Encouraging Vietnamese-American Women to Obtain Pap Tests Through Lay Health Worker Outreach and Media Education

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BACKGROUND: **Five times more Vietnamese-American women develop cervical cancer than white women. Few studies have examined whether community-based participatory research can effectively address Asian immigrants' health problems. This article reports the preliminary evaluation of 1 such project.**

METHODS: **A coalition of 11 organizations in Santa Clara County, California worked with university researchers to design and simultaneously implement a media education (ME) campaign and a lay health worker outreach (LHWO) program to increase Vietnamese-American women's cervical cancer awareness, knowledge, and screening. Two agencies each recruited 10 lay health workers (LHWs), who, in turn, each recruited 20 women who were then randomized into 2 groups: 10 to LHWO+ME (n = 200) and 10 to ME alone (n = 200). LHWs organized meetings with women to increase their knowledge and to motivate them to obtain Pap tests. Participants completed pre- and post-intervention questionnaires.**

RESULTS: **At post-intervention, significantly more LHWO+ME women understood that human papillomavirus and smoking cause cervical cancer. The number of women who had obtained a Pap test increased significantly among women in both LHWO+ME and ME groups, but substantially more in the LHWO+ME group. Significantly more LHWO+ME women said they intended to have a Pap test.**

CONCLUSIONS: **Media education campaigns can increase Vietnamese women's awareness of the importance of Pap tests, but lay health workers are more effective at encouraging women to actually obtain the tests. Lay health workers are effective because they use their cultural knowledge and social networks to create change. Researchers, community members, and community-based organizations can share expert knowledge and skills, and build one another's capacities.**

KEY WORDS: **cervical cancer; screening; Vietnamese; lay health worker; media.**

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Researchers are beginning to use community-based participatory research (CBPR) to address health disparities in underserved populations.[1–3] Through this approach, researchers, community members and local organizations[4] work collaboratively to bridge cultural and linguistic gaps and overcome structural barriers. Proponents suggest that CBPR is more effective than traditional "research-driven" strategies, and builds collaborators' capacities. Few studies have examined whether CBPR can be used effectively to address Asian immigrants' health problems, especially for those with limited English ability, such as Vietnamese refugees.

Vietnamese Americans face substantial health disparities. Vietnamese-American women have the highest rates of cervical cancer of any racial or ethnic group in the United States (43.0 cases/100,000 vs 8.7 cases/100,000 among white women).[5] Vietnamese-American women ages 55 to 65 have a rate 10 times higher than white women of the same ages (181.6 cases/100,000 vs 17.8 cases/100,000).[5] According to the Northern California Cancer Center, cervical cancer is detected later in California's Vietnamese-American women than in the general population (R. Leung, written communication, June 2000).

To prevent deaths from cervical cancer, the National Cancer Institute and the American Cancer Society recommend that women from high-risk groups should be screened annually. Many studies[6–11] have documented that Vietnamese-American women are underscreened. From 1990 to 2002, only 50% of Vietnamese-American women reported ever having had a Pap smear,[9,10,12–16] compared with 94.7% for women in the general United States population.[14]

To address these problems, the University of California, San Francisco's *Suc Khoe La Vang!* (Health is Gold!) Vietnamese Community Health Promotion Project, in collaboration with a community coalition in Santa Clara County, California, undertook to use CBPR to increase Pap screening among Vietnamese-American women. This demonstration project, "REACHing Vietnamese-American Women: A Community Model for Promoting Cervical Cancer Screening," was funded by the Centers for Disease Control and Prevention (CDC) under the Racial and Ethnic Approaches to Community Health (REACH) 2010 Program.[17] This article discusses the implementation and impact of 2 project components—a media education campaign and a lay health worker outreach program—on Vietnamese-American women's awareness and knowledge of cervical cancer and Pap tests, and their receipt of Pap tests or their intention to obtain them. We

describe the benefits of, and lessons from, using CBPR for these activities.

METHODS

Population

The 2000 Census counted 1,122,528 Vietnamese in the United States, an 85% increase over 1990.[18] Demographers predict that by 2030, Vietnamese Americans will be the second largest Asian/Pacific Islander group in the United States, numbering nearly 4 million.[19] Approximately 40% of Vietnamese Americans live in California, with about 100,000 residing in Santa Clara County.[18] When this project began in 1999, there were an estimated 31,000 Vietnamese-American women age $\geq$18 living in Santa Clara County. Roughly one third immigrated during the 1990s; they are generally less educated, less acculturated, and economically more disadvantaged than those who came before.

Project Evolution

REACH 2010 supports 2-phased, 5-year projects that build community capacity to reduce health disparities. In 1999, the Vietnamese Community Health Promotion Project received 1-year funding from the CDC and organized a coalition of 7 local community-based organizations and 4 health agencies that provide services to Vietnamese Americans, community activists, public health professionals, health care providers, social workers, and academics. The Vietnamese REACH for Health Initiative Coalition met monthly and held a retreat to identify key barriers to Pap testing.

Early in 2000, the Coalition hosted a community forum with over 200 Vietnamese-American women and their families to discuss the problem of cervical cancer, and brainstorm about strategies to increase cervical cancer screening. Using ideas from community members, the Coalition met and held a second retreat to develop a cervical cancer prevention project using the "Pathways" framework.[3,20–22] Pathways posits that people move along a sociocultural pathway to cancer screening. If they can access health care, they also traverse a medical care pathway. Pathways predicts that people obtain cancer screening when the 2 pathways converge through cultural concordance and sensitivity, patient education, and system capacity.[22] Our Coalition analyzed these pathways and used Green's PRECEDE/PROCEED planning framework[23] to identify predisposing, enabling, and reinforcing factors that might increase screening.

In a second community forum, the Coalition cycled their draft plan back to 200 community members. Using community feedback, the Coalition finalized a Community Action Plan. REACH 2010 funded a 4-year demonstration project based on the Plan. The University of California–San Francisco (UCSF) Committee on Human Research approved the research protocol. The project integrates 6 components implemented simultaneously to address sociocultural and structural barriers to cervical cancer screening by reaching: community members (via a media education campaign and a lay health worker outreach program); physicians (Pap registry and reminder system; continuing medical education for Vietnamese-American physicians); and the health care system (reduced-cost, Vietnamese-staffed Pap clinic, and action to reestablish a Breast and Cervical Cancer Control Program site in Santa Clara County).

Because we used CBPR in the formulation and implementation of the media education (ME) and the lay health worker outreach (LHWO) components, we selected these components to measure the effectiveness of using CBPR in this population. This article compares the impact on women exposed to the ME campaign alone (ME) versus the impact on women exposed to both the LHWO program and the ME campaign (LHWO+ME).

Interventions

Media Education Campaign. In previous community intervention trials, we showed that media education can increase breast and cervical screening, decrease smoking, and increase hepatitis B vaccinations among Vietnamese Americans.[9,24–26] Based on community input, the Coalition felt that a media campaign would reach women in Santa Clara County, and therefore asked the staff to design a multimedia education campaign. The staff developed the project logo, messages, and content. Three Vietnamese-language television channels broadcast 6 television ads 2 to 3 times per week over 3 months. Concurrently, 3 Vietnamese-language radio stations aired 6 radio advertisements 1 to 2 times/day, 5 days/week, and 5 Vietnamese newspapers ran 6 print ads. We developed a Vietnamese-language cervical cancer poster and an information booklet that was later reprinted by the National Cancer Institute. We distributed booklets (10,000 copies) and posters (2,000 copies) at physicians' offices, community forums, lay health worker outreach sessions, and cultural events.

Lay Health Worker Outreach Program. In a previous intervention trial, we showed that LHWO could promote breast and cervical cancer screening among Vietnamese-American women.[16,27] The Coalition selected this strategy for the present study.

Recruitment of agencies, lay health workers, and participants. A full-time staff member and a half-time assistant, both Vietnamese American and bilingual, coordinate the LHWO program. The Coalition selected 5 agencies to be contracted partners based on their capacity, their Vietnamese-American staff, their reputation, and their Vietnamese-American client base. Initially, each agency selects a LHWO coordinator and 10

lay health workers (LHWs) who each receive a $1,500 stipend. Coordinators and LHWs must be Vietnamese-American women, ages ≥18, residents of Santa Clara County, compassionate, dedicated, personable, and willing to learn. Each LHW recruits 20 women from her social networks. To attract and retain participants, partner agencies offer participants $30 or a gift incentive. By October 2004, 5 agencies will have recruited 50 LHWs who will have reached 1,000 Vietnamese-American women.

Materials and training. Staff designed a training manual in Vietnamese for the LHWs. The manual provides information on the program's structure, recruiting participants, organizing and leading small group meetings, and conducting oral presentations about cervical cancer and Pap tests. Staff developed a portable 11 × 14-inch, 14-page flip chart with talking points in Vietnamese and illustrations of Vietnamese women. LHWs also receive booklets.

Staff train LHWs in two 3-hour sessions. In the first session, trainees learn about becoming a LHW, female reproductive anatomy, cervical cancer and its risk factors, screening recommendations, and benefits of early detection through Pap tests. LHWs learn to use flip charts and lead small group sessions. In the second training, women learn about the evaluation process and role-play to practice recruiting, giving oral presentations, facilitating discussions, and answering questions.

LHWO activities. The Coalition selected 2 nonprofit health and social service agencies as the first 2 partners: Asian Americans for Community Involvement and Southeast Asian Community Center, both in San Jose, California. From April 2001 to August 2002, each agency recruited 10 LHWs, most of whom were married full-time homemakers. Each LHW, in turn, recruited 20 women from her social networks. These 20 women were randomized into 2 groups: 10 in LHWO+ME (n = 200) and 10 in ME alone (n = 200). Participants were randomly assigned unless they lived in the same household or were recruited to replace women who withdrew before the first session.

Intervention group. LHWO activities were conducted during the media education campaign. Thus, women assigned to the LHWO intervention received information both from the lay health worker and the media (LHWO+ME). Depending on women's availability, LHWs organized groups of 3 to 4 women to participate in two 90-minute sessions, or groups of 5 to 10 women to participate in two 120-minute sessions. Before the sessions, staff administered paper-and-pencil pre-intervention questionnaires. LHWs then used flip charts to give 15- to 20-minute presentations, facilitate discussions, and answer questions. The LHWs explained how to access medical services and helped some women to schedule Pap tests.

Two months later, LHWs conducted small group sessions with the same women. The LHWs answered questions, reemphasized the benefits of annual screening, and discussed Pap testing. Afterwards, staff administered paper-and-pencil post-intervention questionnaires.

Control group. Women in the control group only received information from the media education campaign (ME). At pre-intervention, staff administered pre-intervention questionnaires by telephone. Because the Coalition felt that the control group should receive the same information and assistance as the intervention group, the control group received a delayed intervention. Accordingly, after LHWs had finished the intervention group sessions, they led separate sessions for women in the control group. Before these sessions, staff administered paper-and-pencil post-intervention questionnaires. Then, LHWs provided educational information to the ME group women.

Evaluation Methods

Community Assessment of Media Education Campaign. To monitor the impact of the mass media campaign, the Coalition hosted 2 additional community forums. The Coalition used questionnaires and group discussions to collect community members' opinions. Afterwards, staff reviewed questionnaire responses and discussion notes to identify common views, dissenting opinions, and noteworthy suggestions. The Coalition and staff used these data to refine existing media strategies and formulate new approaches.

Lay Health Worker Outreach Evaluation. To evaluate the effects of the LHWO program, we compared the intervention and control groups' responses to the questionnaires. The pre- and post-intervention questionnaire contained 25 questions covering sociodemographics, acculturation, exposure to the media campaign, awareness of cervical cancer and beliefs about its causes, and awareness, receipt and intention to receive the Pap test. The questionnaires were translated from English into Vietnamese, back-translated, pretested, and revised.

Analysis. The primary outcome variables were: 1) awareness and knowledge of cervical cancer and Pap tests; and 2) self-reported receipt of, or intention to obtain, a Pap test. Exposure to media education was an intermediate outcome. We compared each participant's matched responses to the pre- and post-intervention questions to determine if their awareness, knowledge, Pap test status or exposure to media had changed. We used the SPSS 11.0 statistical package (SPSS, Inc., Chicago, Ill) to conduct the McNemar χ^2 test to determine if the change was significantly different from chance. This test compares the proportion of respondents that changed their answer at post-intervention (e.g., "no" at pre-intervention to "yes" at post-intervention) against the proportion that changed in the opposite direction (e.g., "yes" to "no"). A P value of <.05 was considered significant.

RESULTS

Two agencies enrolled 400 women in the LHWO. Ten dropped out and were replaced before the first group sessions. All participants completed the pre-intervention and post-intervention questionnaires, nearly all answering in Vietnamese. Some respondents left questions blank, or selected "refused." The sociodemographics of the LHWO+ME and ME groups were similar, except that the ME group had more divorcees (Table 1).

Exposure to Media Education

At pre-intervention, most participants had seen or heard our media education campaign (Table 2). At post-intervention, the percentages increased significantly in both groups for self-reported exposure to all 4 media components. At post-intervention, both groups reported being similarly highly exposed to TV and ratio spots. The LHWO+ME group reported being more exposed to newspaper articles (χ^2 $P = .01$) and articles ($P = .028$) than the ME group.

Awareness and Beliefs About the Causes of Cervical Cancer

At pre-intervention, similar percentages (>80%) of both groups had heard of cervical cancer (Table 3). By post-intervention, virtually all women in both groups were aware of cervical cancer. On both the pre- and post-intervention questionnaires, 137 women in the LHWO+ME group selected at least one item from a multiple-choice list of possible causes of cancer; the others selected "don't know" on either questionnaire. In the ME group, 105 women selected at least one cause. The LHWO+ME group increased more than the ME group in their beliefs about established causes of cervical cancer. In the LHWO+ME group, the net percentage of women who correctly selected "HPV infection" as a cause of cervical cancer increased from 25.5% at pre-intervention to 67.2% at post-intervention (Table 3). A significantly greater proportion (48.9%) of women changed their answers from pre- to post-intervention to select this as a correct answer than vice versa (7.3%; $P < .001$). In the LHWO+ME group, the net percentage of women who correctly selected "active or passive smoking" as a cause of cervical cancer also increased substantially from 16.1% to 70.8%. Here again, the proportion of women that changed their answers to correctly select this answer was significantly greater than vice versa ($P < .001$). The ME group had a smaller net increase (7.6% to 27.6%) in correctly selecting "active or passive smoking" that was significant ($P < .001$).

The LHWs explained that "heredity" and "poor hygiene" are not established causes of cervical cancer. At pre-intervention, 32.8% of the LHWO+ME group had incorrectly selected heredity as a cause, and 67.2% had correctly not selected this item. By post-intervention, there was a net increase to 93.4% of those who did not select heredity. The change in correct answers versus incorrect answers was significant ($P < .001$). By contrast, among the ME group at pre-intervention, 21.9% incorrectly selected heredity as a cause and 78.1% did not select it. At post-intervention, 66.7% did not select it. Only 8.6% changed their answers correctly, whereas 20% changed to incorrectly select it ($P < .04$). For "poor hygiene," the LHWO+ME group had a net increase from 55.5% to 79.6% produced by a significant change to correct answers (35.0%) versus incorrect answers (10.9%; $P < .001$). For this item, nearly equal proportions of the ME group changed their responses correctly and incorrectly (22.9% and 21.0%, respectively, P = not significant [NS]).

Table 1. Sociodemographic Characteristics of Media Education (ME) Versus Lay Health Worker Outreach + Media Education (LHWO+ME) Groups at Baseline

Demographic Characteristic	ME Intervention Group ($N = 200$)	LHWO+ME Intervention Group ($N = 200$)	P Value
Mean age, y (±SD)	43.0 (13.7)	42.8 (14.3)	.93
Min–max	19–77	18–88	
Mean residence in U.S., y (±SD)	9.6 (6.2)	8.4 (5.6)	.06
Min–max	0–43	0–27	
Self-rated English speaking ability, poorly or not at all, %	51.0	55.3	.34
Educational level <12 years, %	51.2	53.3	.68
Marital status, %			
Married	59.0	64.5	
Widowed	7.0	5.5	
Divorced or separated	15.5	8.0	.04
Living with a partner	0	0.5	
Never married	19.0	19.0	
Employment status, %			
Currently employed	28.5	30.0	
Unemployed	19.0	24.0	.17
Homemaker	33.5	33.0	
Student	16.5	8.5	

Table 2. Participants' Exposure to the REACH Mass Media Campaign Elements in Media Education (ME) Versus Lay Health Worker Outreach + Media Education (LHWO+ME) Groups

Respondent Saw or Heard About Cervical Cancer and Pap Tests on	ME Intervention Group				LHWO+ME Intervention Group			
	N	Pre-, %	Post-, %	Pre- vs Post-, *P* Value	*N*	Pre-, %	Post-, %	Pre- vs Post-, *P* Value
Television ads	198	56.1	73.3	<.001	192	59.9	78.1	<.001
Radio ads	194	74.7	84.5	.003	195	71.8	87.2	<.001
Newspaper ads	193	51.3	69.4	<.001	195	56.4	79.0	<.001
Newspaper articles	193	40.4	60.6	<.001	193	50.8	73.1	<.001

Pap Awareness and Understanding

At pre-intervention, over 80% of women in both groups had heard about the Pap test (Table 4). By post-intervention, nearly all women had heard of the test, increasing significantly in both groups. At post-intervention, significantly more women in the LHWO+ME group than in the ME group understood that postmenopausal women should continue, and women ≥18 years old should start having Pap tests. Both groups improved in their understanding that virginal women should have Pap tests.

Pap Receipt and Intention

Prior to the intervention, about two thirds of the women in both groups had had at least one Pap test (Table 4). In the 3- to 4-month time span between pre- and post-intervention surveys, the percentage of women who had had a Pap test increased significantly in the LHWO+ME group (from 62.1% to 76.9%, $P < .001$), but did not increase significantly in the ME group (70.2% at pre- to 72.8% at post-intervention, P = NS). Among those who reported never having a Pap test at pre-intervention, the percentage that reported having one by post-intervention increased significantly more in the LHWO+ME group than in the ME group (47.8% vs 2.5%, Z-test scores for change in both groups, $P < .001$).

In both groups at pre-intervention, about two thirds of women who had not had a Pap test reported that they had thought about obtaining one. This percentage increased significantly between the pre- and post-interventions in the LHWO+ME group (from 65.6% to 90.6%, $P = .02$), but

Table 3. Participants' Awareness and Beliefs Regarding Causes of Cervical Cancer in Media Education (ME) Group Versus Lay Health Worker Outreach + Media Education (LHWO+ME) Group

	ME Intervention Group					LHWO+ME Intervention Group				
	N	Pre-, %	Post-, %	% Changed from Disagree to Agree vs % Changed from Agree to Disagree	Pre- vs Post- *P* Value	*N*	Pre-, %	Post-, %	% Changed from Disagree to Agree vs % Changed from Agree to Disagree	Pre- vs Post- *P* Value
Heard of cervical cancer	191	88.5	93.7	10.5 vs 5.2	.10	188	80.3	100.0	19.7 vs 0*	†
HPV infection causes cervical cancer‡	105	23.8	31.4	21.0 vs 13.3	.24	137	25.5	67.2	48.9 vs 7.3*	<.001
Active or passive smoking causes cervical cancer‡	105	7.6	27.6	22.9 vs 2.9*	<.001	137	16.1	70.8	56.9 vs 2.2*	<.001
Heredity does not cause cervical cancer‡	105	78.1	66.7	8.6 vs 20.0§	.04	137	67.2	93.4	30.7 vs 4.4*	<.001
Poor hygiene does not cause cervical cancer‡	105	42.9	44.8	22.9 vs 21.0	.88	137	55.5	79.6	35.0 vs 10.9*	<.001
God's will does not cause cervical cancer‡	105	93.3	82.9	3.8 vs 14.3§	.02	137	92.0	97.1	8.0 vs 2.9	.12

* *Significant change to the correct answer.*
† *Test cannot be performed because 100% of respondents answered "yes" at post-intervention.*
‡ *Responses to a multiple-choice question. Cases that selected "don't know/unsure" as an answer excluded.*
§ *Significant change to the incorrect answer.*
HPV, Human papillomavirus.

Table 4. Pap Test Awareness, Understanding, Intention, and Receipt in Media Education (ME) versus Lay Health Worker Outreach + Media Education (LHWO+ME) Groups

	ME Intervention Group				LHWO+ME Intervention Group			
Responses	*N*	Pre-, %	Post-, %	Pre- vs Post- *P* Value	*N*	Pre-, %	Post-, %	Pre- vs Post- *P* Value
Heard of Pap test*	190	83.7	95.8	<.001	186	80.1	100	†
All married women should get Pap tests‡	194	93.8	95.9	.45	194	94.8	99.5	.01
Postmenopausal women should continue Pap tests‡	193	80.8	85.5	.22	195	86.7	97.4	<.001
Women ≥ 18 years old should get Pap tests‡	192	62.5	70.3	.08	188	60.1	93.1	<.001
Virginal women should get Pap tests‡	191	47.1	57.1	.01	186	40.3	85.5	<.001
Ever had a Pap test (among all participants)*	191	70.2	72.8	.41	182	62.1	76.9	<.001
Ever had a Pap test (among those who had not had a Pap test at pre-intervention)*	57	0	24.6	<.001	69	0	47.8	<.001
Ever thought about having a Pap test (among those who had not had a Pap test at pre- or post-intervention)*,§	41	61.0	70.7	.34	32	65.6	90.6	.02

* *Excludes "don't know" responses.*
† *Test cannot be performed because 100% of respondents answered "yes" at post-intervention.*
‡ *"Don't know" responses transformed to "no" and included.*
§ *Includes only those who had not had a Pap test at pre- or post-intervention.*

increased only slightly in the ME group (from 61% to 70.7%, P = NS).

In telephone follow-up, most women in the LHWO+ME group reported sharing newfound information with family and friends, suggesting that the LHWO had a "multiplier effect."

DISCUSSION

This project demonstrates that community-based organizations and university-based researchers can use CBPR effectively to promote cervical cancer screening among Vietnamese-American women.[1–5] Working in equal partnership, community representatives and researchers combined their complementary skills to elicit ideas and support from community members, and created effective media education and lay health worker outreach programs.

The combined effects of the media education and lay health worker outreach increased women's knowledge about cervical cancer prevention, motivated significant numbers of women to obtain Pap tests, and motivated others to consider obtaining them. Media education alone was effective in raising women's general awareness about cervical cancer and about Pap tests, but was less effective at motivating women to obtain them. These results are consistent with our previous findings among Vietnamese Americans that media alone, while equally effective for increasing their recognition of, and intentions to undergo, cervical and breast cancer screening, was less effective than a lay health worker intervention, for improving receipt and maintenance of screening.[8,16,28]

Using CBPR can help Vietnamese-American community members and community-based organizations build important capacities. Lay health workers can use their new-found health knowledge, organizational skills, and facilitation experiences to organize future outreach programs. Many participants said that they wanted to become LHWs. Partner agencies developed capacities to conceptualize and organize lay health worker outreach. Researchers developed the capacity to organize an effective coalition, develop intervention content, and formulate and implement protocols that meet both community and scientific standards.

Fortunately, in undertaking this CBPR project, we did not have to start from scratch. These components succeeded partly because of the Coalition members' knowledge of the Vietnamese-American community and years of capacity building in their agencies, including 16 years of staff development in the UCSF Vietnamese Community Health Promotion Project.

We believe that the LHWO model reaches Vietnamese-American women effectively because it replicates their established cultural patterns of seeking and sharing reproductive health information within their social networks.[27,29] This pattern is vital for many women to survive in the United States because they face barriers of limited formal education, limited ability to speak or read English, no health insurance, and limited

access mainly to male Vietnamese physicians who primarily provide curative services.[20] We believe that media education is effective in raising general awareness because most Vietnamese Americans are avid consumers of the many Vietnamese-language TV, radio and print media.

This study has several limitations. First, participants in the LHWO program were self-selected. Therefore, data obtained from them may not completely represent changes among Santa Clara County's population of Vietnamese-American women. However, self-selecting participants are most likely to be "change agents" in their communities, thus allowing us to measure change among those who were most likely to spread the word about cervical cancer. We will conduct a more complete assessment of the whole community by comparing data from our pre-intervention random survey of 1,556 women[9] in 2000 with data we will collect in a post-intervention survey in 2004. Second, results presented here are from 2 of 5 agencies (400 of 1,000 women). We will only be able to determine how each agency's characteristics influence LHWO when all 5 agencies have completed the program. Third, some of the gains among the LHWO+ME group may be attributable to somewhat higher exposure to newspaper articles and ads. We believe it is more likely that higher rates of self-reported exposure to newspaper articles and ads reflect the effects of the lay health worker outreach in priming women to seek information. Fourth, we rely on self-reports to measure women's receipt of Pap tests. Like other ethnic groups,[30] some Vietnamese Americans may wish to please the project organizers by over-reporting their testing. To address this measurement issue, we will validate the self-reports through another component of the project, the Pap registry. Fifth, the time span between pre- and post-intervention questionnaires was only 3 to 4 months. In Santa Clara County, some women must wait more than 3 months after making an appointment to receive a Pap test. Thus, we may have undercounted those who obtained a Pap test following the interventions.

Community-based participatory research developed in the United States as a product of American culture, having been undertaken mainly with native-born Americans. We have found that some aspects of CBPR can be applied with immigrants from Vietnam, but CBPR must be adapted to work within their cultural context. It is not enough for researchers working in ethnic communities to use CBPR; researchers must modify CBPR according to the culture of each ethnic community. A "one-size-fits-all" approach to CBPR is unlikely to be effective.

We modified CBPR to fit the cultural norms and expressed needs of the Vietnamese-American community. We had to strike a balance between respecting the dominant cultural pattern of deferring to authority figures (e.g., senior community leaders and physicians) and their interest in encouraging community members to contribute their views. The standard expectation in CBPR is that coalition members should "empower" themselves by taking control of a project. We found that the Coalition members were not inclined to struggle with the research staff or one another to seize power to run this project. Instead, they established a one-member, one-vote governance structure in which the research team had one vote. Most Coalition members, already having a sense of their own power, chose to participate by formulating and implementing the project, and allowed the university-based researchers and community-based organizations to engage their complementary capacities to develop content, manage logistics, and evaluate outcomes. The Coalition also asked the research staff to report the research findings back to them so that they could monitor and modify the project. Coalition members valued harmony and efficiency, and considered interpersonal conflicts counterproductive. The maxim for this Vietnamese approach to CBPR is "everyone does what they do best, and grows by doing it with others in the process."

Vietnamese-American community members and community agency representatives often lacked a basic understanding of scientific research methods. Learning to become researchers was not a high priority for people who are focused on their own pressing priorities: reuniting family, earning a living, raising children, and building successful organizations. Accordingly, the research team had to respect the community members' limited time and their varying levels of interest in research. The "science gap" between the community members and the research staff presented a challenge when we asked the agencies and LHWs to adhere to the protocol for randomizing women into the intervention and control arms of the study. To address this gap, we added a training module on basic research concepts. As this population becomes more familiar with research concepts and exposed to CBPR projects, we expect that their understanding of research methods will increase.

The university structure prevented us from involving the community representatives in all aspects of the research. We had intended to involve LHWs and agency staff in data collection. However, the university's institutional review board would not allow us to engage lay health workers and agency staff to collect data from women in their community without first undergoing human subjects training and receiving National Institutes of Health human subjects certification. Given that many of the participants have limited or no ability to read English, and limited scientific literacy, and that no human subjects training materials are available in Vietnamese, we could not provide them such training in the time frame of this project. Research staff conducted all surveys and interviews, and managed all data collection and entry. In the future, we may surmount this barrier by developing a Vietnamese-language human subjects training program.

Conclusions

University-based researchers can work as equal partners with community members to develop effective media education and lay health worker outreach projects for Vietnamese Americans. However, CBPR must be adapted for the cultural context in each community. Community input is essential for developing culturally and linguistically appropriate media and lay health worker programs. Lay health workers can use their cultural knowledge, sensitivity, and social networks to reach underserved women and improve their peers' knowledge and screening behaviors. Together, researchers and community members benefit from sharing their respective expertise, and can expand one another's capacities to address health challenges.

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