

A COMMUNITY-BASED APPROACH TO DIABETES CONTROL IN MULTIPLE CULTURAL GROUPS

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Diabetes mellitus is one of the most common, serious, and costly chronic diseases, and is a leading cause of death in the United States. Communities of color bear a disproportionate burden of diabetes risk, prevalence, complications, and mortality. REACH 2010 Seattle and King County provides socio-ecological interventions to reduce diabetes disparities among African-American, Cambodian, Chinese, Filipino, Korean, Latino/Hispanic, Vietnamese and soon Samoan, and Vietnamese groups.

This paper reports evaluation results of REACH classes and support groups. Results from participant pre- and post-surveys demonstrated increases in self-reported physical activity and healthier eating, and increased self-efficacy in managing diabetes. Qualitative focus group results revealed participants' enthusiasm for classes tailored to their ethnic groups, and for intervention impact on management of their diabetes. Qualitative results confirmed survey findings that group participation resulted in significant changes in diet and physical activity. The results underscore the need for more widespread adoption of culturally competent diabetes education and support programs. (*Ethn Dis.* 2004;14[suppl 1]:S1-85-S1-94)

Key Words: Diabetes Management, Multicultural Interventions, Quantitative and Qualitative Community-based Research

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INTRODUCTION

Diabetes mellitus is one of the most common, serious, and costly chronic diseases in the United States,¹ and is the fourth most common reason for office visits to physicians.² Of those reporting a diabetes diagnosis, 16% had not seen their doctor during the previous year, only 31% had heard of glycosylated hemoglobin (HbA_{1c}), and only 65.2% had received an eye exam during the previous year (data from the Behavioral Risk Factor Surveillance System [BRFSS] 1994–2002³). In 2002, in King County, Washington, diabetes caused 376 deaths, contributed to an additional 644 deaths, and led to 1,560 hospitalizations.

Several ethnic groups bear a disproportionate share of the burden of diabetes, reflected in their higher rates of disease prevalence, diabetes-related mortality, complications, and risk factor prevalence, combined with limited access to health care and health insurance coverage.^{4–7} Diabetes prevalence among King County African Americans (AA) aged 40 years and older is 2.6 times the rate for Whites, and the African-American death rate is 3.5 times higher. The diabetes crude death rate for King County AA (36.0 per 100,000 averaged over 1993–1997) is 26% higher than the crude rate for AA in the United States (28.5 per 100,000, 1995). The diabetes death rate among AA in King County increased sharply (86%) in recent years, from 38.7 per 100,000 during 1989–1991, to 72.0 per 100,000 during 1993–1995, and remains at a high level. The pattern among Latino/Hispanics (L/H) is similar, and the death rate for this group is significantly (62%) higher than the rate among

Whites. Among Asians/Pacific Islanders (API) in King County, self-reported diabetes prevalence (among BRFSS respondents) is similar to the rate among Whites and the death rate is slightly higher. However, the Seattle Japanese-American Community Diabetes Study found a substantially higher prevalence rate of diabetes among Japanese Americans, compared to Whites men and women, aged 45 years to 74 years: 20% and 16% higher than the prevalence among Whites, respectively.^{8,9} The University of Washington Diabetes Prevention Program reported that several API groups (Filipino, 28%; Korean, 23%; and Japanese, 23%) had higher rates of undiagnosed diabetes, compared to Whites (15%) and AA (17%).¹⁰ Adult members of our targeted ethnic groups are more likely to be sedentary, compared to Whites; in addition, AA and L/H adults are more likely to be obese (BRFSS 1994–1998).

Funded by the Centers for Disease Control and Prevention, REACH is an acronym for Racial and Ethnic Approaches to Community Health. REACH 2010 Seattle and King County provides interventions to reduce the diabetes-related disparities among most of the previously mentioned racial/ethnic groups, that is: African Americans, Cambodians, Chinese, Filipinos, Koreans, Latinos/Hispanics, Samoans, and Vietnamese. (Race, ethnicity, and language have become highlighted as complexities in recent public health research. In this paper, we use the term racial/ethnic group to indicate that the groups are constructions of different dimensions. We are well aware that race is a social category usually based on color and other physical features, and that ethnicity is a cultural construct related

to one's affinities with a shared heritage and culture. Language is a related area of complexity. Although we treat Spanish speakers as a single group, we know that there are cultural differences between the Mexican, Latin, and Caribbean Americans within the population studied. Also, the racial/ethnic category of Asians/Pacific Islanders is very complex. There are significant cultural differences among Asians and Pacific Islanders. The Asians in Seattle speak nearly 40 different languages, have very different immigration and cultural histories, and experiences in the United States. Finally, African Americans have different levels of acculturation in the United States, and our participants included African and/or Caribbean immigrants who speak English and have differences in cultural background.)

Using a socio-ecological approach, the interventions are directed to multiple societal levels, including individuals, families, communities, and institutions. This paper provides information for all except the Samoan community, as data are not yet available for that group, and describes the interventions, populations served, primary evaluation methods, and results to date, that demonstrate the effectiveness of our individual interventions.

METHODS

Program Description

The REACH 2010 Coalition guides this diabetes intervention effort and includes a wide range of organizations, experts, people with diabetes, and other agencies and individuals interested in diabetes and the health of people of color. Several benefits of the REACH Coalition model are to facilitate broad community participation, empower and develop community capacity, promote networking and social capital development, and increase coordination of services. Based on information gathered during community meetings, and key

informant interviews from people with diabetes, their family members and service providers, the Coalition created a multi-faceted, culturally competent community action plan. The community action plan is implemented by the following contracting agencies: the Center for MultiCultural Health (CMCH), with some of the early data from the African-American Community Health Network (AACHN), both serving African Americans; International Community Health Services (ICHS), serving Asians and Pacific Islanders; Sea Mar Community Health Centers (Sea Mar), serving the Latino/Hispanic community; and the Community Health Council of King County, serving all racial/ethnic groups for case coordination. Each contracting agency is also an active coalition member. Coalition decisions are made by consensus, and the coalition relies on an ongoing operations committee for decision recommendations, as well as for ad hoc committees to work with public health to plan and conduct joint activities.

Support Groups. Contracting agencies established regularly scheduled support group meetings for diabetes patients and their support network of family members and friends. These group meetings have been tailored to meet the cultural needs of each of the 3 broad racial/ethnic groups. For example, the Asian American group meetings are conducted in the appropriate primary language, eg, Korean, and nutrition discussions are centered on cultural food preferences. Group meetings include both formal and informal discussions, and are led by a trained lay leader, peer educator, or health professional. Groups meet in faith-based environments (eg, churches), senior centers, senior housing, or other community sites. Support groups provide psychosocial support, and opportunities to learn from the experiences of others on topics including: getting what patients need from the healthcare system; following medical, physical activity, and healthy diet rec-

ommendations; managing experiences of discrimination; racism and other stressors; communicating about diabetes; and getting support from family and friends.

Peer Education. Using the lay leader approach,¹¹⁻¹⁴ a Peer Educator Program increases community capacity and assists in creating sustainability of diabetes education and support. One full time equivalent peer educator per racial/ethnic community facilitates support groups, assists in education and self-management classes, and arranges for the dissemination of diabetes materials in community settings. A peer educator is a person with diabetes, or with a family member or friend who has diabetes, who has leadership abilities, and a commitment to helping others manage this disease. Multiple part-time bilingual peer educators address the need for multiple language capacity.

Education Classes. These classes cover the following topics in a culturally relevant manner: diabetes education; how to check glucose levels; physical activity; healthy eating without losing taste or cultural significance; weight management/weight loss; psychosocial issues and social support; how to talk to your medical provider about your medications, tests, and other care needs; other topics are covered as needed. Leaders conduct education classes in community settings. Cultural relevance is assured by focusing on community concerns, such as ethnic-specific foods and their meanings. In addition, groups take into account the specific cultural barriers and contexts that arise as patients and families attempt to make the recommended changes in their lives.

Self-Management Classes. Following the Lorig Chronic Disease Self-Management model,¹⁵ trained facilitators offer self-management classes several times per year. These 6-week classes assist diabetes patients in increasing their confidence in their ability to manage their disease. The classes cover such topics as: cognitive symptoms and their manage-

ment; how to formulate a personalized action plan; exercise; healthy eating; communication skills; problem solving; medication usage; and working with healthcare professionals. REACH staff members have been working with Dr. Lorig and officials at Stanford University to adapt this model to be used within the local cultural communities. This includes training a large number of master trainers in the Spanish version of the program, and adapting a Chinese version for its first use in the United States.

Enhanced Use of a Diabetes Registry.

There is clear evidence that computerized, registry-driven diabetes care can substantially improve diabetes management.¹⁶⁻²⁰ In King County, our Community Diabetes Initiative (CDI) uses the Chronic Disease Electronic Management System (CDEMS) software to create diabetes registries within each of the participating community clinics, so that individuals who have not received appropriate services can be identified and targeted for interventions. Data are then reported to a central site for recording. The CDEMS software was created by the Washington State Diabetes Prevention and Control Program, is currently in use by community clinics in King County, and is available for use by other providers who would like the convenience and efficiency of this form of patient tracking. REACH has expanded community clinics' use of the CDEMS registry for tracking the progress, and monitoring the health care needs, of their diabetes patients.

Case Coordination for Appropriate Patients. Case coordination is conducted in several settings, including Harborview Medical Center, and clinics of the Community Health Council of King County, and of Aging and Disability Services, our local Area Agency on Aging. Managed by the Community Diabetes Initiative Coordinator, REACH 2010 case coordinators are health professionals who work in the selected settings to assist other providers in using the diabetes registry to improve patient

care. They monitor the registry and alert providers to diabetes patients with poor glycemic control, or those having difficulty keeping appointments or adhering to their medical regimen. Case coordination activities include data entry, tracking of glycemic testing, foot and eye exams, keeping tabs on medication adherence, and making referrals for nutrition, physical activity and stress reduction, including referrals to REACH classes and groups.

Evaluation of REACH Classes and Support Groups

REACH was designed as a community-based research demonstration project. As such, one goal of the REACH evaluation is to provide adequate information about program effectiveness, while minimizing the burden on respondents, many of whom are immigrants, to whom English is a second language, and Western survey methods are unfamiliar. The following is a description of the quantitative (survey) and qualitative (focus group) methods used in the evaluation of REACH classes and support groups.

Quantitative Methods. The REACH project is using pre- and post-surveys to assess the impact of the support groups, education classes, and self-management classes. Participants in diabetes education and self-management classes are given a closed-ended survey at the first session they attend, and again at the last session of the cycle. Support group surveys are administered at the first meeting attended, and at 6-month and 1-year follow ups. Repeat participants (eg, those taking a self-management class immediately after completing a cycle of education classes) are given a post-test survey at the end of each cycle of classes. Surveys are administered to participants with diabetes by REACH evaluators, using translators, if necessary.

The pre-/post-survey instruments were developed by the Evaluation Team to measure diabetes knowledge, social support level, attitudes, self-efficacy, and

health status, and has been translated into 6 languages: Chinese, Korean, Vietnamese, Cambodian, Filipino (Tagalog), and Spanish. Three methods were used initially for in-class survey administration: self-administration, one-on-one administration, and group administration. In February 2003, we added, with Institutional Review Board (IRB) approval, 2 additional methods: mailed surveys, and surveys administered in participants' homes. Analyses are conducted using *t* tests to compare pre- and post-surveys. When multiple post-tests have been conducted, only the most recent is used in the analysis.

Qualitative Methods. Focus groups were used to generate information about how REACH affected the lives of group participants by asking them about their experiences in REACH activities, and in living with diabetes, following their REACH involvement. A standard approach to focus groups was used.²¹ We hired 8 bilingual moderators (one to facilitate, one to take notes) to conduct focus groups at ICHS in each of the 4 Asian languages (Mandarin, Cantonese, Korean, and Vietnamese). All were native speakers of their specific Asian language, and were bilingual in English. All moderators attended 2 training workshops led by the evaluation team. The moderator, evaluators, and other REACH staff recruited participants and facilitated the focus groups at their respective agencies. To avoid biasing participants' responses, staff who were directly involved in intervention activities were not permitted to facilitate focus groups.

From July 2002 through August 2002, we conducted focus groups with each of our racial/ethnic groups about their experiences in REACH interventions. Participants in a focus group were limited to those who had attended support groups, education and/or self-management classes anytime from September 2001 through June 2002, and who had given signed consent to be included in REACH research activities. Grocery

Table 1. Comparison of REACH participants to 2000 BRFSS sample of people with diabetes†

	African American		Asian		Latino	
	REACH	BRFSS	REACH	BRFSS	REACH	BRFSS
N	184	1494	209	198	165	1220
Female	63.0	68.6	59.3	47.5*	56.8	61.2
Mean age	54.9	56.3	64.1	61.9	51.9	57.4*
Married	32.0	52.5*	64.2	65.7	62.4	69.2
High school graduate	78.3	66.6*	54.9	82.7*	42.9	49.2
Income less than \$10,000	32.3	20.0*	60.9	7.6*	59.4	39.2*
Mean number of people in household	2.1	2.3	1.9	2.4*	2.8	2.6
Health status excellent, very good, or good	48.1	46.9	23.6	65.8*	25.6	31.9
Doctor said to lose weight	65.4	38.6*	55.6	25.5*	62.4	38.2*
Trying to lose weight	71.3	47.2*	70.3	47.4*	69.1	50.2*
Participated in some physical activity	73.3	58.9*	76.3	67.5	77.2	50.9*
Mean body mass index	33.3	31.7*	24.3	27.2*	30.0	29.6

* $P < .05$ for comparison of BRFSS versus REACH sample (within ethnic group).
 † All figures in percent, except where indicated.

store gift cards, valued at \$25 each, were provided to focus group participants to thank and compensate them for their time. The focus group questions were: 1) Do you talk about diabetes differently as a result of the project? 2) How do you feel about the amount of information you have received about diabetes? 3) What have been the most significant events that happened to you during your involvement in this group or class? 4) Tell us about the involvement of your family and friends in helping you manage your diabetes; and 5) Is there anything you would like to change?

Focus group reports constituted the principal texts for content analysis, which was used as the primary method for data reduction. Coding categories were generated from an intensive review of the focus group reports, and from knowledge of how the support and education groups were designed.

RESULTS

This section combines results from both the quantitative and qualitative evaluation of the REACH classes and support groups.

Quantitative Results. As of December 2003, we had collected a total of

594 pre-test, and 410 matched post-test, surveys (CMCH: 187 pre-, 121 post-; ICHS: 221 pre-, 143 post-; Sea Mar: 186 pre-, 146 post-). Of the 594 pre-test respondents, 168 were potentially lost to follow up. Some of the reasons for this attrition include: some participants are deceased, some changed residence, some have no interest, and some receive diabetes information elsewhere.

Table 1 compares REACH participants at baseline to people with diabetes from the 2000 Behavioral Risk Factor Surveillance Survey (BRFSS). Across all 3 ethnic groups, REACH participants had significantly lower incomes. For example, 59% of Latino REACH participants had annual household incomes less than \$10,000, compared with 39% for the BRFSS sample; 61% of REACH Asian participants had incomes less than \$10,000, compared with only 8% of BRFSS respondents. REACH participants were also more likely to be trying to lose weight and to have received a doctor’s recommendation for this. For example, 71% of African-American REACH participants said they were trying to lose weight, compared with 47% of African-American participants in the BRFSS.

There were other differences between REACH participants and the

BRFSS sample, within specific ethnic groups. African-American REACH participants were less likely than African Americans in the BRFSS sample to be married, and more likely to be high school graduates; they were more likely to be physically active, but also had a higher mean body mass index. Asian REACH participants were less likely to be in good (self-reported) health and less likely to be overweight, compared to their BRFSS counterparts. Latino REACH participants were younger and more physically active, compared to the national average for BRFSS Latinos.

Table 2 shows pre- and post-health behavior changes among REACH participants. There was a modest increase in physical activity (76% to 84%, overall, $P < .05$), and improvements in a number of dietary behaviors (positive and significant changes in 10 of 12 specific items, eg, the percentage reporting greater consumption of vegetables rose from 76% to 85%). There was little or no change in tobacco or alcohol use.

Knowledge about diabetes appeared to increase significantly as a result of participation in REACH in two areas (Table 3). More participants knew how often hemoglobin A_{1c} should be checked (an increase from 54% to 69%, overall, $P < .05$), a greater percentage knew the best way to take care of their

Table 2. Health behavior change among REACH participants†

	CMCH		ICHS		Sea Mar		Total	
	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
N	109	109	109	109	130	130	348	348
Trying to lose weight	70.4	73.3	68.9	68.0	68.5	73.4	69.2	71.7
Doctor said to lose weight	72.6	67.0	52.7	50.5	61.5	59.8	62.7	59.2
Participated in some physical activity	71.8	75.8	74.4	91.6*	79.5	83.6	75.6	83.5*
Smoke cigarettes now	15.9	13.2	5.7	5.9	10.9	10.2	11.2	9.9
Mean number of cigarettes per day	11.9	9.8	10.8	6.8	10.4	8.1	11.3	8.7
Drink any alcoholic beverages	26.7	27.2	3.8	3.1	13.3	11.7	15.4	14.0
Mean number of drinks per week	3.6	4.0	3.7	5.5	5.0	7.5	4.1	5.1
Working to maintain healthy diet	90.1	97.0*	90.0	93.8	80.2	90.6*	86.1	93.5*
Things being done to achieve a healthy diet:								
Eat more vegetables	81.7	84.4	79.8	89.9*	67.7	80.8*	75.9	84.8*
Eat more fruit	71.6	81.7	58.7	69.7	52.3	55.4	60.3	68.1*
Eat more chicken	67.0	71.6	33.9	38.5	58.5	64.6	53.4	58.6
Eat more grains	62.4	67.0	40.4	53.2	41.5	47.7	47.7	55.5*
Eat more fish	62.4	69.7	61.5	73.4	46.9	50.8	56.3	63.8*
Eat more leaner meats	51.4	57.8	58.7	69.7	50.8	59.2	53.4	62.1*
Eat less beef	44.0	56.0	44.0	45.9	41.5	61.5*	43.1	54.9*
Eat lower fat dairy	50.5	54.1	47.7	56.9	42.3	51.5	46.6	54.0*
Try low-fat foods	54.1	59.6	47.7	54.1	51.5	72.3*	51.1	62.6*
Reduce salt intake	64.2	67.0	63.3	68.8	38.5	57.7*	54.3	64.1*
Eat less sugar	71.6	72.5	65.1	79.8*	56.9	68.5*	64.1	73.3*
Take vitamins	51.4	56.0	35.8	39.4	21.5	31.5	35.3	41.7

* $P < .05$ comparing pre/post within ethnic group and overall.
 † All figures in percent, except where indicated.

feet (increasing from 77% to 85%, overall, $P < .05$). The other seven knowledge items measured showed no significant overall improvements, and no other changes within ethnic groups than would be expected due to chance alone.

Results for changes in self-efficacy and social support are shown in Table

4. The percentage of respondents saying they were better able to care for their diabetes increased significantly, including their reported ability to keep blood sugar in good control (48% to 58%, overall), keep weight under control (44% to 55%), do things for their diabetes (60% to 72%), and handle their

feelings (46% to 54%), (all at $P < .05$). There were also statistically significant increases in the percentages who were confident they could stick to their diet (54% to 64%, overall), and exercise 30 minutes per day (56% to 68%, overall). There were no overall increases in respondents' confidence in their ability to

Table 3. Changes in knowledge about diabetes among REACH participants†

	CMCH		ICHS		Sea Mar		Total	
	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
How often hemoglobin A _{1c} should be checked	55.0	66.7	42.7	57.4	59.6	80.0*	53.5	69.0*
Foods used in treating low blood glucose	28.0	26.5	37.5	41.8	22.2	31.2	28.4	32.5
Best way to care for feet	92.0	93.6	85.4	85.6	60.0	78.6*	77.4	85.2*
Risk factors reduced by eating low-fat foods	88.3	93.8	66.2	71.3	83.9	89.3	81.5	85.9
Symptoms associated with numbness	76.9	82.7	78.4	80.0	57.6	62.0	70.0	74.8
Health problems associated with diabetes	94.9	93.1	56.5	76.2*	69.5	71.1	75.1	79.7
For those taking insulin								
What to do if forgot insulin before breakfast	65.3	64.3	44.8	50.0	51.2	58.7	55.4	58.6
What to do if insulin reaction	77.3	69.2	41.2	40.0	40.5	48.8	54.2	54.6
Effect on blood glucose of taking insulin and skipping breakfast	67.4	71.7	84.4	72.1	61.2	84.8*	69.3	76.1

* $P < .05$ comparing pre/post within ethnic group and overall.
 † All figures show the percent who answered the question correctly.

Table 4. Changes in self-efficacy and social support among REACH participants†

	CMCH		ICHS		Sea Mar		Total	
	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
Percent who are‡								
Able to pay for diabetes treatment/supplies	45.6	47.5	32.6	31.6	20.0	18.6	30.5	31.4
Diabetes affects life a lot	56.7	55.1	49.4	46.5	60.5	58.9	56.2	54.0
Able to keep blood sugar in good control	37.7	53.3*	41.7	60.8*	59.2	59.7	47.5	58.0*
Able to keep weight under control	28.3	32.0	53.1	63.8	51.6	67.2*	44.1	55.1*
Able to do things for diabetes	43.7	57.4*	59.3	69.5	74.4	85.3*	60.4	72.0*
Able to handle your feelings	44.2	60.2*	38.3	47.9	52.3	53.1	46.0	53.8*
Percent who are confident they can§								
Stick to their diet	31.1	54.7*	57.6	56.6	68.5	76.6	53.5	63.7*
Exercise 30 minutes per day	30.4	47.6	59.3	67.7	74.6	85.3*	56.2	68.2*
Not smoke	65.2	66.7	71.4	73.0	94.5	93.5	82.2	82.4
Limit alcohol	83.1	75.0	76.9	82.5	96.1	96.0	89.1	87.3
Get health care when needed	80.8	89.7	82.7	80.6	87.7	85.5	84.3	85.7
Ask a doctor for information	85.9	90.0	74.6	80.8	89.4	88.0	84.6	86.9
Percent who‡								
Want help from family in caring for diabetes	60.6	72.3	65.9	65.7	80.8	85.8	70.2	75.4
Say family and friends help in caring for diabetes	55.4	73.5*	59.8	58.8	60.5	65.6	58.7	66.0

* $P < .05$ comparing pre/post within ethnic group and overall.

† All figures in percent.

‡ Percent answering 4 or 5 on a 1–5 scale: 1=None, 3=Somewhat, 5=Yes.

§ Percent answering 4 or 5 on a 1–5 scale: 1=None, 3=Some, 5=A lot.

quit smoking, limit alcohol, get health care when needed, or ask a doctor for information. The percentage of people saying family and friends helped in caring for their diabetes increased from 59% to 66% ($P = .06$).

Qualitative Results. We conducted 7 focus groups with 48 total participants: 1) two African-American groups (6 participants at CMCH, 8 participants at AACHN); 2) one Hispanic/Latino group (7 participants); 3) four Asian language groups—Mandarin, Cantonese, Vietnamese, and Korean (10, 9, 4, and 4 participants in each, respectively). This paper describes the process of the focus groups, the results of which are organized into 2 sections: what happened during intervention groups and classes, and the effects of the interventions on the lives of participants.

Focus group discussions were consistent in reporting the acquisition of a great amount of information in the REACH classes and support groups. This education and support took place among people with similar backgrounds and cultures, and, most importantly,

who spoke the same language. People felt that they had not been fully informed by their clinicians, and believed that more information would assist them in adapting to their chronic disease. An African-American woman summed this up when she said, “It is surprising the information you don’t get from the doctor. Most of what I learned was from this class.” Participants’ needs for information on diabetes were wide-ranging, and included information about the disease itself and how to manage it, about food and its importance in maintaining health, and about the significance of exercise to people with diabetes. A Vietnamese man said:

REACH classes are very helpful to those who are diagnosed with diabetes in general, and very helpful for me, in particular. I am very grateful to have programs such as REACH where I can go to get information. In truth, my diabetes is being treated by my doctor, but at times, it is not completed. REACH is helpful to us because it helps remind us of what we should eat, how to select our food, and the importance of exercise. There are many other ways that REACH is

helping us, we cannot mention it all. Basically the information we received helps minimize our risks.

Participants received their information about the nature of the disease from health practitioners who spoke their language. This combined the prestige of medicine with the cultural attention derived from language. Participants learned how to control their diabetes, a key issue. Related to this, they learned how to measure their blood sugar, and to understand its importance. One Mandarin speaker learned to control his glucose levels by adjusting his diet. A Spanish-speaking woman learned how to recognize when blood sugar is high or low, and what needs to be done for each condition to prevent a health emergency.

Food discussions were extensive and elaborate in all the groups. Nutrition education included the following 6 main topics: 1) managing diabetes through diet, which specifically entailed learning how to control glucose levels by learning what foods, in what amounts, should be consumed; 2) learning what

to eat; 3) how much food to eat; 4) learning how to prepare food; 5) finding out how to read labels; and finally 6) learning where to shop for food. Where to shop for food is a particularly important topic in a heterogeneous city such as Seattle. Many ethnically appropriate foods for people with diabetes are available, but not always in the same part of the city. Exchanging stories of where such foods could be found was an important part of support group sessions, such as, where a certain type of brown rice or diabetic candy could be purchased.

In addition to discussing food, participants in the focus groups reported that during the classes and support groups, they learned the value of exercise, including how to exercise, and the importance of exercise in controlling diabetes. While some participants were regularly exercising prior to their involvement in one of the intervention groups, many of them were not. In the Mandarin Group, a male participant learned that sweaty exercise would help him reduce the extra fluid in his body. He tried this type of exercise, and was successful. Participants also learned types of exercise that they could do, including jogging and Tai Chi. A Cantonese-speaking man said:

Normally I would exercise. I do my free-style exercise. But that day when they taught, it was good, but I didn't really follow it. They taught, they taught everybody. But often for the past 20 to 30 years in the morning I'd exercise, do my free-style exercise. But after listening to the education classes, it has caused me to take exercise more seriously, it's very important. Because if you don't exercise, you won't be able to make it. So every morning and every night, I would walk. In the morning I'd walk for an hour and at night, I'd walk for the next [another] hour. If I don't walk, my glucose levels would be higher. It's very important, if one just gets 2 hours of exercise everyday, it'd help with diabetes a lot.

Finally, through the classes and support groups, participants learned how to prepare for their doctor appointments.

Many of these participants had interacted with their providers only sporadically. It was helpful for participants to hear from clinicians in their own languages, and to hear examples of how to talk with a physician.

Respondents in the focus groups also reported that class activities, and conducting intervention groups in their native languages, contributed to their knowledge about diabetes. Several of the groups reported having had facilitators who took their classes grocery shopping, which afforded participants the opportunity to see where certain foods could be purchased, as well as to learn to read labels, and select food appropriate for managing diabetes. Several other groups reported exercising together and taste-testing diabetic foods. Through these hands-on experiences, participants were able to move beyond passive learning to active experiences in shopping, exercising, and eating correctly.

Focus group discussions provided an indication of how participants and their families have changed their attitudes and behavior as a result of attending intervention groups. People felt that they were better able to treat their disease, that they were more comfortable talking about their diabetes with their families and friends, and that they felt more confident and in control of their lives. An African-American woman stated "I speak more openly about it [diabetes]. It's no longer my little secret." Similar sentiments were expressed by a Vietnamese woman who said, "Of course I feel more confident. They taught us good stuff." A Mandarin-speaking woman changed her feeling about how to control diabetes. Formerly, she had thought that restricting diet would be very tiring and burdensome. She learned from the classes that it is essential to restrict the diet for a diabetic. Using the knowledge she learned from the classes, she felt it would be much easier for her to manage her diet. Additionally, support from group members, as well as from family and friends, was reported to

play an increasingly important role in participants' lives.

Just as food was the most discussed subject in the focus groups, and reportedly in the classes and support groups as well, the most significant changes that people reported centered on their eating habits. Most people reported dramatic changes in what they eat. A Vietnamese woman reported that:

When I eat fish, I don't even use the kind of sugar they teach us here. I use onion, pepper, and a tiny bit of fish sauce. I cannot eat salty food and I steam it. My children say 'How can you eat stuff like that?' and I say I have to. I eat much simpler than before because I am sick. I eat to live, not to enjoy myself."

In addition to what they eat, many participants have changed how much they eat. A Latino man said, "Before I didn't know what to eat or at what time. Now I know to control the portion size."

These changes in diet are quite significant in that they entail participants' deviations from cultural norms and expectations, as well as their exercising personal control over what and how much they eat. In many of the Asian countries, rice is a very important food. Not only is it the staple grain, but it holds great value as a cultural food as well. As members of the Korean group put it, "In Korea rich people ate polished rice, and the poor ate barley. It is funny that we [people with diabetes] should have to eat stuff like barley and brown rice out of a reason other than poverty." It is very difficult, both on personal and cultural levels, for the various cultural groups not to be able to enjoy their traditional foods, such as white rice for Asian groups, or tamales for the Spanish group. Several respondents noted that it was difficult to say "no" to family and friends who wanted them to eat foods that were not appropriate, especially during social events, or when they were eating at a restaurant. As one Vietnamese woman stated, "I can control myself at home, but when I go out, it is harder to control what I eat. I get so lonely at home, so I want

to go out, but when I go out, I don't have the same control." Even with this type of pressure from family and friends, or the cultural expectations about what they should be eating, most participants in the focus groups reported that their eating habits had improved, which suggests that the program was successful in this area.

Other changes that focus-group respondents reported concerned physical activity and interacting with doctors. Exercising became more important to many of the participants, including those who exercised regularly before they began attending classes and/or support groups. As one Cantonese man stated,

How do I exercise? I walk; I walk. In the past, I walk for an hour each day. Now, I still walk for an hour, but I also do Tai Chi. Before, I didn't know Tai Chi. Because I have this illness, I forced myself to learn Tai Chi. I don't learn anything else, I just learned Tai Chi.

Changes in exercise behavior included changes in the type and length of the exercise performed, as well as an increase in regularity.

Korean participants also talked about the importance of exercise. One said, "Even when we overly ate, exercise would help us consume extra energy." They said that meals should be followed by exercise (until they were sweating) to expend calories. Participants' patterns of exercise were different, but they all mentioned that exercise should be a part of everyday life. Like the Cantonese man in the previous example, most of the participants in the focus groups reported that they take exercise much more seriously now than they did before joining the classes/support groups.

Additionally, many participants reported changes in how they interact with their doctors, including meeting with them more regularly. An African-American man said,

I've learned to be ready for the doctor . . . When I go to the doctor's office and I go into the examining room, I take off my shoes and socks. I don't wait for him

to tell me . . . On the counter I lay my monitor book with all my blood pressures and all my sugar. So it's all there so he don't have to walk out and come back. I'm getting every bit of the minutes he's supposed to be giving me.

Finally, through participation in this REACH program, most people felt that their families and friends had become more supportive, and that members of their intervention groups supported them as well. An African American stated, "I feel more supported. I know there are others who know what I'm going through. There's more of a kinship." This support within the groups seems to be a natural consequence of bringing people together who have a common interest in diabetes. However, participants' reports of an increase in support from family and friends require more explanation.

One of the reasons for this increase in support may have to do with the changes in the people with diabetes themselves, particularly their willingness to talk about the disease, and to discuss what they have learned in the classes and support groups with their families and friends. Additionally, many focus group participants reported that their non-diabetic spouses or other family members often attended the intervention groups with them. Through this direct participation in the classes and support groups, family members were able to learn how to help their loved ones control their diabetes, and, therefore, were able to become more supportive. One Cantonese-speaking wife commented that

Before coming to attend these classes, I would be the one to cook rice and vegetables at home . . . Sometimes I would make dessert and ask him [the diabetic husband] to eat some. Some people had said that diabetics should not eat dessert, but personally, I felt that sugar would benefit his liver. Later on, after attending these education classes, I make meals according to the recommendations given.

DISCUSSION

This paper described REACH 2010 Seattle and King County: a project designed to reduce the diabetes-related disparities among African-American, Cambodian, Chinese, Filipino, Korean, Latino/Hispanic, Samoan, and Vietnamese communities. The foci of the evaluation for this paper were the education and self-management classes, and support groups. Results from the pre- and post-surveys demonstrated increases in participants' self-reported physical activity and healthier eating, as well as increased self-efficacy regarding their abilities to care for their diabetes.

The qualitative results from the focus groups were particularly striking for the enthusiasm shown by participants for having classes tailored to the issues faced by their ethnic groups, and for the impact their participation had on the way they cared for their diabetes. The qualitative results confirmed the survey findings that group participation resulted in significant changes in diet and physical activity.

LIMITATIONS

The primary limitation of the quantitative (closed-ended survey) assessment of the impact of REACH on participants is the lack of a comparison group. The budget for evaluation was not sufficient to allow for a comparison group, and the community-based, community-driven nature of the program would have made it difficult to conduct a randomized trial, even if resources were available to do so. It is therefore not possible to say whether the improvements in, for example, self-reported diet, were simply due to social desirability bias after participants had learned they should be eating better.

Another limitation is a lack of health status markers, including clinical indicators (blood sugar control, eye/foot exams, diabetes-related complications), and self-reported health status. The only

distal measure of health status collected on the survey was a standard question on overall health, a good proxy marker for a variety of more objective health indicators. Overall, those reporting their health as good, very good, or excellent increased from 30% to 36% ($P < .05$).

An additional limitation was the difficulty in administering a fairly complex, closed-ended instrument in 7 different languages (Cantonese, Mandarin, Vietnamese, Korean, Tagalog, Spanish, and English), with a limited amount of time available during the group/class. Many participants were not literate, or experienced difficulty reading and understanding the questionnaire. Staff provided assistance and/or read the instrument aloud, but it is uncertain whether all respondents fully understood all the questions in the survey.

The principal limitation of the qualitative evaluation is that only focus groups were used for this portion of the evaluation. The use of ethnography, or at least a broader range of ethnographic field techniques, would allow a great deal more confidence in the findings. Ethnography would have placed an individual investigator or team of investigators (to accommodate the different ethnic and language groups) with participants in many more situations and over a much longer period of time. Given the monetary constraints of this evaluation, focus groups were a good choice. Moreover, we are triangulating the data reported above with interviews with group facilitators and with other REACH intervention staff. We expect to report these results in a future publication.

Finally, we encountered several barriers in implementing our interventions. These included recruitment difficulties, staff turnover, scope of work challenges, limited access within some of the Asian and Pacific Islander communities, and limited impact of our efforts among some businesses, such as restaurants. These issues will be discussed in a future paper covering cultural and other implementation challenges and barriers.

CONCLUSION

Despite these limitations, the REACH evaluation results, to date, suggest that the program is being enthusiastically received, and that the support groups and education classes are having a significant impact on the way participants view and manage their diabetes. The results confirm the need for more widespread adoption of culturally competent diabetes education and support programs. This evaluation provides good data with which to evaluate program effectiveness, yet underscores the need for additional, more systematic research to further evaluate the effectiveness of such community programs.

Next steps for the Seattle and King County REACH Coalition include a continuation of current efforts, focused activities to attain a sustainable program, as well as expansion and enhancement of current interventions through our affiliation with the Steps to a Healthier United States initiative. Specifically, this includes development of interventions for the Samoan community, and an enhanced faith-based intervention involving lay health leaders. We are able to provide training of the Lorig Self-Management of Chronic Illness Model in Spanish to other providers. In addition, because we are the first in the United States to help develop and pilot the Chinese version of the self-management curriculum, we are currently involved in further refining and tailoring this instrument for our population. We are also developing plans for: 1) incorporating our efforts into existing systems of care; 2) seeking funds to maintain current levels of intervention activities; and 3) garnering support from new partners, such as businesses and policy makers.

ACKNOWLEDGMENTS

There are many people who have contributed to the contents of this paper. Special thanks go to evaluators Jacqueline Vasquez, Edna Nunn, Melissa Ponder, and to addi-

tional focus group leaders, Devon Love, Bu Huang, Wenjin Li, Kim Nguyen, Mythu Chim, Unice Wong, Ada Pang, Hyo Jung Park, Hyun Jung Kim, Daniella Ochoa, and James Hurd, who helped to collect data and contributed to the analyses. We would also like to thank Valerie Baldiserrotto, Rietta Williams, Maxine Chan, Rahul Gupta, and Lois Watkins, for program coordination, and thank you to the many peer educators and interpreters for program implementation and translation. Finally, we would like to thank Dr. Alonzo Plough for initial leadership, and Drs. James W. Krieger and Lin Song, and medical safety net providers, for epidemiological data and initial grant preparation.

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Conclusions Group diabetes peer support over 8-12 months was associated with a small improvement in blood pressure but no other significant outcomes. Long term benefits should be investigated. Trial Registration ISRCTN.com ISRCTN6696362166963621. One group of interventions to improve diabetes outcomes involves assistance from another person with the condition: such "peer supporters" have often faced similar problems [7]. Support is characterised by empathy, and an approach that shares practical aspects of managing diabetes in day-to-day life i.e. the "how to do" rather than the "what to do". Peer support can involve individual or group approaches face-to-face, telephone and internet contacts [8]. The Diabetes Integrated Care Initiative (DICI) was delivered by a separate enhanced community diabetes service in Cambridgeshire, East England, increasing specialist support to primary care and patients. The DICI was evaluated using a mixed methods approach, including a before-after design, with controls from adjacent geographical areas and patients without diabetes. The Action to Control Cardiovascular Risk in Diabetes Study Group. Effects of intensive glucose lowering in type 2 diabetes. N Engl J Med. Hollern H, Simmons D. Cost saving and improved glycaemic control in an integrated diabetes service. Prim Care Diabetes. 2011;13:176-81. Google Scholar. Communities of color bear a disproportionate burden of diabetes risk, prevalence, complications, and mortality. REACH 2010 Seattle and King County provides socio-ecological interventions to reduce diabetes disparities among African-American, Cambodian, Chinese, Filipino, Korean, Latino/Hispanic, Vietnamese and soon Samoan, and Vietnamese groups. This paper reports evaluation results of REACH classes and support groups.