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### Authors

Mishra, Shiraz I  
Chavez, Leo R  
Magan~a, J Raul  
[et al.](#)

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# Improving Breast Cancer Control Among Latinas: Evaluation of a Theory-Based Educational Program

Shiraz I. Mishra, MD, PhD  
Leo R. Chavez, PhD  
J. Raul Magaña, PhD  
Patricia Nava, MA  
R. Burciaga Valdez, PhD, MHSA  
F. Allan Hubbell, MD, MSPH

The study evaluated a theory-based breast cancer control program specially developed for less acculturated Latinas. The authors used a quasi-experimental design with random assignment of Latinas into experimental ( $n = 51$ ) or control ( $n = 37$ ) groups that completed one pretest and two posttest surveys. The experimental group received the educational program, which was based on Bandura's self-efficacy theory and Freire's empowerment pedagogy. Outcome measures included knowledge, perceived self-efficacy, attitudes, breast self-examination (BSE) skills, and mammogram use. At posttest 1, controlling for pretest scores, the experimental group was significantly more likely than the control group to have more medically recognized knowledge (sum of square [SS] = 17.0,  $F = 6.58$ ,  $p < .01$ ), have less medically recognized knowledge (SS = 128.8,  $F = 39.24$ ,  $p < .001$ ), greater sense of perceived self-efficacy (SS = 316.5,  $F = 9.63$ ,  $p < .01$ ), and greater adeptness in the conduct of BSE (SS = 234.8,  $F = 153.33$ ,  $p < .001$ ). Cancer control programs designed for less acculturated women should use informal and interactive educational methods that incorporate skill-enhancing and empowering techniques.

## INTRODUCTION

### Background

Breast cancer is the most commonly diagnosed cancer among Latinas in the United States.<sup>1</sup> While considerable effort has been focused on the development of cancer control

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Shiraz I. Mishra, MD, PhD is an assistant adjunct professor at the University of California, Irvine, in the department of medicine, the School of Social Ecology and the Center of Health Policy and Research. Leo R. Chavez, PhD, is a professor at the University of California, Irvine in the department of anthropology and the Center for Health Policy and Research. J. Raul Magaña, PhD, is an associate clinical professor at the University of California, Irvine, in the department of medicine and the Center of Health Policy and Research. Patricia Nava, MA, is a research scientist, at the Center for Health Policy and Research at the University of California, Irvine. R. Buciaga Valdez, PhD, MHSA, is with the School of Public Health at the University of California, Los Angeles. F. Allan Hubbell, MD, MSPH, is a professor at the University of California, Irvine, in the department of medicine, the School of Social Ecology and the Center of Health Policy and Research.

*Address reprint requests to Shiraz I. Mishra, Center for Health Policy and Research, University of California-Irvine, 3255 Berkeley Place, Irvine, CA 92697-5800; phone: 949-824-3206; e-mail: Simshra@uci.edu*

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programs among women in general, few have focused on this important ethnic group. This study evaluated the effectiveness of a theory-based breast cancer control program specially created for Latinas. The article has two goals. First, to describe the program developed to educate Latinas about breast cancer. Second, to provide results that evaluate the program's impact on breast cancer-related knowledge, attitudes, and practices (KAP).

Several national and local studies have shown that Latinas, compared with women of other ethnic groups, differ in their knowledge about breast cancer.<sup>2-8</sup> The term "Latina" refers to women who identify themselves as either Hispanic, U.S.-born Mexican Americans (Chicanas), or immigrants from Mexico or other Central American countries, and the term "Anglo" refers to women who identify themselves as either Caucasian, white, or non-Hispanic white. Based on a cultural analysis of ethnographic data, Chavez et al.<sup>2</sup> identified a "Latina Model" of beliefs about breast cancer risk factors that emphasized breast trauma and "bad" behaviors, including drinking alcohol and using illegal drugs. In contrast, Anglo women embraced a "Biomedical Model" that emphasized risk factors described in the medical literature such as family history of breast cancer and age. Subsequently, Hubbell et al.<sup>3,4</sup> confirmed these findings in a large random sample telephone survey. Furthermore, this group reported that, unlike Anglo women, Latinas more often preferred not to know if they had breast cancer, were afraid to tell their husbands if they had breast cancer as it would affect their relationship, and believed that compared with women of other ethnic groups they were very likely to get breast cancer. More important, Latinas were 3 times as likely as Anglo women to believe that they needed a mammogram only when they had a breast lump.

Latinas are less likely than women of other ethnic groups to practice appropriate breast cancer screening examinations such as breast self-examination (BSE) and to use early detection services such as clinical breast examination (CBE) and mammogram. Compared with women of other ethnic groups, Latinas are less likely to report the conduct of regular BSE.<sup>9-11</sup> In addition, among those who do conduct regular BSE, few have shown the desired proficiency in the BSE technique.<sup>12</sup> Furthermore, surveys have consistently reported that Latinas are less likely than Anglo women to have had mammography.<sup>9-11,13-16</sup> Reasons for lower mammography use by Latinas include limited knowledge about cancer-related risk factors and screening procedures;<sup>6,7,10,13</sup> socioeconomic factors such as poverty, the financial inability to pay for out-of-pocket medical expenses, lack of health insurance, and inadequate access to health care;<sup>17,18</sup> and physician-patient communications.<sup>19</sup>

There are, therefore, serious gaps in Latinas' breast cancer-related knowledge and practices. Moreover, Latinas harbor beliefs that may impede them taking preventive or early diagnostic actions. In view of these realities, there is an unmet need to develop appropriate cancer control programs for Latinas that enhance their knowledge, positively affect attitudes and beliefs toward preventive practices, and impart skills necessary for the proficient conduct of examinations.

### **A Theory-Driven Breast Cancer Control Program for Latinas**

We developed a theory-driven breast cancer control program for Latinas,<sup>3</sup> the "Empowerment Model," based on Bandura's theory of self-efficacy<sup>20,21</sup> and Freire's empowerment pedagogy.<sup>22,23</sup> In brief, Bandura's theory predicts that individuals change their

beliefs about their own self-efficacy when they have experienced mastery of a task from effective performance of it. An increased sense of self-efficacy, in turn, leads to changes in behaviors, which result in improved outcomes. For example, a woman will be more likely to perform BSE if she feels competent to do it, and if she detects breast cancer early, she improves her chances for a good outcome. There are several examples in the breast cancer control literature that support the importance of self-efficacy in the practice of preventive behaviors.<sup>24,25</sup>

The Freirian pedagogy is based on the *problem posing* concept. The problem posing method of learning is contrasted with the *banking* concept of education. The banking method of learning reinforces the individuals' fatalistic perceptions of their situation and consequently does not allow students to shape their own actions to achieve needed change. The empowerment pedagogy provides a unique model to conduct education and nurture new behavioral skills by defining attributes of an ideal educational environment, the mode of effective education or information transference, and inclusion of cultural and socioecological sensitivities within the educational context.

In the empowerment pedagogy, a health educator presents a particular situation to students as a problem to be solved by the group. In this mode of learning, fatalism gives way to a perception that enables individuals to analyze the way they perceive reality. Thus individuals can be critically objective about that reality. The educational process involves give-and-take communication. Students are able to internalize and to evaluate critically the information they receive in the course of participating in an open dialogue with those imparting the information, that is, interactive or participatory rather than didactic exchange of information. Due to the active participation of the group in the critical analysis and discussion of issues under consideration, the educational environment assumes less threatening characteristics wherein students become intimately involved in the subject being examined, and whatever solutions are developed and agreed on have an increased likelihood of being applied to their own lives.

An effective educational process is one in which students are invited to introduce into the educational setting current environment and life circumstances that affect their risk of breast cancer. They, in turn, feel empowered to make the problem of avoiding cancer their own problem instead of the health educator's problem. Through this strategy, health educators involve themselves in an interactive process that allows them to gain more information about the beliefs and prevention of breast cancer while at the same time allowing program participants to be actively involved in a problem-solving process that will lead to their improved health. When using the Freirian pedagogy, a health educator poses questions to participants that are designed to encourage thought and discussion about, in this study's case, breast cancer's potential impact on their lives; about their beliefs related to risk factors, signs, and symptoms of the disease; and about prevention and treatment. The educator then guides the group to come up with solutions to the problem of breast cancer control. The approach allows a maximum ability to mold the content and process of the intervention to the specific needs, characteristics, and level of formal education of the target population, while encouraging a maximum degree of involvement by the participants, a component thought to be vital to facilitate behavioral change.

Freire developed his pedagogy during his literacy campaigns in developing countries. Those who have already been helped by his pedagogy share many cultural, socioecomic, and ecological attributes—such as low levels of formal education, less acculturation to Western norms, and traditional group-based interactions to achieve consensus on

personal and social issues—with the persons to whom our proposed intervention is targeted, that is, Latinas. Studies in cross-cultural settings have demonstrated that individuals with low educational attainment absorb new information best when it is presented in a way that relates the information to current environment and life circumstances.<sup>22,23</sup>

The Freirian pedagogy has widespread applicability to health education, especially with minority or marginalized populations who may believe they are powerless to change their lives.<sup>26-30</sup> The pedagogy has been used to develop programs for comprehensive health education for adolescents,<sup>31</sup> labor education,<sup>32</sup> environmental health and smoking prevention,<sup>33</sup> primary health care,<sup>34</sup> and homeless prenatal care.<sup>35</sup>

The Empowerment Model addresses some of the limitations of formal health education programs.<sup>22,23</sup> The formal, English-oriented, didactic breast cancer educational programs have limited usefulness for Latinas, especially those with lower acculturation and education levels. These programs employ a “deficit knowledge” approach<sup>2,6</sup> wherein only biomedical information is presented and fail to incorporate beliefs about breast cancer held by less acculturated Latinas. In addition, the health problem is decontextualized from the belief systems and daily routines of the target population, thus reducing their effectiveness. Moreover, programs that prescribe the “dos and don’ts” have little effect among Latinas since the information presented often is not culturally appropriate, sensitive, or comprehensible. Finally, many of the formal programs fail to provide practical skills necessary to the target population, skills that can enhance self-efficacy and follow-up behavior.

The primary goal of the Empowerment Model program was to improve breast cancer control among Latinas. The program focused on the facts and misconceptions about breast cancer signs, symptoms, risk factors, and practices. The outcomes of interest included enhancing the Latina’s knowledge about breast cancer, positively affecting her attitudes and perceived self-efficacy regarding the disease. In terms of breast cancer control practices, the program empowered Latinas with knowledge and skills necessary to conduct BSE and to obtain CBE and mammograms.

## METHODS

### Research Setting and Study Sites

The implementation and evaluation of the breast cancer control program was conducted in parts of Orange County, California. Approximately 23% of Orange County’s population is Latino. Most Latinos are of Mexican heritage; however, an estimated 25,000 immigrants from Central America, particularly from El Salvador, also live in the county. The study participants were recruited through a university-affiliated community-based primary care clinic and two community-based social service organizations. The primary care clinic and the social service organizations predominantly serve Latinos.

### Study Design and Procedures

We used a quasi-experimental panel design with random assignment of participants into experimental or control groups. Over a 10-week period, research assistants conducted

an initial screening interview and administered a pretest and two posttest surveys to these groups. The research assistants were specially trained and bilingual in English and Spanish. The pretest and posttest 1 surveys were separated by about 2 weeks during which period the experimental group received the educational program. The posttest 1 and posttest 2 surveys were separated by a period of about 6 weeks. Each of the pretest and posttest surveys lasted an average of 45 minutes, and the women received a total sum of \$80 for all the interviews. This type of comparative prospective evaluation design has been strongly recommended by a number of researchers to assess the effectiveness of prevention programs in the most rigorous way.<sup>36</sup> Women eligible for the study included those who were Latinas (U.S.-born or immigrants from Mexico or other Central or South American countries), 37 years of age or older, had not obtained a mammogram in the past 2 years, had never been taught BSE, and had never experienced breast cancer.

### Measures

The study instruments assessed variables that are important to KAP change in health promotion programs. The survey contained questions from our ethnographic<sup>2</sup> and telephone survey<sup>3</sup> research and also those adapted from the National Health Interview Survey and its Cancer Control Supplement<sup>37</sup> and a previously validated acculturation scale.<sup>38</sup> Bilingual investigators translated the questions from English to Spanish and then back-translated them using well-established procedures.<sup>39</sup> We revised the questionnaire after pilot-testing it in a random sample of Latinas not involved with the study.

*Sociodemographics.* Sociodemographic variables included country of birth, acculturation level, age, marital status, education level, employment status, annual household income, and health insurance coverage. We dichotomized the sociodemographic variables as follows: country of birth (1 = non-U.S. born, born in Mexico or other Central American country, 0 = U.S. born), age (1 = 37 to 49 years of age, 0 = more than 49 years of age), marital status (1 = currently married, 0 = currently single, widowed, divorced), educational level (1 = having less than 13 years of education, 0 = having 13 or more years of education), employment status (1 = currently unemployed or not in the workforce, 0 = currently employed full or part time), annual household income (1 = less than \$10,000, 0 = \$10,000 or greater), and health insurance coverage (1 = insured, 0 = uninsured). We measured acculturation level based on the preferred language (English or Spanish) used to read, speak, think, talk with friends, and used when growing up.<sup>28</sup> We scaled and dichotomized the scale as less acculturated (1) or more acculturated (0) using procedures described elsewhere.<sup>5</sup>

*Knowledge.* Nineteen items measured breast cancer-related knowledge about risk factors and symptoms. We categorized these items as either medically more recognized (9 items) or medically less recognized (10 items) based on the medical literature.<sup>40</sup> The 19 items were coded as: 1 = yes (i.e., the item is a risk factor or symptom for breast cancer) or 0 = no (i.e., the item is not a risk factor or symptom for breast cancer). The nine medically more recognized knowledge items about risk factors and symptoms included age, family history of breast cancer, giving birth to the first child after age 30, using birth control pills, being exposed to medical X rays, starting menstruation before age 12, detecting a lump in the breast, puckering of the breast skin, and bloody discharge from the breast. These items were scaled into a medically more recognized knowledge index

(range 0-9), in which a higher score on the index indicated a greater endorsement of medically more recognized risk factors and symptoms. Cronbach's alphas for the medically more recognized knowledge index were .37 (at pretest), .48 (at posttest 1), and .51 (at posttest 2). The 10 medically less recognized knowledge items about risk factors and symptoms included receiving hits or bruises to the breast, excessive fondling of the breast, breast implants, ingestion of antibiotics, worrying about breast cancer, chemicals in food, fate, having multiple sexual partners, differing breast size, and painful breasts. These items were scaled into a medically less recognized knowledge index (range 0-10), in which a higher score on the index indicated a greater endorsement of medically less recognized risk factors and symptoms. Cronbach's alphas for the medically less recognized knowledge index were .58 (at pretest), .67 (at posttest 1), and .67 (at posttest 2).

*Attitudes.* Eleven items assessed breast cancer-related attitudes. Respondents were asked to either agree or disagree with the attitude statements. Three items (if breast cancer is found early, it can be cured; I would undergo breast cancer treatment that is unpleasant or painful if it would improve my chances of living longer; I can protect myself from getting breast cancer) were coded as 1 = agree or 0 = disagree. Eight items (I think I would rather not know if I had breast cancer; At my age I do not need to worry about breast cancer; I would be afraid to tell my husband or partner that I have breast cancer because it would affect our relationship; I only need a mammogram when I or my doctor finds a lump in my breast; There is not much that I can do to prevent getting breast cancer; I am very likely to get breast cancer in my lifetime; A woman usually dies if she gets breast cancer; Breast cancer can be cured by a curandero[a]) were coded such that 1 = disagree and 0 = agree. The 11 attitude items were scaled into an attitude index (range 0-11), in which a higher score indicated more agreement or endorsement of medically favorable attitudes. Cronbach's alphas for the attitude index were .38 (at pretest), .42 (at posttest 1), and .60 (at posttest 2).

*Perceived Self-Efficacy.* We used an 11-item index to measure perceived self-efficacy for BSE.<sup>41</sup> The questions on the index covered areas of doctor-patient communications, ability to overcome environmental barriers to care, and perception of skillful performance of BSE. The items were scored using a 5-point Likert-type scale ranging from 1 = *not at all certain* to 5 = *very certain*. The scale score ranged from 0 to 55. Cronbach's alphas for the perceived self-efficacy index were .70 (at pretest), .80 (at posttest 1), and .73 (at posttest 2).

*Breast Self-Examination Skills and Proficiency.* We used a six-item scale to score the women on their skills and proficiency in conducting a BSE using a silicone breast model. A research assistant scored the participants in their palpation techniques (i.e., whether they used pads of finger, moved finger in small, dime-sized circles, lifted finger between palpations), application of pressure (i.e., whether they applied three levels of pressure for each palpation—light, medium, deep), examination of the nipple (i.e., whether they squeezed the nipple to check for lumps), and the breast examination pattern (i.e., whether they used a vertical strip, wedge, circular, or no specific pattern). These items were coded as 1 (yes) or 0 (no), where yes indicated the use of the correct technique. We used the American Cancer Society's guidelines to score the women's skills and proficiency in conducting a BSE.<sup>42</sup> The six items were scaled into a BSE skills and proficiency scale (range 0-6), in which a higher score reflected greater skills and proficiency in the conduct of BSE. Cronbach's alphas for the index were .41 (at pretest), .86 (at posttest 1), and .82 (at posttest 2).

*Breast Cancer-Related Practices.* Three indicators, breast self-examination, clinical breast examination, and mammogram, were used as indicators for breast cancer-related practices. We asked the women whether they had ever heard about these examinations (1 = yes, 0 = no), whether they had ever had these examinations (1 = yes, 0 = no), and when they had had their most recent CBE and mammogram (in months). The time since last screening exam (CBE and mammogram) was dichotomized as 1 = within the past 12 months or 0 = more than 12 months ago.

### **Implementation of the Empowerment Model**

We implemented the intervention for women in the experimental group during four educational sessions each lasting approximately 2 hours and occurring twice weekly. A trained bilingual health educator conducted the educational sessions at each of the three study sites. The women were paid \$25 for their participation at each educational session. Women in the control group did not receive any intervention.

During each session, the health educator posed questions to the participants that were designed to encourage thought and discussion about the potential impact of breast cancer on their lives, about risk factors and symptoms of breast cancer, and about prevention and treatment of the disease. The educator then guided the group to come up with solutions to the problem of breast cancer control. Each of the four sessions consisted of a separate module that addressed different aspects of breast cancer control.

The first module focused on procedural rules of the sessions, reasons for staying healthy, what each member already knew about breast cancer, and myths and facts regarding the disease. The establishment of procedural rules by the group was a major means for instituting empowerment early in the process. This module also initiated entry into the “problem-posing” pedagogy. By discussing knowledge and by learning myths and facts, the women began to assess how much they knew. This stage of the intervention assisted each woman to establish a baseline level of efficacy against which she could assess the extent to which she “owned” the problem of breast cancer control. The second module focused on ways in which the women were in control of their own health, on learning about risk factors and symptoms of breast cancer, and on discussing three types of early breast cancer detection practices (i.e., BSE, CBE, and mammography). The women also set goals in relation to the information presented—another step designed to elevate their own expectations of themselves. The third module addressed the reasons why CBE and BSE may not be performed, how to correctly perform BSE, goals related to BSE, and a plan of action for breast cancer detection. The women also practiced BSE with models. The fourth module focused on what a mammogram is, how it is carried out, how to obtain access to mammography in the community through a list of doctors and clinics providing mammograms, role playing for requesting mammograms, and the importance for following up on abnormal findings.

### **Data Analysis**

We conducted three sets of analyses to examine the impact of the educational program on KAP. First, we used the chi-square statistic<sup>43</sup> to assess whether there were significant between-group differences at the pretest (baseline) on indicators of KAP. No significant differences between the two study groups at the pretest on these indicators would indicate that the two groups (experimental and control) were comparable at the start of the study.



Second, we used a between-group design to evaluate the impact of the educational program in changing KAP between the pretest (baseline) and posttest 1. Since the dependent variables were both continuous (i.e., indices on knowledge, attitudes, perceived self-efficacy, and BSE skills and proficiency) and dichotomous (i.e., ever heard of or had a breast cancer screening exam, time since most recent exam), we used both analysis of covariance (ANCOVA) and logistic regression analyses to examine whether, after controlling for pretest scores, exposure to the educational program (as represented by study group affiliation, experimental, or control) predicted the posttest 1 scores on KAP. The ANCOVA results appear as main effect of education on the dependent variables (*SS* and the *F* statistic), and the logistic regression results appear as odds ratio with 95% confidence intervals.<sup>44</sup> Third, we used a within-group design to examine whether changes in KAP persisted over time, that is, at posttest 2—an assessment conducted 6 weeks after posttest 1. We used both the *t* test (for means) and the McNemar nonparametric test (for proportions) for significance testing of within-group differences between posttests 1 and 2.

The Human Subjects Review Committee of the University of California, Irvine, approved the research protocols for the surveys and educational program. The investigators obtained written informed consent from all participants.

## RESULTS

We recruited 108 women for the study based on the eligibility criteria discussed earlier. At the end of the study, the panel with complete data from all three assessments was made up of 88 women—51 and 37, respectively, in the experimental and control groups. Among the 88 Latinas in the panel, 72.7% were Mexican immigrants, 19% were Chicanas (US-born Latinas of Mexican heritage), and 7.9% were immigrants from Central America. The relative distribution of Latinas (based on their country of origin) was similar to our earlier studies.<sup>2-4</sup> Out of the 20 women who left the study prior to completion of their three assessments, three women were from the experimental group and 17 from the control group.

### Characteristics of the Experimental and Control Groups

In the selection and random assignment of the women, our goal was to create comparable study groups. To verify that this had occurred, we compared selected sociodemographic characteristics of the experimental and control group Latinas and, with one exception, found no significant differences (see Table 1). The majority of women in the two study groups were immigrants (non-U.S. born); had low levels of acculturation, with proportionally more experimental than control group women with low levels of acculturation (92% versus 76%,  $p < .05$ ); had less than 13 years of formal education; and were either unemployed or not in the workforce. Slightly less than one-half of the women in the two groups were currently married. In addition, compared with 62% of the control group women, 45% of the experimental group women were between the ages of 37 and 49 years. Furthermore, proportionally more experimental group women had an annual household income of less than \$10,000 and had health insurance.

We also compared selected sociodemographics of the women in the panel with those of women not in the panel, that is, those who left the study after the pretest. There were no significant differences between the panel and nonpanel women on indicators such as

Table 1. Comparison of Latinas in the Experimental and Control Groups on Selected Sociodemographic Characteristics at the Pretest (Baseline)

	Experimental ( <i>n</i> = 51) Percentage	Control ( <i>n</i> = 37) Percentage	<i>p</i> value
Non-U.S. born	86	73	.12
Less acculturated	92	76	.03*
Between 37 and 49 years of age	45	62	.11
Currently married	47	49	.88
Having less than 13 years of education	92	92	1.00
Currently unemployed or not in the workforce	82	76	.44
Annual household income of less than \$10,000	54	44	.44
Having health insurance coverage	53	43	.37

NOTE: Comparison of differences between Latinas in the experimental and control groups were based on chi-square tests.

\* $p < .05$ .

country of birth, acculturation level, age, marital status, education level, employment status, annual household income, and health insurance coverage.

### Amount of Exposure to the Educational Program

The large majority of the experimental group women participated in the educational sessions. Out of the 51 women in the experimental group, 78% ( $n = 40$ ) participated in all four educational sessions and an additional 18% ( $n = 9$ ) participated in three out of four sessions. The remaining two women participated in two out of the four educational sessions.

### Breast Cancer-Related Knowledge, Attitudes, Perceived Self-Efficacy, and BSE Skills and Proficiency

*Pretest.* There were no significant differences between the experimental and control groups on breast cancer-related medically more or less recognized knowledge and medically favorable attitudes (see Table 2). In terms of medically more recognized knowledge, more than one-half of the Latinas in both the study groups correctly identified six of the nine medically recognized risk factors and symptoms of breast cancer such as age, family history, birth of first child after age 30, lump in the breast (median scores = 6.0 for the experimental and control groups). In addition, more than one-half of the women in the two study groups incorrectly identified 7 of the 10 medically less recognized risk factors and symptoms of breast cancer such as excessive fondling of the breast, hits or bruises to the breast, breast implants (median scores = 7.0 for the experimental and control groups). In terms of their attitudes, more than one-half of the women in the two study groups endorsed 8 of the 11 favorable attitudes regarding breast cancer such as their ability to protect themselves from getting breast cancer, willingness to undergo unpleasant or painful treatment if it would improve their chances of living longer (median scores = 8.0 for the experimental and control groups).

There were no significant differences between the experimental and control groups in their BSE-related perceived self-efficacy and skills and proficiency (see Table 2). In terms

of perceived self-efficacy regarding BSE, more than one-half of the women in both study groups were either undecided or somewhat certain about their ability to effectively interact with their health providers, overcome environmental barriers to care, and skillfully perform BSE (median scores = 42.5 and 43.0, respectively, for the experimental and control groups). In terms of their skills and proficiency to conduct BSE, women in both study groups had less than adequate ability to appropriately perform the examination (median scores = 1.0 for both groups), that is, they were less than likely to move their finger in small circles, not lift finger between palpations, use three levels of pressure, squeeze the nipple to check for lumps, and use a regular pattern (vertical, wedge, or circular) during BSE.

*Pretest to Posttest 1.* The educational program positively changed knowledge, attitudes, perceived self-efficacy regarding breast cancer, and skills and proficiency to perform BSE among women in the experimental group. The positive changes in knowledge were reflected in the increased mean (and median) scores for the experimental group women on indices measuring medically more recognized knowledge, medically favorable attitudes, perceived self-efficacy, and BSE skills and proficiency, and the decreased mean (and median) score on the medically less recognized knowledge index (see Table 2).

We conducted ANCOVAs to examine the impact of the educational program on knowledge, attitudes, perceived self-efficacy regarding BSE, and skills and proficiency to perform BSE (see Table 3). We modeled the analyses to uncover, after controlling for pretest scores, main effects of the educational program on posteducation (posttest 1) knowledge, attitudes, perceived self-efficacy, and BSE skills and proficiency. At the posttest 1, compared with the control group women, those in the experimental group were more likely to correctly identify medically more recognized risk factors and symptoms ( $SS = 17.0$ ,  $F = 6.58$ ,  $p < .01$ ), less likely to endorse medically less recognized risk factors and symptoms ( $SS = 128.8$ ,  $F = 39.24$ ,  $p < .001$ ), have a higher sense of perceived self-efficacy regarding their ability to perform BSE and overcome barriers ( $SS = 316.5$ ,  $F = 9.63$ ,  $p < .01$ ), and display greater skills and proficiency in the conduct of BSE ( $SS = 234.8$ ,  $F = 153.33$ ,  $p < .001$ ). The experimental group women were also more likely to endorse medically favorable attitudes regarding cancer; however, the findings did not reach statistical significance.

*Posttest 1 to Posttest 2.* Posteducation changes in knowledge, attitudes, perceived self-efficacy, and BSE skills and proficiency are important outcomes; however, it is equally important to ensure that the positive gains of the educational program are not lost over time. To test for the persistence of changes over time, we conducted within-group analyses that examined posttest 1 to posttest 2 changes (a period of about 6 weeks) in knowledge, attitudes, perceived self-efficacy, and BSE skills and proficiency (see Table 2). At posttest 2, controlling for the posttest 1 scores, there were no significant differences on means testing ( $t$  test) in knowledge, attitudes, perceived self-efficacy, and BSE skills and proficiency among women in the experimental group—the scores attained at posttest 1 after exposure to the educational program appeared to have remained relatively stable over time.

### **Breast Cancer-Related Practices**

*Pretest.* At the pretest (baseline), there were no significant differences between the experimental and control groups on the frequency with which they conducted BSE and obtained a CBE and a mammogram (see Table 4). Less than one-fourth of the experimen-

Table 2. Knowledge, Attitudes, Perceived Self-Efficacy, and Breast Self-Examination Skills and Proficiency Index Scores for Latinas in the Experimental ( $n = 51$ ) and Control ( $n = 37$ ) Groups at Pretest, Posttest 1, and Posttest 2

	Pretest		Posttest 1		Posttest 2		$p^b$
	Experimental	Control	Experimental	Control	Experimental	Control	
More recognized knowledge							
Mean ( <i>SD</i> )	5.9 (1.5)	5.5 (1.7)	7.0 (1.6)	6.0 (1.7)	7.1 (1.3)	6.1 (2.0)	.72
Median	6.0	6.0	7.0	6.0	7.0	7.0	
Less recognized knowledge							
Mean ( <i>SD</i> )	7.0 (1.8)	6.2 (2.2)	4.7 (2.3)	6.7 (1.9)	5.0 (2.3)	6.6 (2.1)	.68
Median	7.0	7.0	5.0	7.0	5.0	7.0	
Medically favorable attitude							
Mean ( <i>SD</i> )	8.0 (1.7)	7.6 (2.0)	8.8 (1.4)	8.2 (1.7)	8.9 (1.7)	8.2 (1.6)	.80
Median	8.0	8.0	9.0	8.0	9.0	8.0	
Perceived self-efficacy							
Mean ( <i>SD</i> )	40.6 (8.9)	42.2 (8.0)	48.2 (7.2)	45.4 (7.0)	48.7 (6.4)	46.3 (7.4)	.09
Median	42.5	43.0	51.0	47.0	51.0	47.0	
BSE skills/proficiency							
Mean ( <i>SD</i> )	1.5 (1.1)	1.7 (1.0)	5.0 (1.1)	1.7 (1.4)	4.7 (1.1)	1.4 (1.0)	.14
Median	1.0	1.0	5.0	1.0	5.0	1.0	

NOTE: Standard deviations (*SD*) are denoted in the parentheses; BSE = breast self-examination.

a. Significance testing of between-group (experimental and control) differences of the pretest mean scores of the indices was based on means testing (*t* test).

b. Significance testing of within-group (experimental or control) differences between the posttest 1 and posttest 2 mean scores of the indices was based on means testing (*t* test).

Table 3. Summary of Main Effects of the Educational Program on Knowledge, Attitudes, Perceived Self-Efficacy, and Breast Self-Examination Skills and Proficiency Between the Pretest and Posttest 1

	Posttest 1 <sup>a</sup>	
	Sum of Squares	F
Main effect of education on		
Medically more recognized knowledge	17.0	6.58*
Medically less recognized knowledge	128.8	39.24**
Medically favorable attitudes	3.6	2.84
Perceived self-efficacy	316.5	9.63*
BSE skills and proficiency	234.8	153.33**

NOTE: BSE = breast self-examination.

a. Covariates at posttest 1 were the respective pretest scores on knowledge, attitudes, perceived self-efficacy, and BSE skills and proficiency.

\* $p < .01$ . \*\* $p < .001$ .

tal (24%) and control (22%) group women conducted BSE at least once every month. The majority of the experimental (65%) and control (70%) group women had ever had a CBE; however, less than one-third of the women had had a CBE within the past year: 31% of experimental and 22% of control group women had had a CBE within the past year. About one-fourth (24%) of the experimental and about one-third (32%) of the control group women had ever obtained a mammogram. Furthermore, none of the women in either study group had obtained a mammogram within the past year.

*Pretest to Posttest 1.* From pretest to posttest 1, the educational program positively changed certain breast cancer control practices, especially those related to breast self-examination. We did not anticipate pretest to posttest 1 changes in the frequency with which the women obtained CBE and a mammogram; there were nevertheless some, albeit small, changes in the positive direction on these indicators.

*Posttest 1 to Posttest 2.* At posttest 2, the positive gains made by women in the experimental group at posttest 1 remained relatively stable. Based on within-group analyses of posttest 1 to posttest 2 changes, there were small positive changes among experimental group women on indicators of the frequency with which the women conducted BSE and had CBE and obtained a mammogram. In terms of BSE, at posttest 2, significantly more experimental group women conducted a BSE at least once a month (posttest 1: 47%, posttest 2: 67%,  $p < .01$ ). Furthermore, at posttest 2, proportionally more experimental group women had obtained a CBE and a mammogram.

## DISCUSSION

### Summary and Qualifications

The theory-based Empowerment Model educational program is an effective way to change breast cancer-related knowledge, attitudes, and, more important, practices. This is especially true if the knowledge, attitudinal, and behavioral components are specifically

Table 4. Breast Cancer Control Practices Among Experimental ( $n = 51$ ) and Control ( $n = 37$ ) Group Latinas at the Pretest, Posttest 1, and Posttest 2 (percentages)

Practices	Pretest		Posttest 1			Posttest 2					
	Experimental	Control	$p^a$	Experimental	Control	ORs <sup>b</sup>	CI <sup>s</sup>	Experimental	Control	$p^c$	$p^d$
BSE at least once a month	24	22	.80	47	30	2.2	(0.9-5.6)	67	35	.01*	.69
Ever had a CBE	65	70	.58	71	76	0.9	(0.1-6.5)	73	76	1.00	1.00
CBE within the past year	31	22	.31	33	22	1.6	(0.5-5.1)	43	24	.23	1.00
Ever had a mammogram	24	32	.36	31	35	2.7	(0.3-26.1)	35	41	.50	.63
Mammogram within the past year	0	0	na	2	3	na		10	11	.12	.25

NOTE: BSE = breast self-examination; CBE = clinical breast examination; OR = likelihood; CI = confidence interval.

- Significance testing ( $p$  values) of pretest differences in practice scores (proportions) between the Experimental and Control groups using chi-square statistics.
- The likelihood (ORs) and significance testing (CIs) of pretest-to-posttest one differences between the Experimental and Control groups. Using logistic regression models, the posttest one scores on practices for the Experimental and Control groups were predicted by exposure to the educational program after controlling for the respective pretest practice scores.
- Significance testing ( $p$  value) of the posttest one-to-posttest two changes within the Experimental and Control groups on practice scores using the McNemar differences in the proportions test.
- Proportions with empty cells (i.e., when there were no differences either between or within a group, or when all the participants responded "yes") were excluded from the significance testing and logistic regression models. In these circumstances, the  $p$ -values or ORs are denoted as not applicable (na) in the Table.

\*  $p < .01$ .

contained in the program. Prior to the study, Latinas in both groups had some knowledge about the medically more recognized risk factors such as heredity, advancing age, use of birth control pills, and exposure to radiation. After exposure to the educational program, the experimental group women were significantly more likely to correctly identify most of the medically more recognized risk factors and, more important, less likely to endorse the medically less recognized risk factors such as breast trauma, breast implants, multiple sexual partners, chemicals in food, and excessive breast fondling. In addition, Latinas exposed to the educational program had significantly higher levels of perceived self-efficacy, especially in their ability to conduct BSE, effectively interact with their providers, and overcome barriers related to the exam. There were some changes in medically favorable attitudes regarding breast cancer among the experimental group women after exposure to the educational program; the changes, however, were modest. Furthermore, the positive gains in knowledge, perceived self-efficacy, and attitudes were maintained over time (posttest 1 to posttest 2).

Knowledge, attitude, and perceived self-efficacy changes are necessary but not sufficient conditions for changes in behaviors. Behaviors of primary consideration in this study were regular conduct of BSE using proper skills to detect lumps in the breast and obtaining regular CBE and screening mammogram. At the pretest, although nearly one-fourth of the Latinas in both study groups reportedly conducted BSE at least once a month, they were less likely to perform BSE using proper skills such as moving fingers in small circles, not lifting their fingers during palpation, using different levels of pressure, squeezing the nipples to check for lumps, or using a regular pattern. As a consequence, despite the fact that the women regularly performed BSE, they lacked knowledge about and proficiency in the proper conduct of BSE skills. After the education program, the skill-building activities discussed during the educational sessions and the practice on silicone breast models significantly improved the experimental group's ability to perform BSE. Furthermore, the experimental group women maintained their newly acquired skills for at least 6 weeks beyond the educational program.

We think our educational program succeeded for several reasons. First, it was based on the successful interactive and empowering techniques prescribed by Paulo Freire. We did not structure the educational sessions in didactic terms but rather established an intensively interactive model wherein the facilitator guided the discussion by posing questions, provided clarification, and introduced medically established concepts about risk factors, symptoms, and appropriate practices. Second, the facilitator conducted the education at a level that was comprehensible and appropriate for the literacy level of the women. Third, the interactive approach provided an appropriate informal mode of communication with these less acculturated women as opposed to the more formal didactic educational approach that places emphasis on the "dos and don'ts" of knowledge and behaviors with complete disregard to personal beliefs. Fourth, the interactive approach facilitated the introduction of new knowledge by addressing the women's personal beliefs. The women had the opportunity to discuss their conceptions in a nonthreatening environment and to conclude, individually and as a group, the support for their beliefs and adoption of new ideas. Fifth, the skill-building exercise using silicone models provided the women with a practical learning experience rather than an abstract, theoretical concept of a new behavior. Moreover, the actual practice and use of role playing may have enhanced their sense of self-efficacy and competence in the conduct of BSE. In addition, use of women to teach each other the proper conduct of BSE may have made the practice and the environment seem less threatening and more comfortable for new

learning. This educational model made the women feel empowered to address issues of importance to them.

We did not observe significant attitudinal and behavioral changes on indicators such as obtaining CBE and a screening mammogram. A lack of significant attitudinal changes could be attributed to a high baseline score on the medically favorable attitudes (mean and median scores of 8 out of a maximum score of 11). Therefore, there was not much room for program-induced changes on these items. Furthermore, many of the attitudinal items on the scale were not directly addressed through the educational program. We focused instead on the enhancement of the sense of self-efficacy (perceived and actual) with the presumption that self-efficacy would provide the women a sense of empowerment. A sense of empowerment would, in turn, motivate the women to be more proactive regarding their health in general and breast cancer prevention in specific. The fact that, at the posttest, significantly more women in the experimental group positively endorsed the attitude "I can protect myself from cancer" and negatively endorsed the attitude "There is not much I can do to prevent breast cancer" (data not shown) suggests that the program was effective in empowering the women in terms of their health attitudes.

Several reasons could account for the lack of impact on the behavioral indicators of obtaining CBE and a mammogram. First, unlike BSE-related behaviors, for the women to obtain a CBE and a mammogram, they need to have access to the health care system. Access to health care for these women may be limited owing to a lack of health insurance coverage, the lack of which has repeatedly been shown to impede access to health care, especially preventive services.<sup>17,18</sup> Second, although the women realized that seeking preventive care was important, it is quite likely that their other responsibilities such as child care services, lack of transportation, and inability to take time off from their jobs may have acted as barriers for them to schedule appointments for CBE and mammogram. Evidence that these factors may have acted as barriers comes from our experiences in scheduling the educational sessions. To circumvent these factors acting as barriers in our efforts to coordinate the sessions, we scheduled some of the sessions late in the evening. This schedule alleviated some of the barriers faced by some of the women because they did not have to take time off from work or hire child care services. In addition, we facilitated their ability to participate in the sessions by providing child care service and transportation for those in need of these services. Third, the follow-up time for these behaviors to manifest themselves may have been too short; there was a period of only 6 weeks between posttest 1 and posttest 2 when we could realistically expect changes on these indicators.

Limitations of the study are those inherent in panel studies and studies that research sexually related sensitive issues such as those addressed here. Potential bias due to attrition of participants may have been introduced in our panel study. Because the attrition was primarily due to factors beyond the control of the study (inability to take time off from work, lack of transportation, sickness), there is no reason to believe that the nonpanel and panel women would differ in their KAP. Further reinforcing our conclusion, we found no significant differences in the sociodemographic characteristics of the panel and nonpanel women. The relatively small sample sizes of the study group may call into question the robustness of the study findings. This concern would, however, be more of an issue in a correlational, one-group study design. The stringent sampling criteria and the two-group, quasi-experimental panel design with randomization supports our causal interpretation regarding the efficacy of the educational program. The self-reported changes in practices (especially regular conduct of BSE) as contrasted with direct observation may reflect a response bias, with the women providing socially desirable



responses. There is no reason to believe that we ascertained socially desirable responses since, if that were the case, we would have expected more women affirming that they obtained CBE and mammograms.

### **Implications for Practitioners**

Our findings have several implications for health promotion and disease prevention programs. First, our findings suggest the importance of interactive mode of communication for health programs designed for target populations with low levels of education and acculturation. By creating an environment wherein the target audience could discuss and "own" the intended problem, the participants appeared to identify with the program and they viewed themselves not only as students but also as teachers—a concept stressed by Freire in his empowerment pedagogy.

Second, our prospective comparative design was the key to demonstrating program-caused effects as well as the differential effects between the study groups. Prospective designs are always a challenge, particularly when the target population is poor or has low education levels where health (especially prevention), although an important concept, is lower in the hierarchy of needs behind issues such as employment, child care, and transportation. Nonetheless, the careful planning and persistent follow-up with participants yielded data that provide evidence for the program's effectiveness and insights about more or less effective program components. Furthermore, this hierarchy of needs may take precedence over health care in general and preventive care in specific. Therefore, it may be easier to observe positive outcomes on behavioral indicators where the target population does not have the pressure to disrupt this hierarchy. A case in point from this study is the positive results observed on indicators of BSE. Breast self-examination is a preventive practice the women can practice at a time and location convenient to them, without having to disrupt their daily responsibilities or confront the barriers to care found in our health care system.

Third, the ultimate outcome of effective programs is change in personal behaviors. We demonstrated the program's effectiveness in enhancing knowledge and perceived self-efficacy, positively modifying attitudes, BSE-related skills, and adoption of positive behavior changes. Some behavior changes, especially obtaining a regular CBE and mammogram, may have occurred more at an abstract rather than practical level. This is in part due to the structural limitations in accessing care faced by the target population. Their lower socioeconomic backgrounds rather than their motivation or intentions may preclude them from accessing health care at levels appropriate to maintain adequate preventive care. This contradiction raises an ethical dilemma for program designers, for the target population may acknowledge the importance of preventive practices; however, they may be impeded in their desire to act on their preventive behavior intentions. A related ethical dilemma arises when studies designed to enhance early detection outcomes (i.e., screening mammograms) uncover a cancer among the target population members. Research studies must make allowances for resources necessary in providing appropriate follow-up care for these cases.

In conclusion, this study demonstrated the importance of scientifically rooted theories in the design and implementation of health promotion programs. Furthermore, our findings suggest that educational programs for audiences that have low levels of education and/or are less acculturated need to use informal educational methods that are easy to understand, use the target population as students as well as teachers, use role playing

and modeling techniques to develop new behaviors and skills, and use interactive modes of communication that empower the target audience.

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