EFFECTIVENESS OF ADULT VACCINATION PROGRAMS IN FAITH-BASED ORGANIZATIONS

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Elderly persons of African American and Latino descent have lower rates of immunizations after adjustment for insurance and education. Interventions that use faith-based organizations (FBOs) are promising but have not been well evaluated. We examined the effectiveness of an FBO adult vaccination program in minority communities. From December 2003 through January 2004 and November 2005 through February 2006, 15 churches were randomized to intervention with onsite adult vaccinations or to comparison with no vaccinations. Participants were eligible if they had not been previously vaccinated with pneumococcal vaccine, did not regularly receive influenza vaccine, were aged ≥65 years, and had a clinical indication for vaccination. Baseline and follow-up surveys were conducted. Primary outcome was rates of influenza and pneumococcal vaccinations. The study sample (N=186) was 44% African American, 43% Latino, 8% White, and 3% Asian. Of those eligible, 90 of 112 (80%) in the intervention group used the influenza vaccine compared to 32 of 70 (46%) in the comparison group (P<.001). Of those eligible, 58 of 88 (66%) in the experimental group used the pneumococcal vaccine compared to 20 of 57 (35%) in the comparison group (P <.001). Participants in the intervention group were significantly more likely to receive influenza vaccinations (odds ratio [OR] 4.8, 95% confidence interval [CI] 2.5–9.4) and pneumococcal vaccination (OR 3.6, 95% CI 1.8–7.2). More than ninety percent of all participants reported willingness to participate in FBO education and promotion programs. This onsite, FBO adult vaccination program was effective in increasing vaccination rates and may be promising for decreasing racial/ethnic disparities in vaccination rates. (*Ethn Dis*. 2007;17[suppl 1]:S1-15–S1-22)

Key Words: Church, Faith-Based, Racial/Ethnic Disparities

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INTRODUCTION

Partnerships between faith-based organizations (FBOs) and academic institutions are a common means for conducting community-based research and implementing health promotion programs to reduce racial and ethnic disparities. Examples of such partnerships include cancer screening (breast, cervical, and prostate cancer), diet and nutrition projects, physical activity promotion, diabetes and hypertension screening and management, smoking cessation, HIV/AIDS prevention, mental health programs, and adult vaccination promotion and delivery programs.[1–7] While these partnerships are not a new concept, interest in partnership has resurged in recent years, along with additional governmental and nongovernmental funding for faith-based initiatives.

Various reasons explain this recent increased focus on academic collaborations with FBOs. The partnerships can help academic or public health organizations to broaden models of health to include individual, social, spiritual, and environmental influences; to assist FBOs in implementing health projects; to support the existing assets of FBOs to improve the health of their members; to approach research in healthcare disparities among different racial and ethnic groups; and to recruit potential research study participants from within FBOs. Many FBOs have the infrastructure to execute health promotion programs (eg, volunteers, parish nurses) and a strong desire to improve the health of their congregations, but they often lack the expertise in implementing health programs and could benefit from technical assistance from either academic or public health institutions.

Faith-based organizations (FBOs) are establishing model programs for improving health outcomes, increasing primary prevention, and reducing disease mortality in under-served minority communities.[8] With the publication of the report, *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care* by the Institute of Medicine, the Commonwealth Fund Report, and other data on racial and ethnic disparities in incidence and mortality in cancer, heart disease, and stroke; quality of cardiac and diabetes care; hypertension management; and treatment of pain, interest has been renewed in developing community-based strategies to reduce or to eliminate racial and ethnic disparities.[9] Reports have suggested that many of these disparities are explained, in part, by the poor interactions with the healthcare system experienced by many minorities, problematic communications between minority patients and their doctors, and difficulty understanding healthcare information and following medical care recommendations.[10,11]

Despite the promise of these programs, to date, observational or nonrandomized, interventional research studies in FBOs have outnumbered randomized controlled studies in the published literature.[12–24] More evidence- and outcome-based research in faith-based organization studies is needed, not only to assess the effectiveness of health programs, which is often necessary to sustain funding sources, but for community participation and project continuation. Partnership programs are increasingly asked to demonstrate cost-effectiveness and to meet the research expectations of faith-based leaders.[20,25] Thus, the objectives of our study were to use an experimental design to assess whether church-based vaccine education increases the utilization of adult

vaccinations in racial/ethnic minority communities and whether churchgoers who are offered vaccination in churches, compared with those who do not, have higher vaccine utilization rates.

METHODS

Employing Community-Based Participatory Research (CBPR) Principles

Important elements that have been cited in the creation of successful faith-based health promotion programs have been the establishment of true partnerships between FBOs and academic institutions, creation of health programs of specific value and interest to the community, availability of health services at churches, access to church facilities and volunteers, community-focused interventions on behavioral change, and the development of supportive relationships based on trust between the partners.[26] These were some of the principles that guided our design of the current study.

The researchers who led this study were part of the University of California, San Francisco (UCSF) Center for Aging in Diverse Communities (CADC). For approximately one decade, CADC has collaborated and had a long-standing relationship with minority communities and has an established track record in working with pastors and leaders in local FBOs. In the Bay Area, researchers have worked with networks of church coalitions, providing access to a greater number of churches. For instance, UCSF has formed a partnership with the African American Community Health Advisory Committee of San Mateo County, a coalition of 22 churches that raise awareness in their congregations about selected health issues (eg, breast and prostate cancer, sickle cell anemia, HIV/AIDS, diabetes, obesity, cardiovascular disease) by focusing on a single disease or issue each month.[27] The coalition also provides guest speakers for churches, brochures for congregations, health education programs, video and speaker resources for community outreach, and training for health education coordinators in each church; the coalition also encourages pastor involvement. Our university CADC Community Core has also provided links between other university researchers and faith-based partners on a variety of health-related projects. In the coming year, we also plan to offer a grant-writing course for our faith-based partners to assist them in obtaining their own community health grants. Consequently, as a multiethnic and interdisciplinary research team we had already established credibility with many of our partners in the African American and Latino FBO community.

For this study, we also joined with some new community FBOs, with which we did not have previous collaborative partnerships, which required building new relationships and establishing trust between participating churches, study participants, and CADC. Consequently, in the design of the project we 1) had meetings with church leaders and pastors; 2) considered their concerns in the development and implementation of this project; and 3) collaborated with some faith-based organizations to conduct focus groups on adult immunization with their parishioners. Through these focus group interviews, we found great interest in onsite adult vaccination programs among community churches.[28] Our pilot study of churches also found that among study participants of inner-city churches, 24% had no physician, 29% had no health insurance, and 65% earned <$30,000 per year. These data suggest that our target communities were indeed under-served and underinsured and that community-based health programs may indeed benefit parishioners at these FBOs.

Study Design

We used a randomized study design to test the effect of vaccine education and the provision of onsite vaccine on the utilization of adult immunizations. Churches that agreed to participate and met entry criteria (>50% of congregation African American or Latino) were randomly assigned to either of two groups (ie, control with vaccine education only or intervention with onsite vaccination). The study-specific procedures for each of the two groups were adult vaccine education to help participants identify and circumvent barriers that prevent them from following through with recommended adult vaccinations and provision of onsite adult vaccines.

Recruitment

Our plan for church recruitment consisted of mailing letters to San Francisco Bay Area religious leaders or church governing bodies in racial and ethnic minority communities inviting them to participate in our health education and adult vaccine promotion program. Self-addressed envelopes with refusal/acceptance postcards were included in the mailing. Only churches that agreed to participate by returning the acceptance postcard were contacted about participation. Community church liaisons (already established in many churches through our previous collaborations) contacted churches by telephone two to four weeks after mailing to confirm participation. From December 2003 through January 2004 and November 2005 through February 2006, 15 churches were either randomized to intervention with onsite adult vaccinations or to comparison with no vaccinations.

For faith-based health programs to be successful, pastors must convey how the program is consistent with the mission of the congregation. Thus in the current study, we used the pastor to enhance recruitment of participants in our adult vaccination programs. Partici-

Table 1. Demographics of faith-based organization cohort

	Total	Vaccine Group	Control Group
	***N* = 186 (100%)**	***n* = 113 (61%)**	***n* = 73 (39%)**
Mean age	65 ± 14	64 ± 14	67± 13
Sex			
Male	47 (25%)	25 (22%)	22 (30%)
Female	139 (75%)	88 (78%)	51 (70%)
Race/ethnicity			
African American	82 (44%)	48 (42%)	34 (47%)
Latino	80 (43%)	47 (42%)	33 (45%)
Asian	6 (3%)	6 (5%)	0
White	14 (8%)	11 (10%)	3 (4%)
Other/unknown	4 (2%)	1 (1%)	3 (4%)
Primary language			
English	108 (58%)	65 (58%)	43 (59%)
Spanish	77 (42%)	47 (42%)	30 (41%)
Health insurance status			
Insured	127 (71%)	77 (71%)	50 (70%)
Uninsured	53 (29%)	32 (29%)	21 (30%)
Income			
≤$30,000	92 (65%)	52 (63%)	40 (68%)
>$30,000	50 (35%)	31 (37%)	19 (32%)

pating church pastors were asked to inform parishioners, through church bulletins and during church announcements, that UCSF researchers would be available after religious services to discuss and possibly enroll eligible members in an adult vaccine promotion study. Our study also included incentives such as $20 grocery vouchers to enhance recruitment of research study participants.

Procedures

Eligible persons were asked to stay after religious services for a baseline interview that lasted <30 minutes. The principal investigator or a member of the investigative team interviewed interested persons, verified eligibility for the study and obtained informed consent, which included information that participants may be contacted by telephone by a member of the investigative team for a follow-up interview that lasted <10 minutes. After informed consent was obtained, and before vaccines were administered, demographic information was collected, and a baseline survey was completed by participants.

Participants and Measures

Eligibility criteria for study participation were previously unvaccinated with pneumococcal vaccine and not regularly receiving influenza vaccine, and aged ≥65 years, or having clinical indication for vaccination (diabetes, chronic lung disease, cardiovascular disease, chronic kidney disease). Baseline measures asked about demographics, knowledge and attitudes about influenza and pneumonia vaccines, and potential barriers to obtaining vaccine. A follow-up survey asked about receipt of the vaccine.

Intervention

During the adult vaccine education session component of the intervention, participants learned about influenza and pneumonia vaccines in group discussions that lasted <1 hour. Study participants at sites that were randomized for on-site vaccination were also offered the vaccines, which were administered by UCSF researchers with medical training. Those who become part of the comparison group received informational pamphlets, church-based education on adult vaccinations, and physician reminders that participants should see their physicians for vaccinations and watch a slide presentation on benefits and side effects of influenza and pneumococcal vaccinations. All participants were assessed at baseline and during 3- to 6-month follow-up telephone interviews to assess receipt of vaccination.

Statistical Analysis

Descriptive statistics, including means, medians, standard deviations, and frequencies, were calculated to summarize patient demographic and clinical characteristics within each group. We compared the proportion of participants who received the recommended adult vaccinations after the intervention to assess the overall efficacy of the intervention program. Specifically, the Mantel-Haenszel chi-square test was employed. Baseline demographic and clinical variables were compared among the groups by using the exact chi-square test for categorical variables and the two-sided Student *t* test for continuous variables. As we were primarily interested in vaccination receipt based on church randomization and not

Table 2. Vaccination knowledge, attitudes and behaviors of faith-based cohort

	Total	Vaccine Group	Control Group
	***N* = 186 (100%)**	***n* = 113 (61%)**	***n* = 73 (39%)**
Heard of flu vaccine			
Yes	179/185 (97%)	109/113 (96%)	70/72 (97%)
No	6/185 (3%)	4/113 (4%)	2/72 (3%)
Received flu vaccine in past year			
Yes	77/180 (43%)	40/111 (36%)	37/69 (54%)
No	103/180 (57%)	71/111 (64%)	32/69 (46%)
Heard of PNV vaccine			
Yes	120/178 (67%)	71/107 (66%)	49/71 (69%)
No	58/178 (33%)	36/107 (34%)	22/71 (31%)
Received PNV vaccine in past year			
Yes	42/164 (26%)	22/100 (22%)	20/64 (31%)
No	122/164 (74%)	78/100 (78%)	44/64 (69%)
Declined vaccination before			
Yes	37/182 (20%)	26/111 (23%)	11/71(15%)
No	145/182 (80%)	85/111 (77%)	60/71 (85%)
MD recommend flu vaccine in past			
Yes	133/173 (77%)	77/104 (74%)	56/69 (81%)
No	40/173 (23%)	27/104 (26%)	13/69 (19%)
MD recommend PNV vaccine in past			
Yes	70/161 (43%)	40/98 (41%)	30/63 (48%)
No	91/161 (57%)	58/98 (59%)	33/63 (52%)
Pay for flu vaccine			
<$10.00	83/106 (78%)	47/59 (80%)	36/47 (77%)
Pay for PNV vaccine			
<$10.00	79/100 (79%)	48/57 (84%)	31/43 (72%)
Flu vaccine leads to flu			
Yes	23/183 (13%)	16/111 (14%)	7/72 (10%)
No	123/183 (67%)	69/111 (62%)	54/72 (75%)
Did not know	37/183 (20%)	26/111 (24%)	11/72 (15%)
PNV vaccine leads to PNV			
Yes	10/183 (5%)	6/111 (5%)	4/72 (6%)
No	130/183 (71%)	78/111 (70%)	52/72 (72%)
Did not know	43/183 (24%)	27/111 (24%)	16/72 (22%)
Flu vaccine safe			
Yes	107/184 (58%)	58/112 (52%)	49/72 (68%)
No	48/184 (26%)	34/112 (30%)	14/72 (19%)
Did not know	29/184 (16%)	20/112 (18%)	9/72 (13%)
Flu vaccine lowers risk of PNV			
Yes	85/182 (47%)	51/110 (46%)	34/72 (47%)
No	48/182 (26%)	30/110 (27%)	18/72 (25%)
Did not know	49/182 (27%)	29/110 (26%)	20/72 (28%)
Flu vaccination lowers risk of hospitalization			
Yes	116/182 (64%)	67/111 (60%)	49/71 (69%)
No	36/182 (20%)	22/111 (20%)	14/71 (20%)
Did not know	30/182 (16%)	22/111 (20%)	8/71 (11%)
Medicare or medicaid pays for flu and PNV vaccine			
Yes	72/181 (40%)	39/110 (35%)	33/71 (46%)
No	21/181 (11%)	11/110 (10%)	10/ 71(14%)
Did not know	88/181 (49%)	60/110 (55%)	28/71 (39%)
Smokers at higher risk of PNV			
Yes	131/183 (71%)	74/111 (67%)	57/72 (79%)
No	3/183 (2%)	3/111 (3%)	0
Did not know	49/183 (27%)	34/111 (30%)	15/72 (21%)
Believe we should administer vaccines in church			
Yes	170/183 (93%)	106/110 (96%)	64/73 (88%)
No	2/183 (2%)	0	4/73 (5%)
Did not know	9/183 (5%)	4/110 (4%)	5/73 (7%)

Table 2. Continued

	Total	Vaccine Group	Control Group
	N = 186 (100%)	*n* = 113 (61%)	*n* = 73 (39%)
Believe the flu vaccination really works			
Yes	150/183 (82%)	90/112 (80%)	60/71 (84%)
No	9/183 (5%)	5/112 (4%)	4/71 (6%)
Did not know	24/183 (13%)	17/112 (15%)	7/71 (10%)
Believe flu vaccination prevents death			
Yes	115/181 (64%)	69/109 (63%)	46/72 (64%)
No	33/181 (18%)	19/109 (17%)	14/72 (19%)
Did not know	33/181 (18%)	21/109 (19%)	12/72 (17%)
Believe flu vaccination is safe			
Yes	143/184 (78%)	86/112 (77%)	57/72 (79%)
No	4/184 (2%)	1/112 (1%)	3/72 (4%)
Did not know	37/184 (20%)	25/112 (22%)	12/72 (17%)
Believe PNV prevents pneumonia			
Yes	113/182 (62%)	64/110 (58%)	49/72 (68%)
No	16/182 (9%)	9/110 (8%)	7/72 (10%)
Did not know	53/182 (29%)	37/110 (34%)	16/72 (22%)
Believe PNV is safe			
Yes	121/181 (67%)	73/110 (66%)	48/71 (68%)
No	10/181 (5%)	5/110 (4%)	5/71 (7%)
Did not know	50/181 (28%)	32/110 (29%)	18/71 (25%)
Believe health is dependent on faith or destiny			
Yes	75/177 (42%)	44/106 (41%)	31/71 (44%)
No	77/177 (44%)	49/106 (46%)	28/71 (39%)
Did not know	25/177 (14%)	13/106 (12%)	12/71 (17%)
Believe church is place for health learning			
Yes	154/182 (85)	98/110 (89%)	56/72 (78%)
No	21/182 (11)	9/110 (8%)	12/72 (17%)
Did not know	7/182 (4)	3/110 (3%)	4/72 (5%)
Would you participate in church health education and promotion program			
Yes	170/183 (93%)	106/110 (96%)	64/73 (88%)
No	4/183 (2%)	0	4/73 (5%)
Did not know	9/183 (5%)	4/110 (4%)	5/73 (7%)

Flu = influenza; PNV = pneumococcal vaccine; MD = physician.

on individual level predictors, we did not do multivariate analysis. Therefore, unadjusted odds ratios are presented.

RESULTS

The study sample (*N*=186) was 44% African American, 43% Latino, 8% White, and 3% Asian (Table 1). The cohort was predominantly female, with a mean age of 65 years. Fifty-eight percent reported English and 42% Spanish as their primary spoken language. Sixty-five percent reported an income of ≤$30,000 per year. Twenty-nine percent reported having no health insurance coverage.

Of those eligible, 90 of 112 (80%) in the experimental group utilized the influenza vaccine compared to 32 of 70 (46%) in the control group ($P<.001$). Of those eligible, 58 of 88 (66%) in the experimental group utilized the pneumococcal vaccine compared to 20 of 57 (35%) in the control group ($P<.001$). Participants in the experimental group were significantly more likely to receive influenza vaccinations (odds ratio [OR] 4.8, 95% confidence interval [CI] 2.5–9.4) and pneumococcal vaccination (OR 3.6, 95% CI 1.8–7.2).

Nearly all patients (97%) had heard of the influenza vaccine while fewer (67%) had heard of the pneumococcal vaccine (Table 2). Only 20% reported that they had declined vaccination previously. More participants reported that their doctor had recommended the influenza vaccine (77%) than had recommended the pneumococcal vaccine (43%). Most participants knew that neither the influenza vaccine nor the pneumococcal vaccine caused influenza or pneumonia, respectively. Participants knew that elderly persons in particular were at higher risk for influenza (58%) and that receiving the vaccine could lower the risk of hospitalization (64%) for these diseases and complications of these diseases. Fewer (47%) knew that the vaccine lowered the risk of having influenza-related pneumonia, and 40% did not know or

Table 3. Affects of barriers to vaccine

	Total	Vaccine Group	Control Group
	N = 186 (100%)	*n* = 113 (61%)	*n* = 73 (39%)
Lack of knowledge			
Yes	123/180 (68%)	73/108 (68%)	50/72 (69%)
No	36/180 (20%)	23/108 (21%)	13/72 (18%)
Don't know	21/180 (12%)	12/108 (11%)	9/72 (13%)
Lack of transportation			
Yes	86/176 (49%)	52/107 (49%)	34/69 (49%)
No	77/176 (44%)	45/107 (42%)	32/69 (47%)
Don't know	13/176 (7%)	10/107 (9%)	3/69 (4%)
Lack of trust in healthcare system			
Yes	101/184 (55%)	58/111 (52%)	43/73 (59%)
No	67/184 (36%)	42/111 (38%)	25/73 (34%)
Don't know	16/184 (9%)	11/111 (10%)	5/73 (7%)
Lack of culturally relevent information on adult immunizations			
Yes	104/178 (58%)	62/107 (58%)	42/71 (59%)
No	51/178 (29%)	33/107 (31%)	18/71 (25%)
Don't know	23/178 (13%)	12/107 (11%)	11/71 (16%)
Language barriers			
Yes	95/171 (55%)	54/105 (51%)	41/66 (62%)
No	66/171 (39%)	42/105 (40%)	24/66 (36%)
Don't know	10/171 (6%)	9/105 (9%)	1/66 (1%)
Reading level barriers			
Yes	86/180 (48%)	45/108 (42%)	41/72 (57%)
No	81/180 (45%)	52/108 (48%)	29/72 (40%)
Don't know	13/180 (7%)	11/108 (10%)	2/72 (3%)
Fear lack of legal status			
Yes	75/183 (41%)	40/111 (36%)	35/72 (49%)
No	90/183 (49%)	57/111 (51%)	33/72 (46%)
Don't know	18/183 (10%)	14/111 (13%)	4/72 (5%)

were unsure whether Medicare or Medicaid covered influenza or pneumococcal vaccinations. Few participants, 2% for influenza and 5% for pneumonia, believed that the vaccinations were unsafe or were unaware of their safety. Most participants (93%) believed that the administration of adult vaccines in churches was a good idea, 85% believed that the community church was a good place for health learning, and 93% reported that they would participate in other church-based health education and promotion programs. Participants were divided on whether or not (42% vs 44%) they believed that their health was dependent on faith or destiny.

Many participants reported that lack of vaccination was related to a variety of barriers (Table 3): their lack of knowledge (68%), lack of trust in the healthcare system (55%), lack of culturally relevant information on adult immunizations (58%), lack of transportation (49%), language barriers (55%), reading level barriers (48%), and fear of not having legal immigrant status (41%). Intervention and comparison groups did not significantly differ on demographic characteristics, vaccination knowledge, attitudes, or barriers to vaccinations ($P \geq .05$).

DISCUSSION

To our knowledge, this is the first study to assess the effectiveness of an onsite adult vaccination program in FBOs. On the basis of our results, onsite adult vaccination programs provided by faith-based organizations appear to increase vaccination rates and may be a promising strategy for decreasing racial/ethnic disparities in vaccination rates. We showed higher vaccination rates when onsite vaccinations were offered in FBOs, compared with education-only vaccination promotion programs.

Prior studies of FBO–academic partnerships such as the HealthWise Church project have found four elements that are essential to their collaboration: networking (which included exchange of information for mutual benefit), coordination (which included sharing and altering activities and schedules for mutual benefit and for a common purpose), cooperation (which included sharing resources and operations for mutual benefit), and collaboration (which included sharing

risks and jointly planning specific health promotion activities).[29] Our current study again reiterates the importance of employing such CBPR principles for a successful outcome. Other examples of productive academic-FBO partnerships that employ CBPR principles include the 5-A-Day Fruit and Vegetable program in North Carolina , the Heart and Body and Soul programs to reduce cardiovascular risk factors, the PATHWAYS program to reduce African American women's risk for diabetes, and cancer control programs.[6,13,18,30,]

Our study also demonstrates how church settings can provide university based researchers access to a population that has traditionally been difficult to recruit into research studies.[31,32] Other studies have also been successful with recruitment and retention of elders when conducted in partnership with FBOs. For example, the Durham Elders Project, an observational study that recruited older African Americans in churches for survey-based research, found that coordination with a community research advisory board helped to identify churches likely to participate and to reduce concerns about exploitation among potential participants. The project received no refusals from any of the churches approached for participation.[33] In the Rhode Island church study, churches were recruited by mail, telephone, and face-to-face meetings.[34] Of the 31 churches that met eligibility criteria, 20 (65%) agreed to participate in a church promotion intervention on cardiovascular risk factors. All 20 of these churches remained in the study for ≥2.5 years.

The limitations and strengths of this study should be recognized. We conducted our study in a poor urban community that was in need of health programs; churches and participants may have been more likely to participate because of free vaccinations. In addition, control participants may have been unable to access health care or other vaccination programs because of limited financial resources. Generalizability is also limited to low-socioeconomic status, inner-city church populations. Alternatively, the strengths of the study lie in the randomized study design and the overwhelming acceptance of vaccination and education among racial and ethnic minority study participants from faith-based communities.

Lessons learned from implementing health-related programs will help universities to provide services to FBOs by conducting assessments and addressing specific community health needs; to build and maintain credibility through community service; to develop partnerships founded on trust and mutual respect; and to increase awareness of resources available at the university for use by the community.[35] Clergy play an important role in the extent to which religiosity or spirituality contributes to the success of health promotion programs, especially in community health outreach programs sponsored by FBOs.[36–39] We conclude that many FBOs are eager to partner with university/academic or public health institutions on health promotion projects as long as there is commitment to CBPR partnership principles.

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