Development and Validation of a Cervical Cancer Screening Self-Efficacy Scale for Low-Income Mexican American Women

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Abstract

Although self-efficacy, a construct from social cognitive theory, has been shown to influence other screening behaviors, few measures currently exist for measuring Papanicolaou test self-efficacy. This article describes the development and psychometric testing of such a measure for Mexican American women. Data from two separate samples of Mexican American women ages ≥50 years, obtained as part of a study to develop and evaluate a breast and cervical cancer screening educational program, were used in the current study. Exploratory factor analysis indicated a single-factor solution and all item loadings were >0.73. Confirmatory analysis confirmed a single-factor structure with all standardized loadings >0.40 as hypothesized. The eight-item self-efficacy scale showed high internal consistency (Cronbach's α = 0.95). As hypothesized, self-efficacy was correlated with knowledge, prior experience, and screening intention. Logistic regression supported the theoretical relationship that women with higher self-efficacy were more likely to have had a recent Papanicolaou test. Findings showed a significant increase in self-efficacy following the intervention, indicating that the measure has good sensitivity to change over time. (Cancer Epidemiol Biomarkers Prev 2009;18(3):866–75)

Introduction

Hispanics have higher cervical cancer incidence and mortality rates compared with non-Hispanic Whites (incidence, 13.8 versus 8.5 per 100,000; mortality, 3.3 versus 2.3 per 100,000; 2000-2004; ref. 1). Data from the 2006 Behavioral Risk Factor Surveillance System survey reports an overall high percentage of women ages ≥18 years who have had a Papanicolaou (Pap) test within the last 3 years (84%; ref. 2). Nonetheless, these trends are not visible in subgroups such as women with less than a high school education, women with the lowest incomes, uninsured women, and Hispanics (3). Hispanic women have lower rates of recent Pap; only 74% reported having had a Pap test in the preceding 3 years (4-6). Even greater disparities exist among older Hispanic women and among those living in certain regions of the country such as the United States-Mexico border (5, 7).

Demographic factors associated with low levels of Pap test screening include having <12 years of education, being unemployed, not being married, recent immigration, and lower income (7-13). Psychosocial factors include embarrassment, uncomfortable examinations, low acculturation, fatalism, language barriers, physician distrust, lack of childcare, fear of the procedure, fear of the results, concern about confidentiality, lack of knowledge, perceived discrimination, and perceived partner disapproval (8, 14-21). External factors include lack of physician referral, lack of health insurance, cost, no regular place of care, restrictive work policies, rigid clinic payment policies, poor transportation, and quality of care (8, 9, 15, 19, 22-25). Cognitive-affective processes that interact with external factors also negatively affect screening (20).

According to Bandura's social cognitive theory (SCT), self-efficacy is one's confidence in being able to exert personal control (26). Bandura (27) proposes that self-efficacy is a task-specific expectation. People gauge their confidence in their capacity to handle a situation through evaluating the specific activities or steps involved in the successful achievement of the task (or behavior). For example, several steps are involved for a woman to have a Pap test screening. First, the woman may call and make an appointment with her doctor. A self-efficacy belief corresponding to this step would be the confidence a woman has in her capability to find and call a location that offers Pap test screening and arrange an appointment. The level of a woman's self-efficacy may vary for each step. For instance, the woman may be able to set an appointment but may have a harder time overcoming the fear of pain or embarrassment during the test. Thus, a self-efficacy measure should assess the major steps involved in the behavior studied to have the best predictive power (28).

SCT holds that persons with high self-efficacy beliefs about a task call on these beliefs and abilities to handle the task (26, 29). Within the context of Pap test screening,

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Pap test self-efficacy can be described as confidence in being able to schedule and complete screening (30).

Self-efficacy varies across different behaviors (e.g., self-efficacy for physical activity differs from self-efficacy for smoking cessation) and across various levels of performance of a domain of function (e.g., walking laps compared with running a marathon; ref. 29). Because the construct of self-efficacy is a function of both the behavior in question and the situational contexts in which the behavior takes place and may differ from one population to another, there are no standard sets of self-efficacy measures that can be used for all individuals in all circumstances (31-33). Therefore, self-efficacy scales need to be developed for specific domains of functioning (33) and for different populations because their situational contexts may differ.

Measures of self-efficacy have been developed for other types of cancer screening behaviors, such as mammography screening (28), breast self-examination (34), and testicular self-examination (35). Self-efficacy measures for other health behaviors have also been developed specifically for Hispanic populations: exercise (36), HIV risk behaviors (37, 38), perimenopausal health (39), chronic disease self-management (40), mammography (41), and arthritis self-management (42).

No measure of self-efficacy for Pap test screening for Hispanic women has been published in the literature, and at the time of the study, no Pap test screening self-efficacy measure existed at all. Currently, the only related scale for any group is a recently published 20-item instrument for sheltered homeless inner city women (43). The scale contains population-specific items concerning confidence in overcoming Pap screening barriers in the context of homelessness, such as living without permanent housing, drug treatment, and alcohol use. According to the criteria set by Hui and Triandis, which describe dimensions of equivalence when attempting to measure constructs across culture, the scale developed for homeless women is unlikely to function adequately in other groups (44). Our article describes the development and psychometric testing of a Pap test screening instrument for Mexican American women that includes behavior and barrier-specific items that reflect their cultural and situational context. It is the first to develop a Pap test self-efficacy scale for Hispanics and thus fills an important gap in cervical cancer-related measures.

Our definition of self-efficacy, based on Bandura's SCT, was perceived confidence in one's personal ability to obtain a Pap test.

Hypotheses were as follows:

1. A confirmatory factor analysis (CFA) will support a single-factor model in which all hypothesized paths have a standardized magnitude of at least 0.40.
2. Cronbach's α for the Pap self-efficacy scale will be >0.70.
3. Perceived self-efficacy will be more highly correlated with screening intention, knowledge, and prior Pap experience than with perceived risk and subjective norms.
4. Perceived self-efficacy will be independently associated with Pap test screening adherence.
5. The scale will detect expected changes in self-efficacy.

Materials and Methods

Study Population. Data from two separate samples were used to inform the development and validation of the instrument. Both data sets were obtained as part of a study to develop and evaluate the effectiveness of a breast and cervical cancer screening educational program for Hispanic women living in farmworker communities, called Cultivando la Salud (Cultivating Health; ref. 45). The first data set, used for the exploratory factor analysis (EFA), was obtained using a convenience sample of 200 female Hispanic women living in neighborhoods in Cameron and Hidalgo counties located in the Lower Rio Grande Valley of Texas. The data were collected as part of the Cultivando la Salud pilot study to identify factors associated with mammography and Pap test screening and to gather data that would be used for instrument refinement. Women were recruited from Lower Rio Grande Valley neighborhoods known to have high proportions of farmworker families. Female bilingual Hispanic interviewers approached women in their homes, determined eligibility, and invited women to participate in a survey. Eligibility criteria included women ages $\geq$50 years, no prior or current cancer diagnosis, and farmworker status (defined as personal or family participation in farmwork for at least 5 years during their lifetime). Women gave written consent before completing the interview and received a \$20 incentive.

The second data set, used for the all other analyses, consisted of data collected from women participating in the Cultivando la Salud intervention trial. Recruitment occurred along the U.S.-Mexico border and the central valley in California in the following cities: Anthony, NM; Eagle Pass, TX; Merced, CA; and Watsonville, CA. We selected neighborhoods or colonias in these areas based on two criteria: (*a*) high percentages of farmworker families residing within them and (*b*) within 20 miles of health-care facilities that offered National Breast and Cervical Cancer Early Detection Program-funded cancer screening services. We randomized selected communities to either the intervention condition (Merced and Eagle Pass) or the comparison condition (Watsonville and Anthony).

To obtain the sample of study participants, the EPI Sampling Quadrants Scheme was used (46). Colonias were divided into four quadrants; data collectors randomly selected a starting point in each quadrant and walked the neighborhood. Administering the screening questionnaire door-to-door, each data collector continued to screen for eligibility and conduct interviews until she had screened all the households in the quadrant. Eligibility criteria were identical to the pilot study. Only one woman per household was invited to participate. If more than one woman was eligible, the woman with the most recent birth date was selected. Eligible women interested in participating gave written consent before the interview and received a \$20 incentive on completion.

Consistent with principles of community-based participatory research methods described by Israel et al. (47), we recruited data collectors and data collection supervisors from the communities at each site. Although more intensive training is typically needed, this approach often results in higher consent rates as well as more accurate and honest responses (48). Interviews were conducted in Spanish and lasted ~2 h. All interviewers were female and bilingual and attended a 2-day training. During the training, data collectors became facile with the study protocol and instrument and participated in several practice sessions. The second day of training included actual data collection in a test community (Lower Rio Grande Valley) and project staff and investigators observed all data collectors. The practice was followed by a debriefing session during which data collectors clarified the answers to any of their questions and receive comments about their performance.

A total of 713 women were interviewed, which included 578 women who satisfied the eligibility criteria above plus an additional 135 women who were oversampled based on their nonadherence to breast and cervical cancer screening recommendations (no mammography in the past year and/or no Pap test in the past 3 years). There were a total 243 women who were nonadherent to recommended Pap test screening guidelines.

Lay health workers delivered the Cultivando la Salud intervention (video, flipchart, and resource list) to all women in the intervention communities who had completed the baseline survey. The intervention was designed to address factors influencing Pap test screening such as knowledge about guidelines, barriers to screening, perceived risk, and self-efficacy. Various methods were used in intervention materials to influence self-efficacy such as modeling, vicarious learning and reinforcement (video and graphic portrayal of women overcoming barriers to screening, talking with their doctor about the Pap test, etc.; refs. 27, 31), and verbal persuasion. We expected that exposure to the intervention materials would increase perceived Pap test self-efficacy.

Six months following program implementation, data collectors conducted follow-up face-to-face interviews. The overall follow-up rate was 66.9% with no statistically significant differences on demographic variables or acculturation between women contacted for follow-up and those lost to follow-up. We also detected no statistically significant demographic or acculturation differences by follow-up status across study conditions.

Measures. The baseline survey instrument consisted of 276 items including demographic, general health, knowledge, attitudinal, and cancer screening questions. The items and scales relevant for the current study were those used to assess: Pap test screening behavior, Pap test knowledge, perceived susceptibility (or risk) to cervical cancer, prior experience with Pap test screening, subjective norms, and Pap test screening intention.

We measured Pap test screening behavior by asking participants the exact month and year of her last Pap test. Those unable to remember the date were asked to estimate the number of years elapsed. We measured acculturation using the Bidimensional Acculturation Scale (49) that includes 60 items assessing English and Spanish language proficiency and frequency. The Pap test knowledge scale consisted of 15 items with a yes/no/don't know response format. Example items include "Women who have gone through menopause do not need a Pap test" and a "Pap test can detect problems before they become cancer." All of the following psychosocial constructs were assessed with five-point Likert-type scales. Prior experience, a construct defined as previous performance of a task or experience (27), included five items (e.g., "Your Pap test was reassuring"). Subjective norms, the belief concerning the desires (related to Pap test screening) of important people or groups and the value that an individual places on those desires (50), was assessed using six items including phrases such as "Your family thinks you should get a Pap test" and "You want to do what your family thinks you should do about a Pap test." Screening intention, an indication of an individual's readiness to perform a behavior (50), was assessed with two items: "Do you plan on having a Pap test in the future?" and "When do you plan on having your next Pap test?" Perceived susceptibility, an individual's perception that she is at risk for a particular condition (cervical cancer in this case; ref. 51), was assessed with four items and included items such as "I believe I have a high chance of developing cervical cancer in the next 10 years." Scales such as subjective norms and perceived susceptibility included items from existing scales (52, 53) and new items generated from our focus groups and other findings, as described elsewhere.[5]

We assessed the internal consistency using baseline data. The Cronbach's α values of scales with more than three items were perceived susceptibility to cervical cancer (0.93), prior experience (0.50), Pap test subjective norms (0.82), and acculturation (0.90).

Bandura (27) describes guidelines that suggest that scale items should include (*a*) the major steps associated with the process of obtaining a Pap test, (*b*) the efficacy beliefs despite certain barriers or difficulties in obtaining the screening, and (*c*) the strength of the belief using a Likert-type scale (very sure to very unsure; ref. 27). The combination of a woman's confidence in her ability to accomplish the major behavioral subcomponents and her belief in her ability to overcome obstacles to the behavior are what constitute overall self-efficacy (27).

Community members participating in the formative phase of our study contributed to the development and review of the items used in the self-efficacy scale. Before the development of items, we carefully delineated both the steps involved in obtaining a Pap test and the barriers and difficulties that low-income Mexican American women might encounter. We conducted four focus groups with women who had obtained a recent Pap test and with those who had never had a Pap test or had not had one in >3 years. Both adherent and nonadherent women generated barriers to Pap test screening, including having to pay for the test, fear of pain, no transportation, no provider recommendation, and discouragement from others.[6] The focus group participants also confirmed the three major steps involved in obtaining a Pap test: discussing Pap test screening with a healthcare provider, scheduling the appointment, and completing the screening.[6,7] These findings as well as a

[5] Cultivando La Salud: Breast and Cervical Cancer Replication and Dissemination Program, Focus Group Report. Fernandez M, Gonzales A. Buda (TX): National Center for Farmworker Health; 2000.
[6] Saavedra-Embesi M. Barriers to breast and cervical cancer screening among migrant and seasonal farmworker women in the Lower Rio Grande Valley, Texas [thesis]. University of Texas Health Science Center at Houston, School of Public Health (San Antonio Campus); 2008.
[7] Cultivando La Salud: Breast and Cervical Cancer Replication and Dissemination Program, Pilot Report. Gonzales A, Fernandez M, Saavedra M, Tortolero-Luna G, editors. Buda (TX): National Center for Farmworker Health; 2001.

literature review on test-specific barriers to screening were used to develop the scale items.

Two experts (William Rakowski, Ph.D. and Alfred McAlister, Ph.D.) evaluated the instrument for content validity. Dr. Rakowski (Medical Sciences, Department of Community Health, Brown University) is an expert in extending the transtheoretical model to cancer screening through instrument design and testing and intervention development and evaluation research. Dr. McAlister (School of Public Health, University of Texas) studied under Albert Bandura and is an expert in SCT and self-efficacy. These experts reviewed scale items and participated in a phone interview. They provided comments about the relevance of each item to the construct. They also made suggestions about slight revisions in item wording.

The self-efficacy scale was translated into Spanish using ''universal broadcast Spanish,'' a style of Spanish that avoids subgroup-specific expressions or colloquialisms and is often used in international broadcast media. Spanish speakers from various countries of origin (Columbia, Mexico, Honduras, Spain, Puerto Rico, and Cuba) then reviewed the instrument to ensure that the Spanish was comprehensible across subgroups. The resulting Spanish language instrument was then back-translated to English, and the two English versions were compared to judge the quality and equivalence of translation and to resolve any inconsistencies, disagreements, or changes in meaning (54). Rather than considering the original English language version of the instrument the ''gold standard,'' we used a modified decentering technique as described by Vinokurov et al. (55). Using this technique, both the original language and the translated versions are considered equally important. Therefore, the original instrument may be revised to incorporate modifications made in the Spanish language version instrument to reflect linguistic and cultural norms of the target audience (54). Decentering then permits modifications based on the nuances of each language and culture to contribute to the final version of the instrument (55, 56).

The instrument was then pretested with a group of 50 female Hispanic migrant farmworkers to examine response format and question clarity. Based on pretest findings, the response format was modified to a two-level Likert scale; first, women were asked if they were ''sure, undecided, or unsure'' and then, depending on the response, women were asked about the strength of their confidence.

Statistical Analysis. Data from both samples (pilot and baseline) were screened before use for evidence of outliers, random responding, and missing value patterns. Cases that were found to be missing all items postulated to be on the self-efficacy scale were deleted. SPSS Missing value analysis was then used to determine if the remaining missing data patterns were consistent with data that were missing at random and to impute values for missing data using the expectation-maximization procedure (57).

Data from the pilot study were used to develop and refine the self-efficacy scale, which would then be used in the baseline survey. EFA was used to determine the factor structure for the items written to reflect self-efficacy. The principal axis factor method was used to identify underlying latent constructs (58). The Scree plot and factor solutions were inspected to identify the most interpretable solution. Varimax rotation was requested for solutions that identified more than one factor. In general, items with factor loadings >0.35 were retained and oblique (Oblimin) rotations were considered when the solutions obtained using the Varimax procedure failed to achieve simple structure.

Items that were found to measure self-efficacy reasonably well in the pilot study were retained for use in the baseline study. CFA was used to assess the fit of the hypothesized model to the data obtained from the baseline sample using AMOS 6.1. Model estimation was done using maximum likelihood procedures and model fit was assessed using a variety of common indices including the root mean square error of approximation (RMSEA; ref. 59), goodness-of-fit index (60), comparative fit index (61), and nonnormed fit index (62). RMSEA values ≤ 0.05 indicate adequate fit and up to 0.08 are often considered acceptable (63). Confidence intervals are available for the RMSEA and are reported in Results. For the goodness-of-fit, nonnormed fit, and comparative fit indices, values ≥ 0.95 are considered reasonable (64).

We computed scale scores by summing the items. To further evaluate the measurement qualities of the final self-efficacy scale, we computed Cronbach's α to assess internal consistency reliability.

Discriminant and convergent validity was assessed by computing correlations between the self-efficacy score and the measures of other constructs included in the survey. Conceptually, self-efficacy should correlate highly and positively with knowledge (KNOW), screening intention (INT), and prior experience (EXP). According to Bandura, self-efficacy is positively associated with people's knowledge and skills (31). Additionally, both one's intention to engage in a certain health behavior and the actual health behavior are positively associated with beliefs in self-efficacy (31, 65, 66). Personal experience is also associated with self-efficacy. Bandura and others have proposed that self-efficacy is acquired through (*a*) direct or mastery experience, (*b*) indirect or vicarious experience, and (*c*) verbal persuasion or symbolic experience (27, 65, 67, 68). To assess discriminant validity, we computed correlations between self-efficacy and two other scales with which it should have lower correlations: perceived risk (RISK) and subjective norms (NORMS). These constructs were chosen because they are not included in SCT and there is no evidence that they would be associated with self-efficacy. Even in Fishbien's integrated model (69) in which both self-efficacy and subjective norms are included, no relation between the constructs is described. Perceived susceptibility, a construct of the health belief model (70, 71), is not expected to be highly correlated with self-efficacy. Although the most recent version of the health belief model does include self-efficacy as a construct that predicts behavior, it does not propose an association between self-efficacy and perceived susceptibility (72). To test whether the correlations between self-efficacy and INT, KNOW, and EXP were higher than the correlations between self-efficacy and SURVIVE, RISK, and NORMS, a series of dependent-samples t tests for correlations were run. To control for type I error in this series of nine tests, an α of 0.005 was selected to maintain the experiment wise α at <0.05. Two-tailed tests were run to allow us to detect differences that may be in the opposite direction than expected.

To test the hypothesized theoretical relationship between self-efficacy and adherence to Pap testing, logistic regression analysis was used. The intent of this analysis was to test the independent association between self-efficacy and Pap test screening while controlling for other potential influences on screening behavior. SCT guided the hypothesis that self-efficacy would be associated with Pap test screening. The selection of covariates of screening was determined by both theory and empirical evidence. Bandura's concept of reciprocal determinism (a reciprocal causation among environmental, personal, and behavioral factors, which when interrelated affect one another) suggests that social and behavioral factors will influence self-efficacy (27). In the model, we selected the variables age, education, marital status, birth status, income, and insurance. The inclusion of these factors was further backed by empirical evidence of their association with Pap screening among Hispanics (10-13, 21). Analysis of the data among our sample led to the final decision about what specific variables would be included. We identified demographic variables that were significantly associated with the outcome (Pap test screening) or with self-efficacy. First, marital status, birth status, and income were collapsed into a smaller number of categories to remove small cell sizes. Then, to determine which variables would be entered into the logistic regression analysis, we computed a χ^2 analyses of demographic variables with adherence to Pap test screening and conducted t tests of demographic variables with self-efficacy. Significant demographic variables ($P < 0.05$) were entered as a block of variables, and self-efficacy was then included as a separate predictor variable.

Another measure of scale validity is its ability to detect expected changes in the construct over time (sensitivity to change; refs. 28, 73). We would not expect self-efficacy for Pap test screening to change without exposure to an intervention or other event (such as practice of the behavior). Therefore, to assess whether the measure detects expected change in the construct, we compared changes in the self-efficacy measure in a situation where change was expected (under the intervention condition) to the changes in a situation in which no (or less) change was expected (comparison condition).

Sensitivity to change analysis was conducted by calculating an effect size reflecting the magnitude of change from baseline to follow-up in the self-efficacy scores of both intervention and control groups. We hypothesized that the intervention group would show the largest magnitude of change in self-efficacy over time. The effect size associated with the pre-post change in self-efficacy for the intervention group reflects the ability of the self-efficacy measure to detect actual change over time. An effect size formula ($d = t2(1 - r)/N$) was used to appropriately measure effect size for non-independent samples to provide a standardized measure of change in self-efficacy (74, 75). We then computed Cohen's d for the difference between change scores for the intervention and control conditions and the CIs for the effect size measure and assessed the statistical significance of this difference ($P < 0.00$).

Results

EFA and CFA on Pilot Data. Missing value analysis found that there were 8 cases, which were missing responses on all self-efficacy variables and were removed from the sample. Another 3 cases had some missing data, which were imputed. The final sample included 192 women (Table 1). EFA identified one factor that explained 67.32% of the variance among the items. The first three columns of Table 2 provide the mean, SD, and factor loadings for the items.

EFA and CFA on Baseline Data. In the baseline data set, 35 cases were eliminated because they were missing all items included on the hypothesized self-efficacy scale. Item values were imputed for another 5 cases using the expectation-maximization procedure resulting in a final sample of 678 women (Table 1). The eight items found to measure self-efficacy in the pilot study were retained for the baseline study and hypothesized to reflect a single factor. The initial CFA resulted in a χ^2 value of 194.653 with 20 *df* and fit the data fairly well based on all but one of the selected fit indices (goodness-of-fit index = 0.93, comparative fit index = 0.97, non-normed fit index = 0.95, RMSEA = 0.11, confidence interval = 0.10-0.13). Because the RMSEA indicated less than adequate fit, the pattern of residuals and the modification indices were inspected to ascertain whether the addition of some correlated error terms might improve the fit of the model to the data. Three correlated residuals were sequentially added to the model, each improving the fit of the model significantly as assessed by the difference in χ^2 test. Correlated residuals are found frequently in measures using a self-report format where common extraneous sources of variation can influence the respondent's answers on multiple related items (76). The final model had a χ^2 value of 66.34 with 17 *df*. Other fit indices indicated adequate fit (goodness-of-fit index = 0.98, comparative fit index = 0.99, non-normed fit index = 0.99, RMSEA = 0.06, confidence interval = 0.04-0.08). The last three columns of Table 2 provide the mean, SD, and standardized regression weights (factor loadings) for this final model. The correlated residuals in the model were between Q1 and Q2, Q1 and Q4, and Q6 and Q7. These ranged from 0.27 to 0.29 and are shown in Table 2 as well.

Testing of Theoretical Relationships. Table 3 shows the correlation matrix between the following scales: self-efficacy scale score that was obtained by summing the items (self-efficacy: high scores indicate high self-efficacy), prior experience with Pap tests (EXP: high scores indicate positive experience), intention to obtain future Pap tests (INT: high scores indicate positive intentions), knowledge (KNOW: high scores indicate more knowledge), perceived risk (RISK: high scores indicate high risk), and subjective norms (NORMS: high scores indicate agreement with norms). All correlations were significant in the predicted direction, with the exception of the one between EXP and RISK. The results of the series of dependent t tests for correlations testing the hypotheses that correlations between self-efficacy and EXP, INT, and KNOW would be higher than those between self-efficacy and RISK and NORMS are shown in Table 4. The correlations between self-efficacy and

Table 1. Demographics

Variable	Pilot study (n = 200), n (%)	Baseline (n = 678), n (%)
Birth status and years in the United States		
Born in United States	44 (22.0)	148 (20.8)
Born in Mexico and <5 y in United States	7 (3.5)	26 (3.6)
Born in Mexico and 5-10 y in United States	15 (7.5)	59 (8.3)
Born in Mexico and 11-19 y in United States	28 (14.0)	57 (8.0)
Born in Mexico and >20 y in United States	102 (51.0)	399 (56.0)
Education (y)		
None	18 (9.0)	63 (8.8)
1-5	106 (53.0)	329 (46.1)
6-11	57 (28.5)	237 (33.2)
>12	13 (6.5)	63 (8.8)
Age (y)		
50-59	115 (57.5)	349 (48.9)
60-69	47 (23.5)	199 (27.9)
>70	38 (19.0)	160 (22.4)
Income		
None	— (—)	48 (6.7)
<$5,000	— (—)	112 (15.7)
$5,000-9,999	— (—)	204 (28.6)
<$10,000	147 (73.5)	— (—)
$10,000-19,999	39 (19.5)	175 (24.5)
≥$20,000	1 (0.5)	55 (7.7)
Insurance		
Any	75 (37.5)	416 (58.3)
None	124 (62.0)	297 (41.7)
Marital status		
Never married	1 (0.5)	21 (2.9)
Married	129 (64.5)	472 (66.2)
Separated	12 (6.0)	34 (4.8)
Divorced	18 (9.0)	24 (3.4)
Widowed	40 (20.0)	151 (21.2)
Living together	— (—)	10 (1.4)
Pap test ever		
Yes	140 (70.0)	589 (82.6)
No	56 (28.0)	90 (12.6)
Adherent to Pap testing (within 3 y)		
Yes	118 (59.0)	437 (61.3)
No	77 (38.5)	243 (34.1)

RISK and between self-efficacy and NORMS were found to be significantly different from self-efficacy and INT and self-efficacy and KNOW. An unexpected finding was that the correlation between self-efficacy and EXP was not found to be different from that between self-efficacy and NORMS.

We conducted χ^2 tests of all demographic variables with Pap test screening adherence (Table 5) and t tests of demographic variables with self-efficacy (Table 6) to determine significant associations before entering variables into logistic regression analysis. All of the demographic variables, except education and birth status, were related to self-efficacy or Pap test adherence. Significant demographic variables were entered as a block of variables and self-efficacy was then included as a separate predictor variable. Results in Table 7 show an independent effect of self-efficacy on Pap test screening.

Sensitivity to Change over Time. Theoretically, women in the intervention group should have a greater change in self-efficacy from baseline levels than women in the control group. Among women in the intervention group (n = 80), the baseline and follow-up self-efficacy scores were 3.63 and 4.28 (r = 0.184; t = 4.448), respectively, whereas scores in the comparison group (n = 89) were 3.71 and 3.87 (r = 0.323; t = 1.312) for baseline and follow-up, respectively. Using the effect size formula mentioned above, a moderate effect size (d = 0.635) was obtained for the intervention group and a small effect size of (d = 0.162) was obtained for the control group. The analysis estimating the effect size of the difference between change scores in the intervention and control groups (d = 2.45; confidence interval = 2.04-2.84) indicated a greater change in self-efficacy over time in the intervention group (P <.000).

Discussion

Five of the six hypotheses for this study were supported and one was partially supported. The self-efficacy scale had a Cronbach's α of 0.95, indicating good internal consistency. EFA indicated a single-factor solution and all items loadings were >0.73. CFA on an independent sample confirmed a single-factor structure with all standardized loadings >0.40 as hypothesized. In fact, all loadings, but one, were >0.80, indicating strong relationships between the items and the latent factor.

The hypothesized relationships with theoretical constructs were partially supported in that self-efficacy was found to be more highly correlated with knowledge, prior experience, and intention than with hypothesized unrelated constructs (perceived survivability, perceived risk, and perceived social norms). There was one exception. The correlation between self-efficacy and subjective norms was higher than expected (0.38) and not significantly different from the correlation between self-efficacy and prior experience (a hypothesized related construct). This finding indicates that the perception that significant others want the woman to engage in the behavior (and the value she places on these desires) is correlated with the woman's own self-efficacy. To the extent that subjective norms represent an individual's belief that others not only want her to perform a behavior but also that they believe she can do it may explain the correlation between self-efficacy and subjective norms. It seems likely to assume that others would not encourage a woman to complete a behavior unless they believed she was capable of doing so. This expressed confidence could affect the woman's own efficacy beliefs. Additionally, verbal persuasion and reinforcement are known methods to enhance self-efficacy (27) and it is likely that individuals endorsing perceived subjective norms have experienced this type of encouragement from their family, friends, and/or doctor concerning Pap test screening. Additionally, if subjective norms reflects actual external social influences, Bandura's concept of "reciprocal determinism," which posits a reciprocal causation among environmental, personal, and behavioral factors, also supports this observed relationship (27). Studies to further examine the relationship between self-efficacy and subjective norms are warranted.

Logistic regression results supported the theoretical relationship between self-efficacy and health behavior in that women with higher self-efficacy were more likely to have had a recent Pap test than women with lower

Table 2. Sample mean, SD, and factor loadings

Question	Pilot data (n = 193)		Baseline data (n = 678)	
	Mean (SD)	Factor loadings	Mean (SD)	Factor loadings
Q1: How sure are you that you can discuss having a Pap test with your health-care provider even if (s)he does not bring it up?	4.22 (1.215)	0.73	4.08 (1.05)	0.81
Q2: How sure are you that you can schedule a Pap test appointment and keep it?	4.22 (1.231)	0.80	4.16 (1.02)	0.87
Q3: How sure are you that you can keep having a Pap tests even if you had to go to a new office to get one?	4.01 (1.318)	0.76	4.07 (1.02)	0.83
Q4: How sure are you that you can ask your primary care physician for a referral to get a Pap test?	4.13 (1.326)	0.89	4.16 (0.99)	0.89
Q5: How sure are you that you can go to get your next Pap test?	4.20 (1.219)	0.90	4.17 (0.97)	0.90
Q6: How sure are you that you can get a Pap test even if you are worried that it will be painful?	4.09 (1.323)	0.90	4.19 (0.98)	0.88
Q7: How sure are you that you can get a Pap test even if a friend discouraged you from having one?	4.16 (1.318)	0.86	4.21 (0.97)	0.82
Q8: How sure are you that you can get a Pap test even if you had to pay for it?	3.94 (1.406)	0.71	3.96 (1.15)	0.71

NOTE: The following correlated residuals were included in the final model: Q1 and Q2 (r = 0.29), Q1 and Q4 (r = 0.28), and Q6 and Q7 (r = 0.27).

self-efficacy. Self-efficacy has been found to be an important determinant of many health behaviors (37, 39, 40, 42, 77), and these findings indicate that it is important for Pap test screening as well.

Finally, because one criterion for a good measure is its ability to detect change in a construct over time (28, 73), we hypothesized that the intervention group would show positive change in self-efficacy over time. This hypothesis was supported and the effect size associated with that change was in the high-medium range. This means that future studies using this measure of self-efficacy can plan on obtaining similar effect sizes when measuring change over time. This will allow for studies with higher levels of power at lower sample sizes than would be the case if only a small effect size had been found.

The limitations of the study include that cross-sectional baseline data were used for the test of the theoretical relationship between self-efficacy and Pap test screening. This decision was made because of sample size limitations in the longitudinal cohort of controls. Use of cross-sectional data obscures the directionality of the relationship between Pap test self-efficacy and actual screening behavior. It is possible that the association observed between self-efficacy and Pap test screening may reflect an increase in self-efficacy beliefs that resulted from completion of the Pap test. However, the intent of this analysis was to examine the expected association between self-efficacy and Pap test screening behavior to test the validity of the construct. Whether self-efficacy affected screening behavior or vice versa, the findings still reflect an independent association between self-efficacy and screening behavior and thus contribute to the construct validity (concurrent validity) of the measure. Future studies should use longitudinal data to test the predictive validity of the measure.

The lost to follow-up rate (33.1%) in this study represents another limitation. Although we scheduled data collection during periods when we expected fewer women would be traveling for farmwork, migration schedules often vary and it is possible that women who were unable to be reached were migrating during that period. We also believe that the length of the interview (2 h) may have deterred participation. Nevertheless, data indicated no demographic or acculturation differences across study conditions between women followed up and those lost to follow-up.

Another limitation is that the data for this study were generated from participants of Mexican American origin, possibly limiting generalizability to other non-Mexican-origin Hispanics. Still, because the items developed for this self-efficacy scale reflect barriers relevant across Hispanic subgroups (11, 12, 78, 79) and were written in a style of Spanish easily understood by all Spanish speakers regardless of country of origin, there is potential for the portability of this measure for other Hispanic subgroups. Studies testing this instrument among English-speaking Hispanics and Hispanics of

Table 3. Correlations between self-efficacy and selected scales using baseline data (n = 678)

	SE	EXP	INT	KNOW	RISK	NORMS
SE	1.00					
EXP	0.37	1.00				
INT	0.50	0.14	1.00			
KNOW	0.51	0.33	0.29	1.00		
RISK	−0.21	−0.06	−0.13	−0.14	1.00	
NORMS	0.38	0.24	0.23	0.26	−0.29	1.00

NOTE: All correlations, except the one between EXP and RISK, were significantly different in the predicted direction.

Table 4. *t* tests for dependent-samples correlations between self-efficacy and selected scales (n = 678)

Test for equal correlations	t	P
$r_{SE,EXP}$		
$r_{SE,RISK}$	11.55	<0.0001
$r_{SE,NORM}$	−0.24	0.81
$r_{SE,INT}$		
$r_{SE,RISK}$	14.60	<0.0001
$r_{SE,NORM}$	3.10	0.002
$r_{SE,KNOW}$		
$r_{SE,RISK}$	14.82	<0.0001
$r_{SE,NORM}$	3.43	0.0006

Table 5. Univariate analyses of demographic variables and Pap test adherence (n = 678)

Variable	Pap adherent (within 3 y) yes, % (n)	Pap adherent (within 3 y) no, % (n)	χ^2 P
Age (n = 673)			0.003
50-59 y	68.3 (228)	31.7 (106)	
60-69 y	67.4 (128)	32.6 (62)	
≥70 y	53.0 (79)	47.0 (70)	
Education (n = 657)			0.446
None	62.7 (37)	37.3 (22)	
1-5 y	65.2 (204)	34.8 (109)	
6-11 y	62.4 (138)	37.6 (83)	
≥12 y	73.4 (47)	26.6 (17)	
Birth status (n = 650)			0.935
Born in United States	65.0 (91)	35.0 (49)	
Born in Mexico and <20 y in United States	65.2 (90)	34.8 (47)	
Born in Mexico and >20 y in United States	63.6 (237)	36.4 (136)	
Insurance (n = 673)			0.162
Any	66.8 (260)	33.2 (129)	
None	61.6 (175)	38.4 (109)	
Marital status (n = 673)			0.013
Married or living together	67.9 (309)	32.1 (146)	
Never married, separated, divorced, or widowed	57.8 (126)	42.2 (92)	
Income (n = 672)			0.053
None	58.1 (25)	41.9 (18)	
<$5,000	63.8 (67)	36.2 (38)	
$5,000-9,999	70.5 (136)	29.5 (57)	
≥$10,000	67.0 (146)	33.0 (72)	
Don't know	54.0 (61)	46.0 (52)	

other national origins would add to the validity of this measure across Hispanic subgroups.

One of the unique features of this study is that it included the development and testing of a Spanish language self-efficacy scale for Pap test screening among Hispanics. Developing measures for Hispanic populations involves more than creating simple translations of English language scales but instead developing measures that are culturally relevant, addressing the behavioral tasks within the context and culturally specific demands of the population. To ensure appropriate assessment of theoretical constructs, it is important that measures are both developed and tested in the language they will be used or translated appropriately and tested to ensure that the characteristics of the measure have not changed. Because cervical cancer represents a significant problem among Hispanic women and Pap test screening continues to be underutilized, it is essential to identify, assess, and address the factors influencing Pap test screening behavior.

Table 6. Univariate analyses of demographic variables and self-efficacy (n = 678)

Variable	Mean (SD) baseline self-efficacy	t	df	P
Age		0.635	672	0.526
50-59 y	4.15 (0.879)			
≥60 y	4.11 (0.863)			
Education		−1.05	656	0.294
0-5 y	4.10 (0.850)			
≥6 y	4.17 (0.874)			
Birth status		−0.208	649	0.836
Born in Mexico and <20 y in United States	4.11 (0.756)			
Born in Mexico and >20 y in United States or born in United States	4.13 (0.907)			
Insurance		−2.478	672	0.013
Yes	4.20 (0.781)			
No	4.03 (0.975)			
Marital status		2.574	672	0.010
Married or living together	4.19 (0.839)			
Never married, separated, divorced, or widowed	4.01 (0.922)			
Income		−0.441	558	0.659
≤$9,999	4.20 (0.752)			
≥$10,000	4.23 (0.746)			

Table 7. Logistic regression of self-efficacy and demographic variables (n = 678)

Variable	Odds ratio (confidence interval)
Age, reference: 50-59 y	
60-69 y	0.78 (0.504-1.212)
≥70 y	0.57 (0.335-0.959)
Marital status, reference: married/living together, never married, separated, divorced, or widowed	0.81 (0.549-1.209)
Income, reference: none	
<$5,000	1.44 (0.665-3.130)
$5,000-9,999	1.53 (0.742-3.146)
≥$10,000	1.23 (0.601-2.537)
Don't know	1.21 (0.557-2.631)
Insurance, reference: none	
Any	1.38 (0.927-2.64)
Pap self-efficacy	2.69 (2.107-3.432)

Disclosure of Potential Conflicts of Interest

No potential conflicts of interest were disclosed.

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