturation were associated with adopting Pap testing (4). In our study, decisional balance was the only factor associated with adherence to Pap testing among those with intentions. Contrary to previous studies among Chinese American women (4,10), we did not find physician recommendations to be a significant factor associated with Pap testing behavior. It may be due to the different grouping of stages or status of Pap testing behavior. Also, our study contained an older sample and the study subjects might hold stronger traditional beliefs against Pap testing, which lessened the effect of physician recommendations. Interventions to increase Pap testing behaviors for Chinese American women aged 50 and older need to train physicians to make culturally-sensitive recommendations to be able to effectively change behaviors and intentions. Within our study, physician recommendation was significant for mammography, but not for Pap testing. More studies are needed to understand women's specific attitude against Pap testing that may exceed the effect of physician recommendations, such as not accepting more "invasive" tests (31) or believing that they did not need screening if they were menopausal or were not sexually active (4).

The pros and cons items adapted from Rakowski's prior work (13,14,32) measured decision making regarding cancer screening behaviors that aimed to reflect individuals' relative weighing of the pros and cons of engaging in cancer screening behavior. We did not include all original items measuring pros and cons of mammography and Pap testing developed by Rakowski, but used "cancer screening" in a few items because of the concern of participant's burden. However, our results of the associations between the pros and cons scores and screening stages are consistent with those of other studies in Asian populations, including Korean Americans (15), Chinese and Filipina (16,24). Other items measuring screening attitudes that have been shown to predict cancer screening in non-Asian populations have not been included in the study, such as self-efficacy, and perceived benefits, constructs of the Health Belief Model (33,34). However, the measures used in this study differentiated older Chinese American women in different stages of adoption. Future studies are needed to investigate measures that can best describe attitudes towards screening among women of various screening stages.

Although stages of adopting cancer screening and decisional balance demonstrates ability to help understand Chinese American women's cancer screening behavior, there are a few limitations that need to be taken into account when interpreting the data. This sample of Chinese American women may have high homogeneity in terms of their socioeconomic status and cultural background. Spencer, Pagell, and Adams suggested that the Transtheoretical Model should be studied in a more diverse group of subjects in cancer screening behaviors (17). With our convenience sample of Chinese Americans in the DC area, there is limited generalizability of stage distribution. More effort should be made to recruit Chinese American women in other regions that might represent a different immigration background and socioeconomic status. This study was also limited by the cross-sectional survey format. We were not able to see how people may move in and out of the stages and how decisional balance may play a role in stage change. In addition, we were not able to differentiate whether some women chose to be screened at a longer interval after

having three consecutive negative Pap testing results. More information would be needed for future studies to better define “regular” Pap testing when categorizing women into stages of cancer screening. Finally, analysis using combined behavioral stage groups does not allow comparisons of characteristics among each of the six stage groups. However, using the three combined groups provide important information for those with current screening, thinking about screening, and not having or at risk of discontinuing cancer screening. Prior research had also used the combined groups for multivariate analysis (26,35). Future studies with a larger sample size are needed to examine the difference among six groups of stages of adopting cancer screening.

Our study demonstrated that decisional balance varied by stages of adopting mammography and Pap testing and was predictive of screening after controlling for other variables. It implies that cancer screening interventions should be tailored to the need of women with different stages of adoption. For Chinese American women, an effective intervention program may need to consider attitudes as well as other important predisposing, enabling, and reinforcing factors, although the use of each factor varied by stages. Future studies could examine how changes of decisional balance prospectively affect the change of stages of adopting cancer screening. This knowledge could further help health educators develop programs to improve cancer screening adherence among Chinese Americans and would be potentially applicable to other Asian Americans or minority groups.

Condensed abstract

This study examines the stage of adopting mammography and Pap testing in relation to women's decisional balance of cancer screening. We found that Chinese American women's cancer screening behavior was associated with their decisional balance, as described in the Transtheoretical Model.

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Table 1

Items used for the pros and cons of mammography and Pap testing

Pros	
General	
1	Regular cancer screening gives you peace of mind about your health.
2	Cancer screening is necessary even when there is no history of cancer in a family.
3	Cancer screening finds cancer at a point when it is more likely to be cured.
4	Having a cancer screening every year or two will give me a feeling of control over my health.
Mammography	
1	I would be more likely to have mammogram if my doctor told me how important it was.
2	Mammograms are most helpful when you have one every year or two.
Pap testing	
1	A pap test can be done so quickly that it is not a bother to have one.
2	A pap test can find a problem even before it develops into cancer.
3	A pap test is most helpful when you have one every year or two.
Cons	
General	
1	I worry that cancer screening has a high chance of leading to surgery that is not needed.
2	I would probably not have cancer screening if my doctor seemed to doubt that I really needed one.
3	If cancer screening finds something, then whatever is there will be too far along to do anything.
4	If I eat a healthy diet, I will lower my risk of getting cancer far enough that I probably do not need to go for cancer screening.
5	Cancer screening is not important for a woman my age.
6	Once you have a couple of cancer screening results that are normal, you don't need to have any more for a few years.
7	I would probably not go for cancer screening unless I had some symptoms or discomfort.
8	Cancer screening is not as important as people say it is.
9	I would probably not have cancer screening unless I got a reminder from my doctor.
Mammography	
1	If I have a breast exam from a doctor or nurse, I don't need to have a mammogram.
Pap testing	
1	Pap test results cannot be trusted because some labs that do the tests are better than others.
2	Women who reach menopause do not need Pap tests very often.
3	After women stop having children they do not need Pap tests.

Mammography items: General + Mammography-specific; Cronbach's alpha: Pros=0.71, Cons=0.85 Pap testing items: General + Pap testing-specific; Cronbach's alpha: Pro=0.76, Cons=0.86

Table 2

Distributions of stage of adopting mammography and Pap testing and decisional balance scores reported by Chinese American women aged 50 and older (N = 507)

Stage	Pre-Contemplation (Stage 1)		Contemplation (Stage 2)		Action (Stage 3)	Relapse (Stage 4)		Relapse Risk (Stage 5)		Maintenance (Stage 6)	
Frequency	never had	one	ever had it, but not last year	yes	had one last year	ever had it, but not last year	no	have regular screening	yes	have regular screening	yes
Intention for next year	no	no	yes	yes	yes	no	no	no	yes	yes	yes
Mammography [number (%)]	67 (13%)	67 (13%)	74 (15%)	26 (5%)	26 (5%)	68 (13%)	46 (9%)	226 (45%)	226 (45%)	226 (45%)	226 (45%)
Pap testing [number (%)]	78 (15%)	78 (15%)	66 (13%)	24 (5%)	24 (5%)	82 (16%)	33 (7%)	224 (44%)	224 (44%)	224 (44%)	224 (44%)
Decisional Balance: Mammography	-1.75 (0.29)	-1.75 (0.29)	0.04 (0.16)	0.43 (0.30)	0.43 (0.30)	-1.16 (0.20)	-0.25 (0.24)	0.86 (0.07)	0.86 (0.07)	0.86 (0.07)	0.86 (0.07)
Decisional Balance: Pap testing	-1.62 (2.47)	-1.62 (2.47)	-0.17 (0.17)	0.59 (0.24)	0.59 (0.24)	-0.70 (0.19)	-0.52 (0.26)	0.88 (0.08)	0.88 (0.08)	0.88 (0.08)	0.88 (0.08)

Table 3
Baseline characteristics of study sample (N=507) by stage of adoption (Stage 1, 4, 5 vs. Stage 2 vs. Stage 3, 6)

Characteristic	Overall n (%)	Mammogram				Pap testing			
		Stage of adoption		P value	Stage 1,4,5	Stage of adoption		P value	Stage 3,6
		Stage 1,4,5	Stage 2			Stage 2	Stage 3,6		
Characteristic	N = 507 (100)	171 (35.70)	74 (14.60)		252 (49.70)	66 (13.02)	248 (48.92)		
Sociodemographics									
Age									
50-64 y/o	276 (54.44)	62 (34.25)	43 (58.11)	<0.0001	63 (32.64)	36 (54.55)	177 (71.37)	<0.0001	
>=65	231 (45.56)	119 (69.75)	31 (41.89)		130 (67.36)	30 (45.45)	71 (28.63)		
Education									
High school or less	160 (31.75)	92 (51.11)	29 (39.13)	<0.0001	92 (47.92)	25 (37.88)	43 (17.48)	<0.0001	
College or above	344 (68.25)	88 (48.89)	45 (60.81)		100 (52.08)	41 (62.12)	203 (82.52)		
Employed (%yes)	185 (36.56)	31 (17.22)	24 (32.43)	<0.0001	33 (17.19)	18 (27.27)	134 (54.03)	<0.0001	
Transfheoretical Model Construct									
Decisional balance score (mean [se])		Mammography	Pap test						
		0.001 (0.08)	.001 (0.08)		-1.15 (0.15)	0.04 (0.16)	0.81 (0.07)	<0.0001	-1.04 (0.15)
									0.85 (0.07)
Predisposing Factors									
Cancer worry (% ever)		Breast cancer	Cervical cancer						
		198 (40.00)	185 (37.37)		42 (23.60)	28 (38.89)	128 (52.24)	<0.0001	48 (25.95)
									28 (43.08)
Perceived susceptibility									
Low	236 (46.55)	259 (51.08)		<0.0001	97 (50.26)	34 (51.52)	128 (51.61)	0.001	
High	176 (34.71)	143 (28.21)			37 (19.17)	22 (33.33)	84 (33.87)		
Missing	95 (18.74)	105 (20.71)			59 (30.57)	10 (15.15)	36 (14.52)		
Reinforcing Factors									
MD recommendation (% yes)	281 (56.54)	66 (37.08)	36 (49.32)	<0.0001	77 (40.96)	33 (50.77)	171 (70.08)	<0.0001	
Family/friend encouragement (% yes)		Mammography	Pap test						
		136 (26.82)	107 (21.10)		62 (24.60)	14 (21.21)	54 (21.77)		0.718
Enabling Factors									

Characteristic	Overall n (%)	Mammogram			Pap testing				
		Stage of adoption			Stage of adoption				
		Stage 1,4,5	Stage 2	Stage 3,6	P value	Stage 1,4,5	Stage 2	Stage 3,6	P value
	N = 507 (100)	171 (35.70)	74 (14.60)	252 (49.70)		193 (38.07)	66 (13.02)	248 (48.92)	
English fluency [mean(se)]	2.70 (0.05)	2.06 (0.08)	2.46 (0.14)	3.23 (0.07)	<0.0001	2.10 (0.08)	2.47 (0.13)	3.22 (0.07)	<0.0001
Health insurance (% yes)	390 (77.38)	115 (64.25)	47 (63.51)	228 (90.84)	<0.0001	127 (66.49)	47 (71.21)	117 (87.45)	<0.0001
Perceived access barriers (% yes)	277 (54.64)	107 (59.12)	51 (68.92)	119 (47.22)	0.001	116 (60.10)	44 (66.67)	117 (47.18)	0.001

Table 4

Multinomial logistic regression models describing associations of decisional balance with stage of adoption mammography and Pap testing: Odds ratio [95% CI] (N = 483 for mammogram; N=482 for Pap testing)

Variable	Mammogram		Pap testing	
	Pre-contemplation/ relapse/relapse risk (Stage 1/4/5) vs. Action/maintenance (Stages 3/6)	Contemplation (Stages 2) vs. Action/ maintenance (Stages 3/6)	Pre-contemplation/ relapse/relapse risk (Stage 1/4/5) vs. Action/maintenance (Stages 3/6)	Contemplation (Stages 2) vs. Action/ maintenance (Stages 3/6)
Sociodemographics				
Age (>=65 y/o vs. 50–64)	1.36 [0.74–2.49]	0.78 [0.39–1.57]	1.89 [1.07–3.34]*	1.10 [0.55–2.19]
Education (College or above vs. High school or less)	0.59 [0.31–1.11]	0.50 [0.24–1.04]	1.01 [0.54–1.89]	0.82 [0.39–1.72]
Employed (Yes vs. No)	0.71 [0.36–1.40]	0.91 [0.43–1.93]	0.62 [0.33–1.18]	0.56 [0.26–1.21]
Transtheoretical Model Construct				
Decisional balance score	0.49 [0.39–0.60]***	0.68 [0.54–0.86]**	0.44 [0.35–0.55]***	0.56 [0.44–0.72]***
Predisposing Factors				
Cancer worry (Ever vs. Never)	0.52 [0.30–0.90]*	0.66 [0.35–1.23]	0.75 [0.44–1.30]	1.12 [0.59–2.13]
Perceived susceptibility (High vs. Low)	0.61 [0.34–1.11]	0.72 [0.37–1.39]	1.03 [0.57–1.87]	1.29 [0.65–2.55]
Perceived susceptibility (Missing vs. Low)	0.75 [0.35–1.61]	0.65 [0.26–1.60]	1.78 [0.89–3.56]	0.95 [0.38–2.35]
Reinforcing Factors				
MD recommendation (Yes vs. No)	0.48 [0.28–0.82]**	0.63 [0.34–1.18]	0.66 [0.39–1.12]	0.82 [0.43–1.54]
Family/friend encouragement (Yes vs. No)	1.29 [0.72–2.30]	1.86 [0.99–3.49]	1.25 [0.70–2.24]	0.84 [0.40–1.73]
Enabling Factors				
English fluency	0.70 [0.53–0.93]*	0.82 [0.59–1.14]	0.67 [0.51–0.87]**	0.76 [0.54–1.05]
Health insurance (Yes vs. No)	0.31 [0.15–0.62]**	0.25 [0.12–0.54]***	0.49 [0.25–0.95]*	0.56 [0.26–1.23]
Perceived access barriers (Yes vs. No)	0.98 [0.56–1.70]	1.47 [0.77–2.80]	1.09 [0.64–1.87]	1.53 [0.80–2.93]

*
p<0.05,

**
p<0.01;

p<0.001