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A Randomized Controlled Trial of a Cervical Cancer Education Intervention for Latinas delivered through Interactive, Multimedia Kiosks

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Abstract

Background—U.S. Latina women experience disproportionately high cervical cancer incidence and mortality rates. These health disparities are largely preventable with routine Pap tests and HPV screening.

Purpose—This study tested the efficacy of a cervical cancer education intervention to improve risk factor knowledge, attitudes, self-efficacy and self-reported behavior related to cervical cancer screening among low-income Latinas who had not been screened in the past two years, compared to a usual care control group.

Methods—Low-income Latinas who had not had a Pap test in the prior two years were recruited from three Federally Qualified Health Centers and randomly assigned to intervention and control groups, with in-person assessment at baseline and six-month follow-up. Women in the intervention group received a one-time low-literacy cervical cancer education program through an interactive, multimedia kiosk in either English or Spanish based on their language preference.

Results—Compared to the control group, the intervention group demonstrated greater knowledge ($p<.0001$) and more favorable attitudes at follow-up: fewer intervention group women never thought of getting a Pap test (46% vs. 54%, p=0.050 or agreed that it's fate whether a woman gets cervical cancer or not (24% vs. 31%, p=0.043). The groups did not differ significantly on the proportion who had obtained or made an appointment for a Pap test at follow-up (51% vs. 48%, $p = 0.35$). Both groups reported high levels of self-efficacy regarding Pap screening at post-intervention.

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Conclusion—A one-time interactive, multimedia educational intervention improved cervical cancer knowledge and attitudes among low-income Latinas, but had no effect on cervical cancer screening behavior. Exposure of the control group to the pretest conducted on the multimedia kiosk may have influenced their screening behavior.

Proposed Keywords

Cervical cancer; Pap test; education intervention; knowledge; attitudes; Latina/Hispanic; health disparities; interactive; multimedia; information technology

Introduction

Although mortality rates for invasive cervical cancer in the U.S. declined steadily in the past 40 years, Latinas are the only racial/ethnic group whose mortality rates did not decline significantly (1). Latinas experience the nation's highest age-adjusted cervical cancer incidence rate (2), and the nation's highest age-adjusted mortality rate of any racial/ethnic group except for Native American women, (3,4). Latinas are more likely than other women to be diagnosed at an advanced stage of disease due to relatively low screening rates (5,6) and experience more invasive treatments, poorer quality of life and low survival rates (7).

These cervical cancer disparities are largely preventable with regular Pap tests and human papillomavirus screening, yet Latinas have lower cervical cancer screening rates than their non-Latina counterparts, including non-Hispanic white and black women (8,9). Lack of regular screening among Latinas has been associated with knowledge gaps, attitudinal barriers, limited health care access due to a lack of health insurance and a medical home (10,11,12–16). English-language proficiency is strongly correlated with health care access and cancer screening (17,18). Limited English-language skills have been shown to act as a barrier to acquisition by Latinas of basic health information from physicians and health education materials and media messages (19). The objective of this study was to overcome those barriers with a culturally tailored, bilingual (Spanish/ English), low-literacy cervical cancer education intervention to improve risk factor knowledge, attitudes, self-efficacy and Pap screening behavior among low-income, medically underserved Latinas.

The study hypothesized that participants in the intervention group would have higher Pap screening rates, greater knowledge, greater self-efficacy, and more positive attitudes toward cervical cancer screening and risk reduction behavior six months after baseline compared to usual care, control group participants.

Methods

This study employed a randomized controlled trial design to test the efficacy of an interactive multimedia cervical cancer education intervention compared to a usual care control group. Primary outcomes were self-reported cervical cancer screening, assessed at baseline and 6-months post-enrollment.

Study Population

The study accrued 943 Latinas at community clinics in Los Angeles, San Jose and Fresno, CA who were there for non-study related appointments. Inclusion criteria were: (a) ages 21–69 years, (b) self-identified Latina, (c) annual household income of $24,680 or less, (d) no prior cervical cancer diagnosis, (d) no prior hysterectomy and (e) no Pap test within the past 2 years. These women were recruited in-person by bilingual, bicultural, female research assistants. After verbally describing the nature and purpose of the study, a screening questionnaire was verbally administered to interested women in their preferred language to determine whether they met the inclusion criteria. Eligible persons who agreed to participate in the study were consented and enrolled. Written informed consent was obtained through a protocol approved by Independent Review Consulting, San Anselmo, CA.

Intervention

Focus groups were conducted with 97 low-income, non-adherent Latinas to identify salient cervical cancer education themes appropriate for a screening promotion intervention. The principal themes that emerged were the pervasiveness of cancer and low cancer survival rates in the Latino community, a perception that cancer is incurable, a lack of understanding of the association of HPV to cervical cancer, the sexual transmission of HPV, and cervical cancer risk factors, including increased risk with age. The purpose of cervical cancer screening and screening guidelines, particularly the recommended age and frequency of screening, and the need for screening among women with a hysterectomy, or screening during pregnancy, were not well understood. Despite a high perceived prevalence of cancer, participants had a notably low perceived susceptibility of developing cervical cancer. These findings guided development of a cervical cancer education intervention to address those knowledge gaps and misconceptions and to promote attitudinal and behavioral change. The resulting intervention included eight interactive modules that addressed the following topics: what is cervical cancer? how is HPV transmitted? HPV screening and prevention methods, what increases or decreases the risk of developing cervical cancer, what is a Pap test and a Pap test walk-through to demystify the procedure, how to schedule a Pap test and follow up on the results, and what does an abnormal Pap test result mean, questions for your doctor, and what to do if you don't have insurance or a regular doctor. The FDA approval of the HPV vaccine prompted addition of a segment on the vaccine to the education intervention.

The intervention was delivered through interactive, multimedia touchscreen kiosks that created an individualized, self-paced learning experience tailored via on-screen prompts to a woman’s language preference (Spanish/English) and age group (18–24, 25–49, 50–69). The intervention featured age-appropriate behavioral models and multimedia elements—text, voice, music, graphics, animation and video—to overcome cultural, linguistic, literacy and attention barriers. For purposes of the study, all women were exposed to a common core of interactive content which they could navigate to at will; the kiosk allowed them to pause, scroll back and print specific items, such as a explanation of the acronyms of different Pap results or contact information of clinics that offered low-cost or no-cost screening in their area. The English modules had an average duration of 3 minutes and ranged in duration from 1:58 for the Pap test walk-through to 4:30 for the Transmission of HPV. The average dose received by women was 24 minutes in English and 28 minutes in Spanish. Control group

participants received an eight-panel, two-color brochure on gynecological cancers produced in English and Spanish by the Office of Women's Health of the California Department of Health Services; the brochure represented standard care.

Measures

Study arm, demographic factors, and baseline health care variables were treated as independent variables. Demographic factors included age, years of education, language of interview, country of birth, years of U.S. residence, marital status, and number of children. Health care variables included clinic site, having a particular doctor, insurance status, and baseline stage of Pap test adoption, defined as pre-contemplation (never had a Pap test, does not plan to have one in the next 12 months), relapse (had a Pap test in the past, does not plan to have another one in the next 12 months), and contemplation (plans to have a Pap test in the next 12 months) based on the Transtheoretical Model (20). Although the study's inclusion criteria excluded persons who had a recent Pap test, 29 women reported at baseline they had received a Pap test within the past two years, which would render them ineligible. Notwithstanding, the intent-to-treat design required their inclusion in the data analysis; these women were included in the contemplation stage.

Outcome measures for assessing intervention efficacy were post-test knowledge, attitudes, self-efficacy, and self-reported screening behavior, defined as having had a Pap test or made an appointment in the interval between pre- and posttest. A posttest knowledge score was obtained by summing the number of correct answers to questions about cervical cancer and Pap tests; the score did not include two additional items regarding knowledge of a free Pap test program.

Validated cervical cancer knowledge, attitudes, self-efficacy and screening behavior scales used in the Pathfinders intervention study conducted by the Northern California Cancer Center (21) were adapted for the study. Nine binary knowledge questions specific to intervention messages for this study were added to the study instruments. These questions were examined for face validity by subject-matter experts, translated into Spanish and back-translated into English to confirm their intended meaning. The resulting questions were assessed for clarity and comprehension through individual cognitive interviews with ten Latinas who were demographically similar to the target population to confirm that the intended meaning was adequately conveyed.

Data Collection

Touchscreen kiosks deployed in waiting areas at the collaborating clinics were programmed with a bilingual (English/Spanish) baseline assessment of demographic characteristics, attitudes, knowledge, self-efficacy and behaviors related to cervical cancer and cervical cancer screening. Study participants were directed to a kiosk by a bilingual, female Research Assistant to begin the pretest. A welcome screen on the kiosk instructed participants through voice and text prompts to touch the screen to select their language preference to begin. The kiosks then displayed the pretest questions in sequence, and prompted respondents to select their responses. The pretest questions appeared on-screen in large text accompanied by a voice-over of the question, and then prompted respondents to touch the screen to select their

responses. This query-response pretest administered to all study participants prior to randomization took an estimated 18 minutes to complete. Participant responses to the pretest questions were recorded automatically by the kiosks.

Randomization

The kiosks were programmed with an algorithm that used a random number generator to randomly assign participants to study arms. Upon completion of a pretest survey conducted on the kiosks, participants were randomly assigned to either an intervention or control condition with equal probability, stratified by study site and kiosk. Participants in both conditions were reassessed at six months from baseline through a structured, language concordant, telephone interview by bilingual-bicultural, female interviewers who were blinded to participants' group assignment. Average completion time for the 48-item pretest was 8:37 minutes. Attrition rates at post-test were 12.8% in Fresno, 18.9% in San Jose, and 35.4% in Los Angeles, with an overall attrition rate of 22.9%.

Data Analysis

The study arms were compared with respect to baseline characteristics using t-tests for years of age, years of education, and number of children, and chi-square tests for categorical variables (all other comparisons). The study employed an intent-to-treat analysis to assess the effectiveness of the intervention by comparing intervention and control group participants on Pap screening status at 6 months, the primary outcome. Secondary outcomes of cervical cancer knowledge, attitudes, and self-efficacy were also compared across study arms. A chi-square test was used to compare the study arms with respect to the proportion of women who obtained a Pap test or made an appointment between pre- and post-test. Chi-square tests were used to compare the study arms with respect to the proportion that answered each knowledge item correctly at post-test. A t-test was used to compare the study arms with respect to post-test knowledge score. A chi-square test was used to compare the study arms with respect to the proportion of women who at post-test reported self-efficacy with respect to Pap tests. To assess the effect of the intervention on particular attitudes, chi-square tests were used to compare the study arms with respect to the proportion that agreed with each attitudinal item at post-test.

In addition, the study developed multivariable models to identify independent predictors of post-test screening behavior and knowledge. A logistic regression model was developed for dichotomous outcomes of Pap test receipt or appointment between pre- and post-test (yes or no) as a function of study arm (intervention or control), site (Los Angeles, Fresno or San Jose), and baseline covariates previously found to be associated with screening (20), including age (18,19,21–32, 33–47, 48–66), language of interview (English or Spanish), years of U.S. residence (born in U.S., ≤ 10, > 10), years of education (≤ 6, 7–11, ≥ 12), marital status (married/ living together or single), number of children (none, 1–2, 3–4, 5 or more), health insurance (yes or no), particular doctor (yes or no), and screening stage (pre-contemplation, relapse, or contemplation). Two successive models added as independent variables (1) post-test knowledge (total knowledge score and knowledge of a free Pap test program) and (2) post-test attitudes (cancer fatalism, barriers, and perceived susceptibility) and self-efficacy in order to assess the incremental effects of these variables. To better

understand the factors associated with knowledge, multiple regression was used to model post-test knowledge score as a function of study arm, site, and the baseline covariates included in the Pap test models.

Results

The study accrued a sample of 943 participants, as shown in Table 1. There were no statistically significant differences between the study arms with respect to demographic characteristics and baseline screening stage.

Bivariate results

There was no statistically significant difference between the intervention and control groups in the percentage of study participants on the primary study outcomes of receiving a Pap test or making an appointment at post-tests (Table 2).

Women in the intervention group were more knowledgeable about Human Papillomavirus (HPV) (51% vs. 32%, p<.0001), having multiple partners (79% vs. 68%, p<.01) as precursors of cervical cancer, and were more likely to know that it may take decades to develop cervical cancer (37% vs. 18%, p<.0001). Women in the intervention group were also more aware of free Pap screening resources (60% vs. 47%, p<.001) and more likely to know how to access those programs (50% vs. 37%, p<.001) compared to women in the control group. Women in the intervention group were less likely than women in the control group to report never having thought of getting a Pap test (46% vs. 54%, p<.05) and less likely to endorse the statement that its fate if a woman gets cervical cancer or not (24% vs. 31%, p<.05). Notably, perceived susceptibility to developing cervical cancer and perceived self-efficacy for Pap screening were similar in both groups. Cost was not perceived as a barrier to screening across both groups.

All women who reported obtaining a Pap test at post-test were queried about the primary reasons for their screening behavior. In the control group, over one-fourth of women (27%) attributed their screening behavior to the kiosks when asked to identify the main reason for getting a Pap test, and three-fourths (76%) reported that specific information they obtained from the kiosk during the pretest influenced their screening decision. There was a statistically significant difference between intervention (90%) and control (76%) group participants in the proportion that reported that the kiosk content influenced their decision to obtain a Pap test (90% vs. 76%, p<.001).

Multivariate results

Regarding the primary outcomes at six months, women were less likely to report having had a Pap test or making an appointment between pre- and post-test if they were foreign born (> 10 years in the U.S. vs. born in the U.S. odds ratio (OR) = 0.51, 95% confidence interval (CI) 0.27–0.97) were in the pre-contemplation stage at baseline (OR vs. contemplation = 0.34, 95% CI 0.14–0.84, had fewer years of education (≤ 6 vs. ≥ 12 OR = 1.97, 95% CI 1.18–2.39), had greater knowledge of cervical cancer and Pap tests (OR =1.16 per correct item, 95% CI 1.03–1.30), or knew about a free Pap test program (OR =3.30, 95% CI 2.33–4.67) (Model 1, Table 3). Knowledge and demographic variables explained 18% of the

variance in the screening outcome (R-square=0.18). Attitudinal variables had no effect on the proportion of variance explained in either screening or scheduling of a screening appointment.

Regarding predictors of cervical cancer knowledge at six months, greater knowledge about risk factors was associated with being in the intervention group, married or living with a partner, or having three or more children (Table 4). Knowledge was negatively associated with being younger, less educated, or in the relapse stage at baseline. The model including demographic, access, and baseline Pap test stage variables explained 9% of the variance in knowledge score.

Discussion

This study examined the effects of an educational intervention in promoting Pap screening among low-literacy, medically underserved Latinas. The proposition that participants exposed to the education intervention would have higher Pap screening rates (H1) was not confirmed. The hypothesis that intervention participants would exhibit greater knowledge (H2) than control group participants was confirmed. The hypothesis that intervention participants would exhibit greater self-efficacy (H3) and more positive attitudes toward cervical cancer screening and risk reduction behavior (H4) were only confirmed for two attitudinal items related to getting a Pap test and the role of fate in whether a woman develops cervical cancer. Although the intervention had no effect on cervical cancer screening behaviors, it was associated with significant increases in knowledge of Pap tests and risk factors for cervical cancer compared to women who received a cervical cancer brochure. Indeed, the strongest effects of the intervention were observed for knowledge gains, with significant differences between the intervention and control groups at post-test on knowledge of where and how to obtain a free Pap test, which was the strongest independent predictor of screening behavior. Knowledge of cervical cancer and Pap tests was also positively associated with screening behavior. These findings suggest that the interactive, multimedia kiosks created an effective learning environment for delivering cancer education and screening promotion to low-income, low literacy Latinas. These findings are also consistent with a large body of research indicating that cancer knowledge and income levels are strong predictors of screening behavior among Latinas, (22–25) although our educational intervention did not produce significant differences in screening behavior across study arms.

Attitudinal barriers related to screening behaviors did not play a role in this study with respect to screening behavior. Attitudes associated with barriers to screening, including self-efficacy for screening, did not differ significantly across study arms. Indeed, women in both study groups had comparable attitudes regarding the cost of getting a Pap test, low perceived susceptibility to developing cervical cancer, and fatalistic beliefs, e.g., that there was nothing they could do to prevent cervical cancer. These results suggest that while attitudinal barriers to cervical cancer screening are evident among Latinas in this and other research, (26–35) they were not pronounced and did not characterize the attitudinal predisposition for the majority of these women.

As expected, women with lower levels of education were less knowledgeable than women with at least a high school diploma. However, contrary to other studies, being less educated was associated with a greater likelihood of reporting cervical cancer screening at posttest. It could be that health care access barriers typically found among those with lower educational levels were absent given that these women were already participating in a system of care. This could explain the lack of effect of the intervention on screening.

The finding that at the 6-month follow-up almost half of Latinas in the control group reported getting a Pap test within the prior six months was unexpected and extraordinary given that previous studies found this population to have significant screening barriers and low screening rates. (36–51) Notably, screening rates in this study exceeded those reported in a meta-analysis of Latino screening promotion interventions, which suggests that exposure to the interactive pretest had the unintended effect of creating awareness and inducing screening behavior among some control group participants. (52)

Another possible explanation for our null findings with respect to between-groups differences on follow-up screening is that the exposure among both groups to pretest questions on cervical cancer and screening was sufficient to produce within-group changes in screening behaviors. Indeed, closer examination of our findings suggests that the screening behavior of control group participants was influenced by their exposure to an interactive, multimedia kiosk during pretest. Exposure to the content-specific questions may have been sufficient prompting to promote screening behavior among some control subjects, increasing the salience of Pap testing among women.

Evidence to support this inference that the pretest prompted screening behavior can be gleaned from an attribution question at post-test that asked women about their primary reason for obtaining or scheduling a Pap test. Over, a fourth of the women in the control group reported the kiosk as their main reason for getting screened. Indeed, these women often commented that the mere experience of taking the pretest convinced them that cervical cancer was something important and that they should do something about it. While this finding was unexpected, it is consistent with research showing that simple reminders, or cues to action can produce modest increases in breast and cervical cancer screening rates. (53–65) An overwhelming majority of both groups, 76% of women in the control group and 90% of women in the intervention group who got a Pap test, listed the information provided through the kiosk as a reason for being screened.

A notable limitation of this study is that its sample was drawn from clinic-based populations and the findings cannot be generalized to the larger population of medically underserved Latinas, particularly those who are uninsured and seldom seek medical care. Another major limitation of this study was that it relied on self-report of Pap screening, which may result in over-estimates of screening behavior, (66, 67); however, the randomization of study participants should have addressed any potential reporting bias.

Conclusion

This study suggests that interactive touchscreen kiosks are an effective cancer education medium for medically underserved Latinas. Notably, this intervention improved knowledge and attitudes towards cervical cancer screening among non-adherent, medically underserved Latinas. Although screening behavior across study arms study did not differ significantly, the findings suggest that the use of the kiosks for the pretest delivered a sufficient dose of information to prompt some women in the control group to get screened. Further research is needed to examine the minimal or optimal dosages of kiosk-based information to prompt screening behavior.

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Table 1

Low Income California Latinas without a Pap Test in the Previous Two Years, Distribution of Participant Characteristics (n=943) by Study Arm

Characteristic	Intervention n=480 n (%)	Control n=463 n (%)	Total n=943 n (%)	p-value
Age (Years)				
Mean (SD)	38.5 (11.8)	39.7 (11.8)	39.1 (11.8)	0.12
21–34	199 (41)	171 (37)	370 (39)	0.36
35–49	184 (38)	191 (41)	375 (40)	
50–69	97 (20)	101 (22)	198 (21)	
Language of pre-test				
Spanish	353 (74)	338 (73)	691 (73)	0.85
English	127 (26)	125 (27)	252 (7)	
Birthplace				
United States	99 (21)	94 (20)	193 (20)	0.90
Foreign born	381 (79)	369 (80)	750 (80)	
Years in U.S. (for foreign born)				
1 – 5	92 (24)	105 (28)	197 (26)	0.25
6 – 10	78 (20)	60 (16)	138 (18)	
11–15	80 (21)	68 (18)	148 (20)	
16+	131 (34)	136 (37)	267 (36)	
Particular doctor				
Yes	236 (49)	229 (49)	465 (49)	0.93
No	244 (51)	234 (51)	478 (51)	
Health insurance				
Yes	235 (49)	250 (54)	485 (51)	0.12
No	245 (51)	213 (46)	458 (49)	
Years of formal education				
Mean (SD)	8.2 (3.8)	8.1 (3.8)	8.2 (3.8)	0.67
1 – 6	185 (39)	183 (40)	368 (39)	
7 – 11	168 (35)	149 (32)	317 (34)	
12	94 (20)	104 (22)	198 (21)	
13+	33 (7)	27 (6)	60 (6)	
Marital status				
Single	104 (22)	97 (21)	201 (21)	0.95
Married	213 (44)	197 (43)	410 (43)	
Living Together	69 (14)	74 (16)	143 (15)	
Divorced, separated	70 (15)	71 (15)	141 (15)	
Widowed	24 (5)	24 (5)	48 (5)	
Number of children				

Characteristic	Intervention n=480 n (%)	Control n=463 n (%)	Total n=943 n (%)	p-value
Mean (SD)	3.0 (2.3)	3.0 (2.0)	3.0 (2.2)	0.65
0	58 (12)	34 (7)	92 (10)	0.13
1	62 (13)	67 (14)	129 (14)	
2	106 (22)	94 (20)	200 (21)	
3	97 (20)	108 (23)	205 (22)	
4	67 (14)	77 (17)	144 (15)	
5+	90 (19)	83 (18)	173 (18)	
Baseline Pap Test stage of Change				
Precontemplation	23 (5)	26 (6)	49 (5)	0.59
Relapse	60 (13)	66 (14)	126 (13)	
Contemplation	397 (83)	371 (80)	768 (81)	

Table 2

Low Income California Latinas without a Pap Test in the Previous Two Years, Post-Intervention Knowledge, Attitudes, and Behavior by Study Arm (N=727)

Item	Intervention n=383	Control n=344	p-value
	n (%)	n (%)	
Knowledge			
Total number of correct responses: Mean (SD)	3.7 (1.6)	3.1 (1.4)	<0.0001
Cervical cancer caused by HPV	194 (51)	109 (32)	<0.0001
Multiple sex partners increases risk	301 (79)	234 (68)	0.0013
Papillomas may take 10 to 20 years…	142 (37)	62 (18)	<0.0001
Knows of free Pap screening	230 (60)	161 (47)	0.0003
Knows how to access program	193 (50)	128 (37)	0.0004
Attitudes			
Never thought of getting a Pap test	177 (46)	183 (54)	0.050
Costs too much to get Pap	101 (26)	109 (32)	0.10
Nothing you can do to prevent cervical cancer	111 (29)	112 (33)	0.27
It's fate if woman gets cervical cancer	93 (24)	106 (31)	0.043
Chances of getting cervical cancer are pretty low	129 (34)	96 (28)	0.10
Self-efficacy			
Every women should get Pap smear	378 (99)	333 (97)	0.083
Can get a Pap smear if needed	356 (93)	314 (91)	0.40
Pap smears can save our lives	366 (96)	327 (95)	0.75
Screening behavior			
Obtained a Pap test or made appointment.	196 (51)	164 (48)	0.35
Kiosk main reason for getting a Pap test	72 (37)	44 (27)	0.045
Kiosk information especially influenced decision to get a Pap test.	177 (90)	124 (76)	0.0002

Table 3

Low Income California Latinas without a Recent Pap Test Models of Pap Test Receipt or Appointment Between Pre- and Post-test

	Demographics (n=727)		+Knowledge (n=723)		+Attitudes (n=723)	
	OR†	(95% CI)	OR†	(95% CI)	OR†	(95% CI)
Intervention Group	1.14	(0.84, 1.55)	0.91	(0.66, 1.27)	0.89	(0.64, 1.25)
Age						
21–34	1.31	(0.78, 2.21)	1.45	(0.84, 2.52)	1.45	(0.82, 2.55)
35–49	1.12	(0.70, 1.78)	1.13	(0.69, 1.85)	1.11	(0.67, 1.84)
50–69	1.00		1.00		1.00	
Education						
≤ 6 years	1.54	(0.97, 2.44)	1.84	(1.13, 2.99)	1.97	(1.18, 3.29)
7–11 years	1.25	(0.82, 1.90)	1.23	(0.79, 1.90)	1.22	(0.78, 1.91)
≥ 12 years	1.00		1.00		1.00	
Spanish Interview	1.49	(0.81, 2.74)	1.46	(0.77, 2.75)	1.51	(0.80, 2.87)
Time in U.S.						
≤ 10 years	0.71	(0.35, 1.44)	0.53	(0.25, 1.10)	0.54	(0.26, 1.14)
> 10 years	0.62	(0.33, 1.14)	0.50	(0.26, 0.95)	0.51	(0.27, 0.97)
U.S. born	1.00		1.00		1.00	
Married/Living Together	1.05	(0.75, 1.47)	1.04	(0.73, 1.49)	1.03	(0.72, 1.48)
Number of Children						
0	0.61	(0.30, 1.25)	0.56	(0.26, 1.19)	0.54	(0.25, 1.17)
1–2	0.99	(0.58, 1.69)	0.92	(0.52, 1.62)	0.88	(0.49, 1.56)
3–4	0.86	(0.53, 1.42)	0.77	(0.46, 1.30)	0.74	(0.44, 1.27)
≥ 5	1.00		1.00		1.00	
Has a Particular Doctor	1.27	(0.91, 1.78)	1.26	0.89, 1.79)	1.31	(0.92, 1.87)
Has Health Insurance	1.11	(0.79, 1.55)	0.98	0.69, 1.40)	1.01	(0.70, 1.45)
Baseline Pap Stage						
Precontemplation	0.38	(0.17, 0.88)	0.41	(0.17, 0.97)	0.34	(0.14, 0.84)
Relapse	0.64	(0.40, 1.02)	0.72	(0.44, 1.18)	0.68	(0.41, 1.13)
Contemplation	1.00		1.00		1.00	

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	Demographics (n=727)		+Knowledge (n=723)		+Attitudes (n=723)	
	OR†	(95% CI)	OR†	(95% CI)	OR†	(95% CI)
Knows About Free Pap			3.22	(2.30, 4.50)	3.30	(2.33, 4.67)
Knowledge Score			1.14	(1.02, 1.28)	1.16	(1.03, 1.30)
Cancer Fatalism						
Cannot prevent					0.93	(0.64, 1.34)
Fate whether gets					0.68	(0.46, 1.00)
Barriers to Screening						
Never thought of					1.12	(0.80, 1.57)
Cost					1.09	(0.74, 1.59)
Perceived Susceptibility						
Chances pretty low					0.94	(0.66, 1.36)
Pap Self-Efficacy						
Can get if need					0.62	(0.33, 1.16)
Every woman should					1.75	(0.41, 7.42)
Can save your life					0.75	(0.31, 1.79)
Max-rescaled R^2	0.07		0.18		0.20	

†Adjusted for study site and all other tabulated variables.

Note: OR = odds ratio; CI = confidence interval.

Table 4

Low Income California Latinas without a Recent Pap Test Model of Post-test Knowledge Score (n=723)

	Parameter† (SE)	
Intervention Group	0.63	(0.11) ****
Age		
21–34	−0.43	(0.19) *
35–49	−0.36	(0.17) *
50–69	Referent	
Education		
≤ 6 years	−0.66	(0.16) ****
7–11 years	−0.24	(0.15)
≥ 12 years	Referent	
Spanish Interview	−0.11	(0.21)
Time in U.S.		
≤ 10 years	0.16	(0.25)
> 10 years	−0.00	(0.22)
U.S. born	Referent	
Married/Living Together	0.29	(0.12) *
Number of Children		
0	0.39	(0.26)
1–2	0.46	(0.19) *
3–4	0.37	(0.18) *
≥ 5	Referent	
Has a Particular Doctor	0.09	(0.12)
Has Health Insurance	0.20	(0.12)
Baseline Pap Stage		
Precontemplation	−0.10	(0.27)
Relapse	−0.35	(0.17) *
Contemplation	Referent	
Adjusted R^2	0.09	

**** p<0.0001;

*** p<0.001;

* p<0.05

† Adjusted for study site and all other tabulated variables.

Note: SE = standard error.