Feasibility of a Targeted Breast Health Education Intervention for Chinese American Immigrant Women

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Purpose/Objectives: To assess the feasibility and acceptability of a targeted educational intervention to increase mammography screening among Chinese American women.

Design: One-group pre- and post-test quasiexperimental design.

Setting: Metropolitan areas of Portland, OR.

Sample: 44 foreign-born Chinese American women aged 40 years and older.

Methods: Participants who had not had a mammogram within the past 12 months were recruited and enrolled to a targeted breast health educational program. Before starting the group session, participants completed a baseline survey, which was administered again 12 weeks postintervention.

Main Research Variables: Completion of mammography screening test, movement in stage of readiness, mammography and breast cancer knowledge, perceived susceptibility, perceived benefits, and perceived common and cultural barriers.

Findings: The study response rate was high (71%). Of the 42 women who completed the study, 21 (50%) had a mammogram postintervention. The top three reasons for not completing a mammogram at the end of the study were no need or no symptom, busy, and reliance on family for assistance. Mean breast cancer susceptibility scores increased significantly at post-test as theorized ($t[40] = -2.88$, $p < 0.01$). Participants were more likely to obtain a mammogram when they had been in the United States for 3–15 years.

Conclusions: A targeted program that aims to increase breast health knowledge, improve access, and remove barriers may promote mammography screening among Chinese American immigrant women.

Implications for Nursing: This promising intervention now being tested under a randomized, controlled design can be adapted to other Asian subgroups.

Knowledge Translation: Targeted breast health intervention is feasible for improving mammography screening among Chinese immigrant women. Educating these women about early detection is important, as the first sign of breast cancer usually shows on a woman's mammogram before it can be felt or any other symptoms are present. Immigrant women may be too busy to dedicate proper time to self-care behaviors; therefore, making it easier and faster for them to obtain a mammogram may improve the screening rate.

Cancer-related disparities continue to persist among ethnic minority groups, despite strides made in early detection and treatment of cancer. The Asian American and Pacific Islander (AAPI) population is the fastest-growing ethnic group in the United States (U.S. Census Bureau, 2011). A 162% increase in the AAPI population is projected from 2008–2050, compared to a 44% increase in the entire U.S. population during the same period (U.S. Census Bureau, 2010). If that growth trend continues, AAPIs will comprise 9%–10% (40.6 million) of the U.S. population by 2050 (U.S. Census Bureau, 2004). Despite decades of progress in prevention and early detection in the United States, breast cancer continues to be the most commonly diagnosed cancer among AAPI women (American Cancer Society [ACS], 2009). Epidemiologic studies have shown an increased risk of breast cancer in Asian women after migrating to the United States (Gomez et al., 2010; Stanford, Herrinton, Schwartz, & Weiss, 1995).

Background

Although early detection of breast cancer through regular screening leads to substantive reduction in morbidity and mortality (ACS, 2011), these trends are not realized for AAPI women. For example, Asian-born women were found to have a larger tumor size (greater than 1 cm) at diagnosis than U.S.-born Caucasian women or U.S.-born Asian women. That finding was attributed to underuse of breast cancer screening among Asian immigrants (Hedeen, White, & Taylor, 1999; Partnership for Prevention, 2007).

Ethnic subgroups traditionally have been aggregated under one category in cancer-related data analyses and reporting despite the internal diversity of many of these subgroups. AAPIs, for example, represent more than 25 separate ethnicities, but cancer outcomes usually are reported for all AAPIs as one racial or ethnic

group (Pew Research Center, 2012). Each group is distinctive and differs from the others in language, culture, and health beliefs, underscoring the need to study subgroups separately and leverage cultural awareness into educational programs to improve cancer-related outcomes. Chinese Americans, the target population for this study, are the largest of the AAPI subgroups (Pew Research Center, 2012).

Despite their large numbers, however, only a few studies since 1982 have reported specifically on breast cancer screening among Chinese American women (Lee-Lin & Menon, 2005). Those studies reported adherence rates and mammogram use in three ways: had test at least once, had test in the past year, and had test in the past two years. The rates of having a mammogram at least once ranged from 12%–86% (Lee, Lee, & Stewart, 1996; Lee-Lin et al., 2007; Tang, Solomon, & McCracken, 2000; Tu et al., 2003; Yu, Kim, Chen, & Brintnall, 2001), and the rate of having one mammogram in the last year or two ranged from 49%–61% (Lee et al., 1996; Lee-Lin et al., 2007; Tang et al., 2000; Tu et al., 2003; Yu, Seetoo, Tsai, & Sun, 1998; Yu & Wu, 2005). Those wide gaps may be a result of, in part, the range of socioeconomic statuses and acculturation of the Chinese participants included in these samples.

According to the U.S. Census Bureau (2010), Oregon has a fast-growing Asian American population, with Chinese Americans as its largest subgroup. The Chinese American population of Portland, the state's largest city, is 30,919 (U.S. Census Bureau, 2010). Oregon consistently ranks among the top five states in the incidence of breast cancer, the most common cancer and the number one killer of Asian American women in Oregon (Oregon State Cancer Registry, 2009). The purpose of this study was to pilot test a theory-driven, culturally responsive, targeted breast cancer screening educational program designed to increase mammography use among Chinese American immigrant women in Portland. The primary objective was to establish the feasibility and acceptability of the program. Second, the authors aimed to assess preliminary effect sizes and the effect of demographics and beliefs on mammogram completion. Feasibility was measured by response rate, intervention completion rate, and attrition rate. Acceptability was assessed by process questions related to cultural appropriateness of the content, participants' response to the content, and intent to change screening behavior. In addition, the authors assessed postintervention mammogram completion and changes in theoretical variables (e.g., knowledge, beliefs, stage of readiness) that were manipulated in the educational program.

Theoretical Framework

Single theoretical frameworks rarely explain all the variance in individual health behavior, and mammogram completion is no exception (Glanz, Rimer, & Viswanath, 2008). Based on the authors' previous descriptive and intervention work and the extant literature, they chose to integrate two popular health behavior change models, the Health Belief Model (HBM) and the Transtheoretical Model of Change (TTM) (Lee-Lin & Menon, 2005). Components of the two health behavior models and the integrated content discussion guide for the education session are presented in Table 1. Under the HBM (with breast cancer as the exemplar), a woman is more likely to participate in breast cancer screening if she believes she is susceptible to breast cancer, believes that cancer is serious, sees positive outcomes associated with screening (benefits) and few obstacles to screening (barriers), has high confidence in her ability to have a screening test (self-efficacy), and has adequate knowledge (Champion & Skinner, 2008).

The TTM provides a framework for explaining health behavior change as a continuum of stages. An individual usually progresses from not thinking about the behavior change to thinking about change to performing the behavior and finally to maintaining the behavior change (Prochaska & Velicer, 1997). However, a notable limitation of most research that uses these models is the lack of integration of cultural variables for minority populations. The current study's conceptual model (see Figure 1) highlights the multidimensional aspects of health behavior change and incorporates cultural beliefs of Chinese American women related to breast cancer and screening. The intervention actually manipulates the behavioral constructs, which then leads to behavior change.

Methods

Design

The study employed a one-group pre- and post-test quasiexperimental design to evaluate the feasibility of delivering a targeted breast health education intervention program (TBHEP) designed to increase mammography screening. The targeted intervention had two parts: group teaching with targeted messages, followed by an individual counseling session. The TBHEP messages were targeted to the participants' stage of readiness. Each stage of readiness is associated with perceived levels of risk for breast cancer, perceived benefits, common and cultural barriers, and self-efficacy for overcoming barriers. The theoretical model shown in Figure 1 incorporates those behavioral constructs.

Sample

Participants were recruited from Asian community organizations in the Portland metropolitan area. Eligibility criteria included (a) being a foreign-born Chinese woman, (b) being aged 40 years or older, (c) having no history of breast cancer, (d) being able to understand

Table 1. Definition of Stage of Readiness and the Relationships Between HBM and TTM

Stage of Readiness	Definition	HBM Beliefs by TTM Stage	Integrated Contents Discussion Guide for Education Session
Precontemplation	Never had a MMG and not thinking about having one in the next six months	Low susceptibility, low benefits, high barriers, low self-efficacy	Group class focuses on changing women's perceived susceptibility to breast cancer and benefits of MMG screening Recommendation from physician Face-to-face counseling to identify and overcome personal barriers and increase self-efficacy
Relapse (precontemplation)	Had one or more MMG in the past and is off schedule, and not planning to have one within the next six months	Low susceptibility, average benefits, high barriers, low self-efficacy	Same as precontemplation
Contemplation	Never had a MMG and thinking about one in next six months	Average susceptibility, low benefits, high barriers, low self-efficacy	Group class emphasizes high benefits of MMG screening and reinforces risks of getting breast cancer Recommendation from physician Face-to-face counseling to identify and overcome personal barriers and increase self-efficacy
Relapse (contemplation)	Had one or more MMGs in the past and is off schedule, and plans to have one within the six months	Average susceptibility, average benefits, high barriers, low self-efficacy	Same as contemplation
Action	Last MMG within the past year	High susceptibility, high benefits, low barriers, high self-efficacy	No intervention Praise for great work

HBM—Health Belief Model; MMG—mammogram; TTM—Transtheoretical Model of Change
Note. Based on information from Champion & Skinner, 2008; Prochaska & Velicer, 1997.

and read English or Chinese, (e) not having had a mammogram within the past year, and (f) having a phone and postal address. A total of 44 women who met these criteria were recruited and enrolled. The authors focused on immigrant women because almost 70% of Chinese Americans are foreign-born (Reeves & Bennett, 2004), and immigrants are more likely to have different cultural beliefs about health and health behavior (ACS, 2009; Lee & Pacheco, 2004). Figure 2 describes the flow of the single-group pilot study.

Procedures

After approval was granted by the institutional review board of Oregon Health and Science University, the authors recruited and obtained informed consent from participants in person at Chinese community partner agencies. The convenience sample was recruited from among women who regularly attend the community agencies for health clinic and education services, weekly exercise, and social gatherings. The community agencies are trusted places where health and other information is sought and given. By virtue of the diversity in age and immigrant status of the women who visit the agencies—with years spent living in the United States ranging from 1 to more than 10—they are representative of Portland's Chinese American community. Participants asked three questions to assess their stage of readiness: whether they had received a mammogram in the past 12 months, whether they had received a mammogram at any time prior to that period, and whether they planned to have a mammogram in the next six months. After determining participants' stage of readiness to change (precontemplation or relapse precontemplation versus contemplation or relapse contemplation), each was given a card with the date, time, and location of the TBHEP class session. Women in relapse may have encountered specific barriers that caused them to be nonadherent with mammography. However, for the purposes of the intervention, the preaction stage of women in relapse (precontemplation or contemplation) is key to understanding which beliefs should be addressed (Menon et al., 2007; Rawl et al., 2005; Russell, Monahan, Wagle, & Champion, 2007).

Before starting the TBHEP group session, participants completed a 20-minute, self-administered baseline survey that measured breast cancer screening knowledge, practices, perceived susceptibility, benefits, barriers, and cultural beliefs. As an incentive for attending the session, food was offered during class and a small gift ($10) was distributed at the conclusion of the session.

All classes were held at two convenient Asian community locations within walking distance of public

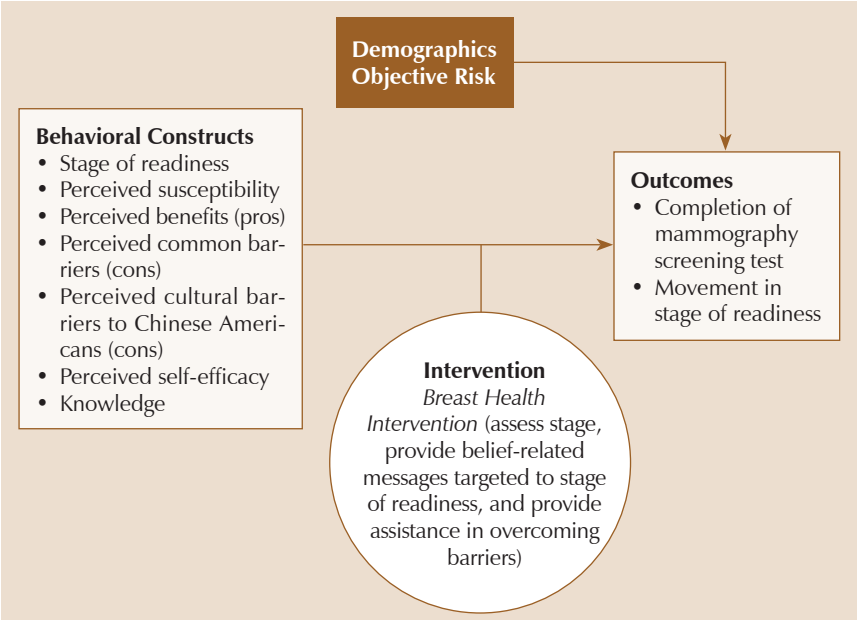


Figure 1. Targeted Breast Health Educational Program Study Model: Integration of the Health Belief and Transtheoretical Models

transportation routes. Women attended an hour-long TBHEP class according to their stage of readiness to change. Because of the logistical challenge of accommodating different time and location constraints, stages of readiness, and languages spoken, each class was conducted in both Mandarin and Cantonese—the most commonly spoken languages by Chinese immigrant women—rather than separate classes being held in each dialect. All classes were provided in Mandarin by the first author and then translated into Cantonese by the community leader.

Within 10 days of the group session, trained staff provided individual counseling sessions by phone to help participants overcome barriers relating to cost, fear or concern about the procedure, transportation, language, child care, and healthcare access. For example, if a participant had limited English-language ability, staff helped to set up a mammography appointment and provided translation service. If a participant had no transportation, staff arranged transportation to her appointment. If cost was an issue (e.g., for individuals lacking health insurance coverage), grant funding was used to pay for a screening mammogram. In addition, if the participant had a questionable mammogram result, she was referred to the Oregon Breast and Cervical Cancer Program or low-income clinics for additional checkup. Some participants needed multiple phone counseling sessions to overcome barriers. The total time of each participant's telephone counseling sessions ranged from 1–180 minutes, with the majority (71%) being no longer than 60 minutes. At 12 weeks, all participants were called to complete a follow-up survey that measured the same variables captured at baseline.

Instruments and Intervention Development

The survey used in this study was adapted and modified from Champion's (1999) **Breast Health Survey**, Tang et al.'s (2000) **Women's Health Survey**, and Taylor et al.'s (2002) **Chinese Women's Health Project Questionnaire**. The Cronbach alphas of each subscale (e.g., perceived susceptibility, perceived benefits, perceived barriers, perceived cultural barriers) ranged from 0.71–0.89 (Lee-Lin et al., 2008). In each scale, all items were evaluated with a review of literature, validated by content and cultural experts, and pretested and critiqued by 10 Chinese American immigrant women who represented the targeted population. The final version of the breast cancer survey consisted of 93 items; detailed descriptions and variables were reported in another article (Lee-Lin et al., 2008).

The structure and content of the TBHEP was based on findings from previous studies of breast cancer beliefs and mammography screening practices among Chinese American immigrants (Lee-Lin et al., 2007; Lee-Lin, Menon, Nail, & Lutz, 2012), as well as the HBM theoretical framework described earlier. Topics covered in the group class included breast cancer incidence and risk factors, the particular risks of breast cancer for Asian women, the process of getting a mammogram, the benefits of mammograms, how to overcome barriers to obtaining mammograms, and other important topics identified by the focus group. A scripted verbal presentation accompanied by PowerPoint® slides served as a guide for an interactive discussion for the precontemplation or relapse precontemplation and contemplation or relapse contemplation groups.

Question-and-answer sessions and face-to-face interactions are particularly important for educating and clearing up misconceptions among minority populations (Champion et al., 2006). For example, one study found that interactive interventions are more effective than noninteractive interventions in increasing adherence and moving African minority women forward in their mammography stage of readiness (Champion et al., 2006). As print materials do not give medically underserved communities the opportunity to ask questions and discuss issues in person, face-to-face interactions are more culturally appropriate for these groups. In addition, although print materials are available through the ACS and the Centers for Disease Control and Prevention (CDC),

these seem to have little impact on increasing mammography use among Chinese American women (ACS, 2011; CDC, 2012; Champion et al., 2006; Skinner et al., 2007).

To increase the content's relevance to study participants, culturally appropriate graphics and language were incorporated. *Cultural appropriateness* is defined as using language, graphics, and content that is culturally relevant to the target population and sensitive to cultural issues such as embarrassment and non-Western views of health and medicine (Kreuter, Lukwago, Bucholtz, Clark, & Sanders-Thompson, 2003). For example, educational messages were scripted in common Chinese language by community experts. The materials have culturally relevant graphics, such as pictures of older and younger Chinese American women and Asian landscapes. All materials were presented to focus groups of women and revised based on their feedback (Lee-Lin et al., 2012).

Power and Data Analysis

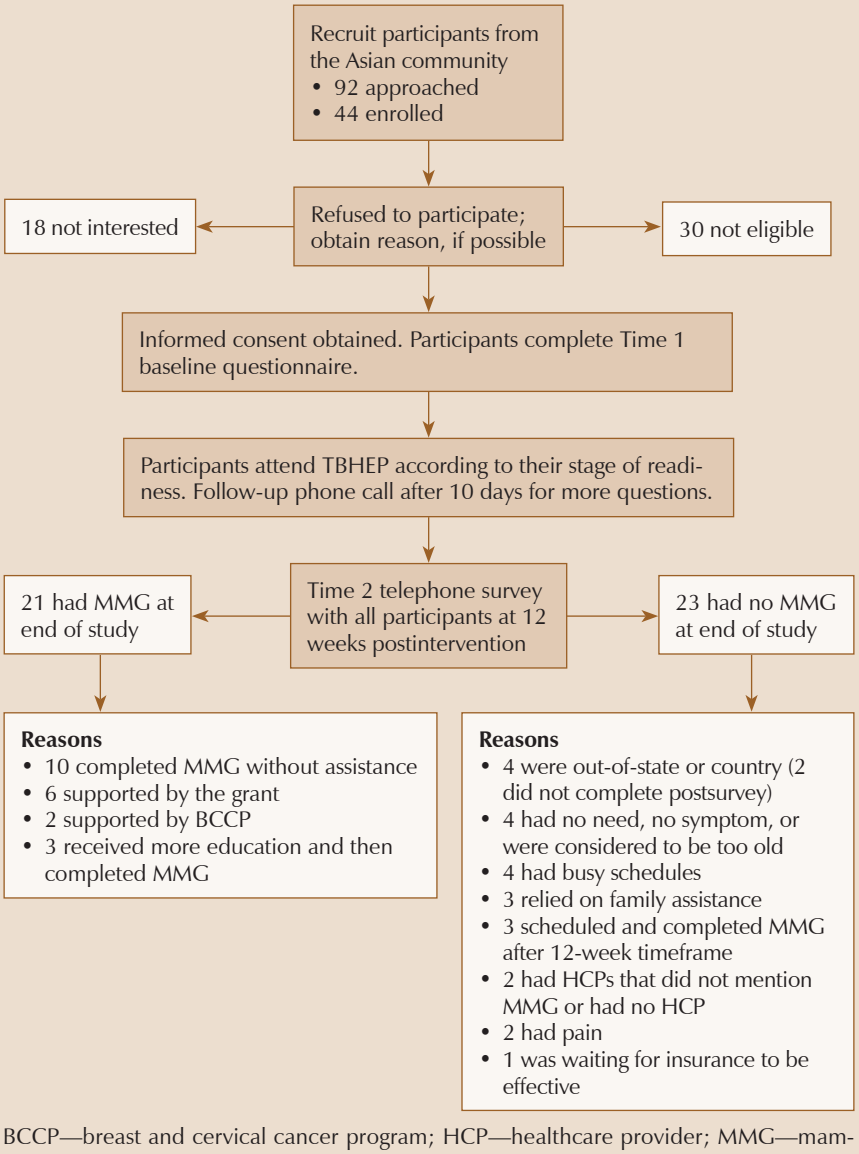
Power analysis was computed using PASS. Data are currently unavailable to guide estimation of effect size. Given that this is a pilot study, the authors calculated the minimally detectable effect size with a feasibly achievable sample size of 40. That sample size would allow the detection a standardized mean difference of 0.4 using a paired t test at 80% power and an alpha level of 0.1. A logistic regression analysis would be able to detect an odds ratio (OR) of 2.29 or larger for positively related independent variables and 0.44 or smaller for negatively related independent variables. Assuming an attrition rate of 10%, the target sample size was set at 44 participants.

Data analysis was conducted using SPSS®, version 19. To assess the change in knowledge and beliefs, paired t tests were conducted across pre- and post-test. To examine the relationships between perceived susceptibility, perceived benefits, perceived barriers, perceived cultural barriers, and whether participants obtained a mammography, a logistic multiple regression analysis was performed. However, because of the limited sample size, the authors wanted to be cautious with the number of variables included in the model. Thus, only independent variables with a significant bivariate correlation with mammogram completion were included. In keeping with the exploratory nature of this research, the alpha level was set at 0.1 levels for all analyses.

Results

Sample Demographics

A total of 44 foreign-born Chinese American immigrant women, aged 40–84 years, participated in this pilot study (see Tables 2 and 3). The authors conducted three intervention classes: two for the precontemplation group and one for the contemplation group. The class size ranged from 7–23 participants. Before starting the intervention class, participants were asked about the major barriers that prevented them from obtaining a mammogram



BCCP—breast and cervical cancer program; HCP—healthcare provider; MMG—mammogram; TBHEP—targeted breast health educational program

Figure 2. TBHEP Single Pilot Study Protocol Flowchart

Table 2. Sociodemographic and Background Characteristics (N = 44)

Characteristic	n	$\bar{X}$	SD
Age (years)	44	63.41	12.62
Age at immigration (years)	44	51.2	14.44
Years lived in United States	43	11.74	8.14

Characteristic	n
Birth place	
Mainland China	36
Malaysia	1
Taiwan	5
Other	2
Marital status	
Currently married	33
Separated	1
Divorced	6
Widowed	4
Education	
No formal school	6
Elementary	10
Some middle school	9
Some high school	11
Some college	1
Graduated from college	6
Graduate school or professional degree	1
Employment	
Full-time	2
Part-time	7
Not employed	34
Missing	1
Income before taxes ($)	
Less than 15,000	29
15,000–30,000	3
30,001–50,000	1
50,001–75,000	1
75,001–100,000	–
100,001–150,000	2
Not sure	8
How well do you speak English?	
Not at all	29
Poorly	5
Average	2
Well	6
Fluently like a native English speaker	1
Missing	1

in the past 12 months. Barriers identified by women in precontemplation and contemplation stages before the intervention class are summarized in Table 4.

Feasibility

During the months of November and December 2009, 92 Chinese American women were approached in the community. Thirty (33%) were not eligible for the study (having had a mammogram within the past 12 months), and 18 (20%) were not interested in participating. The reasons for not being interested in the study included no time for a mammogram (or for the study) and the belief that having a mammogram was not as important as other health problems. Of the 62 women who were eligible for the study, 44 agreed to participate, for a response rate of 71%. All women attended the intervention class. At the end of 12 weeks, the attrition rate was 5% (lost two participants at post-test because they were out of the country), resulting in a 95% completion rate (42 out of 44). The high response rate and very low attrition are indicative of good feasibility (Bowen et al., 2009).

Acceptability

Given the expectation that women would not be comfortable telling the authors if they disliked the intervention, acceptability was not measured with a survey. Women from this culture often are happy to participate in health education and also may have associated the education entirely with the trusted agency; thus, they may have been reluctant to mention any limitations of the education. As such, proxy indicators were used to indicate acceptability. The intervention class was well received by the participants, who applauded at the end of each intervention session and thanked the presenters for taking time to educate them. They commented that they did not know they were at risk for breast cancer and were not aware of how many breast cancer survivors are alive today because of early detection and treatment. Colors, graphics, and content were considered very culturally appropriate. The presentation's dialogue interactions among a mother, daughter, and grandmother were appreciated. Those who identified cost or lack of insurance as the top barrier (n = 9) thanked the presenters for providing access to a mammogram.

Theoretical Constructs

Of the 42 participants, 23 (52%) women were in the contemplation or contemplation relapse stage and 19 (43%) were in the precontemplation or precontemplation relapse stage at baseline. Five participants were excluded from this analysis, as two attended the wrong intervention class and three were missing data on the item asking whether the participant planned on obtaining a mammogram in the next six months and did not complete a mammogram at follow-up. All women were given a date to attend but two women in the contemplation stage attended a session with their friends who were scheduled for a precontemplation stage class. The value of pilot feasibility testing was further realized in this situation where the authors understood that women in the community may discuss the study with each other, thus contaminating study groups. Stronger quality control processes were instituted in the subsequent randomized, controlled trial (RCT). Of the women who have completed the intervention in the RCT, none have attended the wrong session since this potential issue was identified. Of the 37 participants with valid data, 51% (n = 19) reached the action stage by completing a

mammogram during the study period, of which 37% (n = 7) were in the precontemplation stage and 63% (n = 12) were in the contemplation stage at baseline. Of those that did not reach the action stage (n = 18), 50% (n = 9) were in the precontemplation stage and 50% (n = 9) were in the contemplation stage at baseline.

Among the participants, two moved one stage up from precontemplation to contemplation. Seven participants moved two stages from precontemplation to action. For those in the contemplation stage at baseline, 12 moved one stage to action. However, four moved backward one stage from contemplation to precontemplation (see Table 5).

Breast Cancer Knowledge and Beliefs

Results of the paired t tests comparing breast cancer knowledge and breast cancer and mammogram beliefs (see Table 6) found that only breast cancer susceptibility significantly changed over time ($t[40] = -2.88$, $p < 0.01$). Susceptibility scores increased almost 15% from pre- ($\bar{X} = 2.31$, SD = 0.72) to post-test ($\bar{X} = 2.65$, SD = 0.7). Cohen's d for this effect was 0.44.

Factors Associated With Mammogram Completion

Of the 42 women who completed the study, 21 (50%) had completed a mammogram by the week 12 post-test. Three of the 21 who did not complete a mammogram had one scheduled after the post-test. The top three reasons for not receiving a mammogram were having no need or no symptom, being busy, and relying on family for assistance.

Bivariate correlations were conducted among demographic characteristics in pretest scores and belief measures in post-test scores (see Table 7). Perceived mammography and breast cancer barriers ($r = -0.26$, $p < 0.1$) and number of years lived in the United States ($r = -0.33$, $p < 0.05$) were negatively related to mammography screening. These variables then were entered into a multiple logistic regression model to determine their unique relationship with obtaining a mammography. However, a scatterplot of those who completed a mammogram by years of living in the United States indicated that this relationship was curvilinear. Therefore, a quadratic term for years living in the United States also was included in the model.

The overall logistic regression model was significant ($\chi^2 [3] = 10.44$, $p < 0.001$). Perceived mammography and breast cancer barriers was negatively associated with completing a mammogram at post-test (OR = 0.14, 90% confidence interval [CI] [0.02, 0.82]). That is, for every one-unit increase in perceived barriers, participants were 86% less likely to have obtained a mammogram. Because of the nonlinear relationship modeled with age and mammography completion, the odds ratios for the linear and quadratic terms are more difficult to interpret. The odds of obtaining a mammogram rose by a ratio of 2.35 (90% CI [1.31, 4.21]) for each year of living in the United States, but this increase decelerated by a factor of 0.95 (90% CI [0.93, 0.98]) for each year. The likelihood of obtaining a mammogram increases for every year lived in the United States up until about nine years, at which point the probability begins to decline. The participants were more likely (predicted probability of greater than 0.5) to obtain a mammogram when they had been in the United States for 3–15 years, and less likely to do so if their length of residency was outside that range.

Discussion

The program was well received by Chinese immigrant women in Portland's Asian community. The program was presented as free health education, and health-related topics are very popular among Chinese. Lunch was included with the intervention class. The presenter had lunch with participants and they were able to interact with each other. The social aspect of such gatherings, the offering of food, and monetary incentives in a familiar and trusted environment are very attractive to Chinese immigrant women. Response rate was high at 71%, and acceptability of the intervention also was high as evidenced by participants' comments. The content was organized and easy to understand, and the colors and graphics were pleasing and culturally appropriate. The educational program increased attendees' knowledge about mammography and their perceived susceptibility

Table 3. Participant Responses Regarding Health Care (N = 44)

Characteristic	n
Do you have a regular healthcare provider (HCP)?	
Yes	32
No	12
Do you usually understand everything your HCP says?	
Yes	26
No	17
Missing	1
Do you feel that your HCP usually understands what you say?	
Yes	27
No	16
Missing	1
In the last year or two, has your HCP ever told you that you should have a mammogram?	
Yes	24
No	16
Not sure	4
Do you have any kind of healthcare coverage?	
Yes	24
No	19
Not sure	1

Table 4. Barriers Identified Before Intervention: PC Versus C

Barrier	PC (N = 21)	C (N = 23)	Total (N = 44)
No time or troublesome	5	6	11
English problems or difficulty getting an appointment	4	6	10
Uninsured, family with low income, or cost	6	3	9
Afraid of pain	5	2	7
Transportation problems or relies on others	2	2	4
HCP not telling to have a mammogram	–	4	4
No symptoms or no need for mammogram	1	2	3
Number of barriers[a]	23	25	48

[a] Some participants identified multiple barriers.
C—contemplation; HCP—healthcare provider; PC—precontemplation

of breast cancer. Consistent with previous findings (Lee-Lin et al., 2007), Chinese immigrant women perceived themselves as less susceptible to getting breast cancer before the intervention class compared to after completing the class. In addition, perceived mammography and breast cancer barriers were negatively associated with completion of a mammogram at post-test. Education promoting breast cancer awareness and assistance in overcoming the barriers such as TBHEP are critically needed for medically underserved groups (Freeman, 2006; Freeman, Muth, & Kerner, 1995).

A few studies have addressed ways to increase breast cancer screening among Asian American women, but results have been minimal, with effect sizes ranging from 1.27–1.6; multicomponent interventions were more successful (Hou, Sealy, & Kabiru, 2011; Masi, Blackman, & Peek, 2007; Sohl & Moyer, 2007). In addition, a systemic literature review by Legler et al. (2002) showed that among diverse populations who were disproportionately older, poorer, and of racial or ethnic minorities, a combination of intervention approaches (access-enhancing and individual-directed strategies) in nine studies resulted in the strongest outcome for mammography screening. Using a combination of intervention approaches, the current study's interactive, culturally and linguistically appropriate presentation, combined with individual counseling and assistance, resulted in a strong outcome in mammography completion in 12 weeks. Half the sample had a mammogram 12 weeks postintervention and three more reported having scheduled a test, demonstrating a larger effect size than reported in many community-based cancer screening trials. However, cost continues to be an issue for some Chinese immigrant women, as eight women required funding support to obtain a mammogram.

Somewhat consistent with the literature, a nonlinear relationship existed between years lived in the United States and likelihood of obtaining a mammogram. In this study, women were more likely than not to obtain a mammogram when they have lived in the United States between 3 and 15 years, and less likely to do so if they lived in the United States less than 3 or more than 15 years.

As noted by Pourat, Kagawa-Singer, Breen, and Sripipatana (2010), those who have been in the United States five years or longer were more likely to have been screened. However, living in a less acculturated environment and at low income levels in the United States, even for a long period of time, may not change health promotion beliefs and behaviors (Wong-Kim, Sun, & DeMattos, 2003; Yu et al., 2001). The majority of participants (82%) identified their English ability as poor or did not understand English at all. More than half (57%) of the participants had less than a high school education. About 66% of participants reported having an annual income less than $15,000. All of these factors are known to be predictors of lower screening.

Among women who did not complete a mammogram at the end of the study, some insisted that they had no family breast cancer history and no symptoms and strongly believed that they would not develop breast cancer. A key theme addressed in all educational sessions is that women should receive regular mammograms and that breast cancer is detectable by mammography before symptoms develop. Participants also identified many barriers in obtaining mammography, and having greater barriers was significantly predictive of lower screening postintervention in the current study. Most of the women had no knowledge of how to make an appointment for a mammogram. Trained staff provided assistance in scheduling appointments and resolving transportation and translation issues. Logistical assistance is important to immigrant women, who often have minimal knowledge on how to access and

Table 5. Movement of Stage at Baseline and at End of Study (N = 44)

	End of Study			
Stage of Change	Precontemplation	Contemplation	Action	Total
Baseline				
Precontemplation[a]	7	2	7	16
Contemplation[a]	4	5	12	21
Total	11	7	19	37[b]

[a] Includes relapse group
[b] Total N does not equal 42 because three participants were missing data at the end of the study and two attended the wrong intervention class.

Table 6. Comparison of Pre- and Post-Study Variables (N = 42)

Variable	Pretest		Post-Test		% Change	t Test	90% CI
	$\bar{X}$	SD	$\bar{X}$	SD			
Breast cancer knowledge	2.86	1.89	2.95	1.95	3.1	–0.28	[–0.67, 0.48]
Breast cancer susceptibility (N = 41)	2.31	0.72	2.65	0.7	14.7	–2.88*	[–0.54, –0.14]
Cultural barrier: Crisis orientation	2.01	0.46	1.98	0.64	–1.5	0.31	[–0.16, 0.23]
Cultural barrier: Rely on others	3.16	0.79	3.32	0.8	5.1	–1.26	[–0.37, 0.05]
Cultural barrier: Use of Eastern medicine	3.04	0.72	2.93	0.66	–3.6	0.83	[–0.11, 0.34]
Cultural barrier: Modesty (N = 41)	2.5	0.84	2.39	0.79	–4.4	0.61	[–0.19, 0.41]
Mammogram and breast cancer barriers	2.64	0.47	2.64	0.51	0	0.01	[–0.16, 0.16]
Mammogram and breast cancer benefits	4.05	0.49	4.02	0.54	–0.7	0.4	[–0.1, 0.16]

* $p < 0.01$
CI—confidence interval

navigate the U.S. healthcare system (Hou et al., 2011; Pourat et al., 2010; Wu, Hsieh, & West, 2009).

Despite the availability of trained staff to help study participants obtain a mammogram, some women preferred to get assistance from their family members. Three participants reported relying on their family for assistance and did not complete a mammogram by the end of the study. One participant made a mammogram appointment that was subsequently canceled by her daughter because of the participant's "old age." A useful question for future research would be whether and to what extent educating the family members of Chinese participants in intervention studies affects postintervention measures for the participants themselves.

Women in precontemplation and contemplation stages reported different barriers (Wu et al., 2009). In this relatively small sample, women in precontemplation appeared to be more afraid of pain than women in the contemplation stage. Cost was a barrier for a large majority of women in the precontemplation stage. The highest barriers for women in the contemplation stage were no time and lack of English language ability. Transportation and reliance on family for assistance were identified as barriers in both groups. When combined, lack of time was the highest barrier for both groups. Immigrant women may be too busy adapting to their lives in the United States, with little time dedicated to self-care behaviors (Wong-Kim, Sun, Merighi, & Chow, 2005; Yu & Wu, 2005).

The findings of this pilot study, in which many women moved forward one or two stages of change after attending the educational intervention, support the theoretical framework to some extent. The findings are congruent with the TTM prediction (Wu et al., 2009) that behavior change occurs in stages and that it may be easier to move people up one stage at a time (i.e., from contemplation to action rather than from precontemplation to action). However, a significant number of participants in the current study (n = 7) moved from precontemplation to action after the intervention class.

The authors recruited more women who were in the contemplation or contemplation relapse stage at baseline than women in the precontemplation or precontemplation relapse stage (52% versus 48%). However, for those participants who did not reach the action stage, equal proportions were in the precontemplation stage and contemplation stage (50% versus 50%).

Limitations

This study had several limitations. First, the study used self-reported measures of mammography screenings that could have been over- or underreported. Second, because a convenience sample was used, participants may have been more motivated to get mammograms. Chinese women who have low incomes or financial challenges may enroll in such a study because of the prospect of a free mammography screening. Third, the small sample size for this single group pilot test precluded additional statistical testing with adequate power. The study did, however, serve to establish the feasibility and acceptability of the TBHEP intervention, which now is being tested in a two-group RTC design with a proposed sample size of 300 Chinese American immigrant women. The results of that study will offer a more true measure of intervention efficacy. Fourth, because the participants were a convenience sample recruited exclusively from the Chinese community in a single northwestern city, the results cannot be generalized to the general

Table 7. Bivariate Correlations Among Study Variables

Variable[a]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2	–0.07															
3	–0.26*	–0.08														
4	0.09	0.15	–0.58***													
5	–0.08	–0.02	0.48***	–0.7***												
6	–0.18	0.21	0.49***	–0.16	–0.02											
7	0.06	0.07	0.28*	–0.22	0.04	0.37**										
8	–0.25	0.08	0.55***	–0.31**	0.35**	0.48***	0.1									
9	–0.2	–0.14	0.03	–0.27*	0.17	–0.22	–0.19	0.22								
10	0.03	–0.03	0.07	–0.19	0.12	–0.15	–0.22	0.27*	0.8***							
11	–0.33**	–0.15	–0.09	< 0.01	0.04	–0.04	0.1	–0.11	0.09	–0.52***						
12	0.25	–0.06	–0.43***	0.25	–0.29*	–0.09	–0.25	–0.27*	–0.37**	–0.28*	–0.05					
13	0.01	–0.07	0.01	0.02	0.05	0.19	0.02	0.04	–0.23	–0.1	–0.16	0.59***				
14	0.19	–0.24	–0.33**	0.25	–0.08	–0.14	0.22	–0.25	–0.46***	–0.58***	0.29*	0.42***	0.3*			
15	–0.23	0.01	0.02	0.11	0.12	–0.12	0.15	–0.06	0.21	0.02	0.33**	–0.27*	–0.23	0.01		
16	–0.11	–0.19	–0.07	0.06	0.03	–0.2	0.16	–0.15	0.21	–0.08	0.47***	–0.11	–0.06	0.06	0.66***	–

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

[a] 1—mammogram screening; 2—breast cancer susceptibility; 3—mammogram and breast cancer barriers; 4—mammogram and breast cancer benefits; 5—cultural barrier: crisis orientation; 6—cultural barrier: rely on others; 7—cultural barrier: use of Eastern medicine; 8—cultural barrier: modesty; 9—age; 10—age when moved to the United States; 11—years living in the United States; 12—education; 13—income; 14—English proficiency; 15—regular healthcare provider; 16—have insurance

Note. Variables 1–8 were measured at post-test and 9–16 were measured at baseline.

population of immigrant Chinese American women. Although the intervention was very supportive and successful, its feasibility in a real-world environment has yet to be determined and is currently being tested in a RCT.

Implications for Nursing Practice

For oncology nurses working in community settings, a targeted, culturally appropriate program that aims to increase breast health knowledge, improve access, and remove barriers may be effective in promoting mammography screening among Chinese American immigrant women. Given that healthcare providers cannot expect to change someone's culture, they should instead aim to leverage cultural beliefs to optimize intervention effect (Chin, Walters, Cook, & Huang, 2007). Accordingly, efforts to improve knowledge, increase awareness, and address beliefs must be culturally grounded in such ways as to give credence to the norm while also confronting the underlying misconception or myth. That can be achieved in the healthcare setting by maintaining awareness that immigrants may think and feel differently than the majority, and by asking about such beliefs in ways that are respectful. Intervention effect in a clinical setting may be incremental, with each health education discussion advancing a patient's knowledge, awareness, and, ultimately, readiness for behavior change. For

nurse researchers who are working with cancer screening, the TBHEP intervention has the potential to substantially improve mammography screening and can be used in other AAPI subgroups. Following the methods described in this article, researchers can translate the questionnaire and intervention into other languages and dialects and pretest them to determine clarity and feasibility. Further studies will be needed to make multisite and multiAAPI subgroup comparisons. The findings of this study provide a foundation for future intervention studies for Chinese American women and other AAPI subgroups. Results from this ongoing study will inform any needed changes in the translation of the intervention to clinical settings. Certainly, collaboration with community centers or community health workers may facilitate the translation process (Hou et al., 2011; Sabatino et al., 2012).

Conclusions

A targeted program that aims to increase breast health knowledge, improve access, and remove barriers may promote mammography screening among Chinese American immigrant women. This promising intervention, now being tested under a randomized, controlled design, can be adapted to other Asian subgroups.

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Journal club programs can help to increase your ability to evaluate literature and translate findings to clinical practice, education, administration, and research. Use the following questions to start discussion at your next journal club meeting. Then, take time to recap the discussion and make plans to proceed with suggested strategies.

1. Culture is acknowledged as a factor in how patients experience the cancer journey. How do you incorporate cultural differences in your practice?
2. Do you include an assessment of the readiness for change of your patients when planning or implementing educational interventions?
3. This study found that the longer these women had been in the United States, the greater the chances that they would have a mammogram. How can you use this finding in your practice to increase cancer screening among those who are underserved because of cultural and language barriers?
4. Some of the women were discouraged by their family members from having a mammogram. As nurses, it's not uncommon for us to see that kind of interference. What is the best way of dealing with this without causing problems for patients?

Author Sheds New Light on Topics Discussed in This Article

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