

Why a Peer Intervention Program for Mexican-American Women Failed to Modify the Secular Trend in Cancer Screening

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Introduction: We evaluated an intervention program for Mexican-American women to increase Pap smear and mammography screening.

Methods: The three-year intervention included the presentation of role models in the media and reinforcement by peer volunteers. We used a two-community (intervention and comparison) pre-post test design. Activities were targeted to a mainly Spanish-speaking, poverty-level, immigrant population. Pre- and postintervention screening rates were based on independent random samples of Mexican-American women 40 years and older. **Results:** Women reported a 6% absolute increase in Pap smear use similar to the 7% increase in the comparison community. Both communities experienced large but similar increases in

recent mammography use (17% and 19%). Adjusting for differences in demographic factors, intervention and comparison changes remained identical.

Conclusions: Our peer intervention failed to accelerate the secular trend in cancer screening low-income Mexican-American women. Likely, promotional activities were too diffuse and the comparison community was contaminated with similar interventions. Strong social and market forces make it difficult to measure the effect of a specialized intervention on cancer screening rates.

Medical Subject Headings (MeSH): Papanicolaou smears, mammography, Hispanic Americans, intervention studies. [Am J Prev Med 1997;13:411-7]

Noting the significantly lower use of mammography and Pap smear screening among Hispanic women,^{1,2} the National Cancer Institute (NCI) funded research beginning in 1990 to develop cancer control interventions for Hispanic populations.³ Researchers are testing a variety of community intervention models including the use of churches,⁴ lay community helpers^{4,5} ("consejeras" or "promotoras"), Spanish-language media,⁶ and peer role model and volunteer networks.^{6,7} Although the effectiveness of these long-term and communitywide interventions is yet to be fully evaluated, preliminary reports show some promising results.^{5,8} These interventions hold promise because they are specifically tailored to the Hispanic culture⁹ and address the role of

acculturation (e.g., the predominant use of Spanish among low-income Hispanic women), the importance of family in Hispanic health behavior, and the fatalistic attitudes among Hispanics toward cancer.

We report findings from an evaluation of an intervention designed to improve the Pap smear and mammography screening rates of low-income Mexican-American women 40 and older. The study was one of six funded by the NCI to develop public health approaches to cancer screening for underserved women and was the only one to target a Hispanic population.¹⁰ The NCI supported this research in public health agencies because they are direct channels to these populations, frequently providing the only health care and health education to the underserved. In this study, we used a two-community design, one with intervention and the other without, and assessed the status of each community before and after the intervention (pre-post test design). Intervention activities were targeted to a mainly Spanish-speaking, poverty-level, immigrant population and were carried out by a local health department and a service provider consortium. The three-year intervention, based on the *A Su Salud* model, included the presentation of role models in the media and positive reinforcement of health behaviors by community volunteers.¹¹ We

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previously tested this model, without a comparison, in two smaller Mexican-American and African-American communities and observed significant increases in mammography use.¹²

METHODS

Intervention Design

The intervention community (El Paso, Texas) and the comparison community (Houston, Texas) were chosen as study sites because of their large populations of low-income Mexican-American women and high breast and cervical cancer mortality rates compared to state rates overall.¹³ Although we would have preferred a comparison community closer to the Texas-Mexico border, the few Texas border cities all had other cancer-screening initiatives. The intervention, known locally as *Luces de Salud* (Lights of Health), incorporates social modeling and social reinforcement concepts. The strategy is based on Social Learning Theory¹⁴ and is culturally specific in that women from the target community who are early adopters of the desired behavior serve as role models. Stories featuring these role models are developed by project staff in partnership with the local media. These stories are featured in local television, radio, and newspapers as human interest, public affairs, and local news stories. The reinforcement of the desired behavior is provided by volunteers recruited from the social networks of the target audience. These volunteers deliver cancer-screening messages to their peers verbally and through a quarterly newsletter. Newsletters are bilingual and feature additional role model stories along with simple educational messages about screening guidelines and information about clinics offering low-cost examinations.

An important aspect of this intervention test was the application of the model by a local health department. Responsibility for outreach activities, recruitment of role models and volunteers, and development of the newsletters rested with the local health department staff. In addition, a cancer consortium was created to ensure that breast and cervical cancer-screening services were available to all eligible women. The consortium of 57 health care providers and cancer-related agencies provided screenings, follow-up diagnostic examinations, and treatment referrals.

Intervention Activities

During the intervention, 45 Mexican-American women served as role models. Nearly all were 40 years and older, from low-income neighborhoods in central El Paso, and spoke only Spanish. In the first year, 28 role model stories were featured on television, radio, and in newspapers. Twelve role model stories were featured in the second year and six in the third year. Media used were one English and two Spanish television stations, two bilingual radio stations, and one English and one Spanish newspaper. Stories addressed specific barriers to screening participation identified from the baseline survey and from focus group discussions. Role models discussed overcoming embarrassment and fear about the procedures, becoming aware of the benefits of early detection and treatment, and learning about the availability of low-cost screening. Because of the difficulty in obtaining commitment from media outlets to feature role model stories, four public service announcements (PSAs) were developed in the second year. The PSAs, three in Spanish and one in English, were small vignettes that featured older Mexican-American women taking positive actions related to cancer screening. These PSAs were

repeatedly aired on radio and television, 75 times in the second year and over 400 times in the third year. Television interviews of program staff regarding the *Luces de Salud* program and the cancer-screening consortium also appeared periodically. Over the three years of intervention, 878 messages including role model stories and PSAs were delivered by local newspapers, radio, and television stations.

To recruit Mexican-American women as volunteers and role models, about 10 presentations were made each quarter with an average attendance of 24 people. Each quarter, staff recruited an average of 45 new volunteers and maintained a network that varied from 20 to 100 volunteers. These volunteers routinely distributed 3,000 to 5,000 quarterly newsletters, mostly in their neighborhoods, churches, and community clinics. The Mexican-American volunteers were bilingual or monolingual Spanish and ranged in age from 15 to 86 years.

Evaluation Methods

Target population surveys. We used a pretest/posttest cross-sectional design and surveyed residents of 16 El Paso census tracts and seven Houston census tracts. According to 1990 census figures, populations within these census tracts were 75% to 99% Mexican-American and had median annual incomes of \$14,000 to \$16,000, at or below poverty level. About 14,000 Mexican-American women 40 and older resided in the El Paso survey area and 4,600 resided in the Houston survey area. Sample selection in El Paso was a simple random sample of all households in the selected census tracts enumerated using city directory and census sources. The procedure in Houston was multistage; blocks were randomly selected and, from these, every third household was included in the sample. In both sites, eligible respondents were women 40 years and older who identified themselves as Mexican Americans. In households with more than one eligible woman, only one, chosen by recency of birthday, was interviewed. Preintervention surveys were completed in late 1991. In early 1995 after three years of program activities, the cross-sectional surveys were repeated using independent samples from the same designated census tracts. The response rate at preintervention was 82% in the intervention community ($n = 450$) and 85% in the comparison community ($n = 473$). At postintervention, the response rate was 76% for the intervention sample ($n = 450$) and 84% for the comparison ($n = 473$). Assuming the comparison community experienced a 5% increase in screening rates, these sample sizes allowed the detection of a minimum 7.5% increase in the intervention community, with an alpha error of .05 and a beta error of .20.

Study variables: Using a standard Spanish or English instrument, bilingual Hispanic women conducted one-hour interviews in the respondent's home. The solicited information used for this study included age, annual household income and size, education, health insurance coverage, country of birth, an acculturation scale,¹⁵ mammogram and Pap smear history, and knowledge of cancer detection methods and screening guidelines. Cancer-screening history was ascertained by asking women if they ever had a mammogram (or Pap smear) and, if so, the dates of their most recent mammogram (or Pap smear). Women were categorized by whether they reported a mammogram or Pap smear in the previous two years. Mammography or Pap smears done because of a health problem were considered diagnostic examinations and women reporting such diagnostic procedures were excluded (101 for mammograms; 128 for Pap smears). The post-

intervention questionnaire was identical to the preintervention questionnaire but with additional items assessing program recognition; respondents were asked if they had seen or heard anything about the *Luces de Salud* program.

Analysis. Chi-square tests, including tests for trends, were used to assess differences in sociodemographic factors between intervention and comparison sites. To assess changes in screening from pre- to postintervention and differences in these changes between intervention and comparison sites, we used normal approximation formulas for testing proportions.¹⁶ All tests of statistical significance were two-sided. To control for differences in factors between sites and year of survey, we used logistic regression to estimate an adjusted intervention effect on cancer screening. Variables included in the logistic model were age, health insurance coverage, education, indicator variables for community and pre-post time, and, to test for an intervention effect, an interaction term for community and time. Country of birth and language use were not independent predictors, did not affect estimated parameters, and were excluded from the final regression model. Income was also excluded since 24% of all respondents did not know their annual income. Odds ratios (OR) and 95% confidence intervals (CI) for the change in screening due to intervention were computed with the software Statistix.¹⁷

RESULTS

Table 1 shows the characteristics of women in the intervention and comparison communities from the pre- and postsurvey samples. Target women in the two communities were mostly at poverty level, without private health insurance, predominantly Spanish-speaking, and of low education levels. There were some differences in these characteristics between the two communities at baseline. Women in the intervention sample were older, had lower incomes, were more likely to be on Medicare or Medicaid

and be Spanish-language users. In the intervention community samples, there was also a significant increase from 1991 to 1995 in the proportion of women 65 years and older and in the proportion with Medicaid or Medicare.

As shown in Table 2, between 1991 and 1995 women in the intervention community reported a 5.9% absolute increase in Pap smear use (difference between 45.5% and 51.4%), similar to the 6.6% absolute increase in the comparison community. By 1995 reported levels of recent Pap smear use among older Mexican-American women in these two communities were just over 50%, still far below national goals. The increases in both communities were among Spanish-language users, women born in Mexico, and women with incomes at or below the federal poverty level. In both communities, rates of reported Pap smear use by women 50 to 64 increased 11%–12%. Examining groups of women by health insurance status revealed inconsistent trends. There was a 19% absolute increase in reported Pap smear use among the Medicare/Medicaid women in the intervention community, but no parallel increase was observed in the comparison community.

Less than 25% of respondents in both communities reported a recent mammogram before intervention (Table 3). From 1991 to 1995, both communities experienced large increases in reported mammography use. The increase in the intervention community was about the same as in the comparison (17% versus 19%). In the comparison community, statistically significant increases of 16%–27% points were observed in all sociodemographic groups except for women 40 to 49. In the intervention community, significant increases in mammography use were seen among less but not more educated women, among the uninsured and Medicare group but not the privately insured, among Mexican-born but not U.S.-born women, and among Spanish- but not English-language users.

We also examined intervention effects on the knowledge levels of target women. Changes in cancer-screening knowledge between the intervention and comparison communities were

Table 1. Basic characteristics of study subjects

	1991		1995	
	Intervention (n = 450) %	Comparison (n = 473) %	Intervention (n = 450) %	Comparison (n = 473) %
Age (years)				
40–49	28.7	35.9	24.4	31.7
50–64	42.9	41.9	38.4	42.7
≥65	28.4	22.2*	37.1	25.6*
Education				
<12 years	81.7	85.7	83.7	87.8
Income				
≤100% poverty	70.4	54.2*	63.8	67.9
Health insurance				
None	45.3	52.6*	40.0	52.2*
Medicare/Medicaid	29.6	21.1*	39.3	18.8*
Birthplace				
Mexico	61.4	60.7	63.1	64.1
English usage				
Low	64.6	58.0*	71.8	65.5*

* P ≤ .05 for differences between sites.

Table 2. Percentage of women reporting a recent Pap smear at pre- and postintervention by sociodemographic characteristics and language usage

	1991		1995		Difference pre to post	
	Intervention %	Comparison %	Intervention %	Comparison %	Intervention %	Comparison %
Total	45.5	50.1	51.4	56.7	5.9	6.6
Age (years)						
40-49	60.2	52.9	50.5	57.9	-9.7	5.0
50-64	44.6	50.8	56.6	62.0	12.0*	11.2*
≥65	33.1	44.6	46.7	47.0	13.6*	2.4
Education						
<12 years	42.4	48.4	51.5	54.3	9.1*	5.9
≥12 years	59.2	61.3	50.0	76.0	-9.2	14.7
Income						
≤100% poverty	41.7	41.0	50.2	52.7	8.5*	11.7*
>100% poverty	54.8	60.2	53.5	65.6	-1.3	5.4
Health insurance						
None	49.2	48.3	47.1	55.0	-2.1	6.7
Medicare/Medicaid	33.3	44.3	52.3	44.0	19.0*	-0.3
Private	53.3	58.8	58.0	68.9	4.7	10.1
Birth Place						
Mexico	43.9	47.2	53.5	57.6	9.6*	10.4*
United States	47.9	54.7	47.9	55.1	0.0	0.4
English usage						
Low	41.6	45.4	54.3	54.2	12.7*	8.8*
High	52.7	57.0	49.1	62.1	-3.6	5.1

* Two-sided $P \leq .05$ for a significant change in Pap smear screening from pre to post.

Table 3. Percentage of women reporting a recent mammogram at pre- and postintervention by sociodemographic characteristics and language usage

	1991		1995		Difference pre to post	
	Intervention %	Comparison %	Intervention %	Comparison %	Intervention %	Comparison %
Total	21.4	24.1	38.1	43.3	16.7*	19.2*
Age (years)						
40-49	16.8	20.9	33.0	26.5	16.2*	5.6
50-64	22.0	27.5	41.7	51.1	19.7*	23.6*
≥65	24.8	23.1	37.8	50.4	13.0*	27.3*
Education						
<12 years	19.8	23.1	39.2	41.7	19.4*	18.6*
≥12 years	27.0	32.3	31.3	54.7	4.3	22.4*
Income						
≤100% poverty	18.6	16.9	36.1	41.3	17.5*	24.4*
>100% poverty	27.3	31.7	41.8	47.8	14.5*	16.1*
Health insurance						
None	14.1	18.6	35.1	36.6	21.0*	18.0*
Medicare/Medicaid	21.4	19.2	40.1	44.2	18.7*	25.0*
Private	34.0	39.2	40.5	55.2	6.5	16.0*
Birthplace						
Mexico	16.9	20.7	40.7	40.3	23.8*	19.6*
United States	28.1	29.4	33.5	48.8	5.4	19.4*
English usage						
Low	17.5	19.8	42.7	39.2	25.2*	19.4*
High	29.1	30.9	28.3	51.6	-0.8	20.7*

* Two-sided $P \leq .05$ for a significant change in mammography screening from pre to post.

Table 4. Level of knowledge about cancer screening pre- and postintervention

	1991		1995		Difference pre to post	
	Intervention %	Comparison %	Intervention %	Comparison %	Intervention %	Comparison %
Pap smear as early detection method	58.9	59.2	55.3	66.2	-3.6	7.0
Mammogram as early detection method	30.7	36.4	50.4	47.8	19.7*	11.4*
Pap smear screening guidelines	74.4	62.6	70.4	82.0	-4.0	19.4*
Mammography screening guidelines	30.4	27.9	40.2	46.9	9.8*	19.0*

* $P \leq .05$ for a significant change in knowledge from pre to post.

inconsistent (Table 4). The intervention community had a greater increase in knowledge about mammography as an early detection method than the comparison, but the comparison community had greater increases in knowledge about Pap smear and mammography screening guidelines than the intervention community.

Because of differences in sociodemographic characteristics between the intervention and comparison communities and changes in these characteristics between the pre- and post-samples, we used multiple logistic regression to test for an adjusted intervention effect on Pap smear and mammography screening. After controlling for age, education, and insurance status, screening changes in the comparison and intervention were identical (mammography, adjusted OR = 1.01, 95% CI = 0.66, 1.55; Pap smear, adjusted OR = 1.00, 95% CI = 0.68, 1.47).

DISCUSSION

National data show that all groups of women, including Hispanic women, have made significant gains in the use of breast and cervical cancer screening tests. National Health Interview Survey (NHIS) data show that the percentage of U.S. women 40 and older who reported having had a mammogram in the past year increased from 14% in 1987 to 29% in 1992.¹⁸ Similarly, reported rates of Pap smear use in U.S. women 45-64 years increased from 30% to 41%. By 1992, the percentage of Hispanic women who reported a recent Pap smear or mammogram was comparable to that of Caucasian women.^{18,19} We were unable to show that our peer role model intervention was effective in accelerating these trends among poor, Spanish-speaking Mexican-American women. Reasons for this failure may provide lessons to others testing community interventions to improve cancer screening.

One factor that may have contributed to the lack of an intervention effect was the weak application of the *A Su Salud* model. The model hinges on a combination of media, peer role models to tell their stories, and a network of volunteers. It became clear midway through the intervention phase that not enough role model stories were being presented in the mass media. In a previous effort, a small local health department (Corpus Christi, Texas) was very successful in getting free air time for role model stories.¹² For this study in a larger urban community, the local health department was not able to gain media cooperation for

developing and running role model stories. For example, 580 role model stories appeared in the Corpus Christi media in two and a half years while only 46 appeared in El Paso. Not surprisingly, when asked at postintervention, only 11% of women in El Paso had heard of the *Luces de Salud* program. The resort to PSAs in the last year of intervention was a reflection of our failure to implement the model as it was originally conceived. In addition, the ratio of volunteers to members of the target audience was lower than in past efforts. Previous applications of the *A Su Salud* model with its mass media and volunteer components have been in much smaller communities^{12,20} than that attempted in this community trial. While the *Luces de Salud* project averaged over 45 volunteers per quarter in a city of over 500,000, the original *A Su Salud* project site had over 400 volunteers providing monthly contact in a city of 25,000.²¹ Despite these difficulties, the *A Su Salud* model was chosen for its cost-effective, low-intensity approach²⁰ and may have been implemented as well as could be expected given the capacity of local health departments. In any case, activities were not sufficient to affect screening beyond what was taking place in the comparison community. In the future, successful implementation of this model by public health agencies may require more extensive, ongoing training and monitoring of staff on using the media and volunteers for health promotion.

A second factor that influenced our results was the unanticipated and pervasive cancer-screening efforts that resulted from the Breast and Cervical Cancer Mortality Prevention Act of 1990.²² This national initiative allowed the Centers for Disease Control and Prevention (CDC) to develop and fund state programs to deliver cancer-screening services to older, low-income women. About the time our intervention began, many community activities devoted to improving mammography and Pap smear screening were established across the state. In fact, we discarded our initial comparison community on the Texas-Mexico border because a cervical cancer screening intervention was started in the community before we began. Despite careful selection of a second and final comparison community, the local YWCA, the city health department, a school of medicine, and a nonprofit private organization began cancer-screening outreach efforts in our study census tracts (written communication, L. Gutierrez, University of Texas School of Public Health in Houston, 1996). In contrast, *Luces de Salud* was the only breast and cervical cancer screening program in the intervention commu-