

A Randomized Community Intervention to Improve Hypertension Control among Mexican Americans: Using the *Promotoras de Salud* Community Outreach Model

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Abstract: The objectives of this study were: 1) to evaluate the acceptance, effectiveness, and sustainability of a *promotora* (community health worker) pilot program to improve hypertension control among medically underserved Mexican Americans of the El Paso, Texas area, and 2) to demonstrate improvements in clinical measures of blood pressure, BMI and waist circumference, self-reported behaviors and changes in attitudes and beliefs about blood pressure among Mexican American hypertensives. Participants were eligible if they had been diagnosed with hypertension and if they were willing to be randomized as either participants in the intervention or as controls. A total of 58 participants enrolled in the intervention group and 40 participants served as controls. This was a 9-week *promotora* intervention. Health behavior constructs and clinical data were measured pre-post intervention. Perceived benefits, and two heart-healthy behaviors (salt and sodium, and cholesterol and fat) were shown to be statistically significantly different between the intervention and control groups.

Key words: Community health worker, Mexican Americans, U.S.-Mexico border, hypertension control, community outreach, *promotores de salud*, heart-healthy behaviors, perceived benefits, randomized community intervention.

Hispanics are the largest ethnic minority group in the U.S., representing 15% of the total population,¹ and Mexican Americans constitute over 60% of Hispanics living in the United States. For Hispanics, as for most ethnic groups, cardiovascular disease (CVD) is the leading cause of death and disability.² Hypertension is a major

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risk factor for cardiovascular disease.³ Uncontrolled and untreated hypertension represents a serious public health problem that has not been clearly addressed by clinical and/or community health interventions. The lack of hypertension control is emerging as a critical public health problem among Hispanics.⁴ Social and environmental stress factors such as low socioeconomic status, acculturative stress, and low family cohesiveness are among the factors that have been associated with an increased risk of CVD and hypertension among Mexican Americans.⁵⁻⁸ Therefore, ecological interventions can best address cardiovascular disease and major risk factors such as hypertension among medically underserved Mexican American populations.⁹⁻¹⁰

Promotora (community health worker) programs have emerged as promising models to address reduction of risk factors for hypertension in Mexican Americans.⁹⁻¹⁰ A *promotora de salud* (*promotora*) is the Spanish equivalent of a community health worker. Preliminary studies conducted by our team have demonstrated that the *Salud Para Su Corazon* (SPSC) *promotora* program is an effective community outreach model that can be implemented in the U.S./Mexico border region to improve the control of cardiovascular risk factors.⁹⁻¹³ *Promotoras de Salud Contra la Hipertension* (Community Health Workers Against Hypertension) was created as a new program to address hypertension control among Hispanics living in the *Paso del Norte* Region. The objectives of this three-year program were: 1) to evaluate the acceptance, effectiveness, and sustainability of a train-the-trainer *promotora* demonstration pilot study in order to improve hypertension control among medically underserved Mexican Americans of the El Paso, Texas area; and 2) to demonstrate improvements in clinical measures of blood pressure, body mass index (BMI) and waist circumference, self-reported behaviors, and changes in attitudes and beliefs about blood pressure among Mexican American hypertensives. This article describes the development and testing of the *Promotoras de Salud Contra la Hipertension* program, using a family-centered and community-based participatory approach.

Methods

Development of the feasibility project. The project used community-based participatory research (CBPR) approaches to link research and practice to develop community collaboration in the feasibility-demonstration project. These CBPR approaches consisted of the following: 1) conducting two community forums to share the purpose of the program with *promotora* programs in El Paso, Texas; 2) developing a community plan for the feasibility project with *promotoras* from the area; 3) conducting five focus groups including two groups in Ciudad Juarez, Mexico; 4) developing and implementing a community survey with input from *promotoras* and community-based organizations; 5) pilot-testing the program curriculum and new educational materials using *promotoras* as guides; 6) implementing the train-the-trainer approach in consultation with the community-based organizations and *promotora* programs; and 7) implementing the community feasibility pilot program (intervention). For the purpose of this article, only the last two sections will be described.

As part of the feasibility pilot project, several strategies were developed to engage community-based organizations and *promotora de salud* programs in El Paso to par-

ticipate in the train-the-trainer *promotora* project and the selection of the target area. The project was supported by a partnership that was established between the Univ. of Texas School of Public Health–El Paso Regional Campus, AYUDA (a community-based organization) and *Centro San Vicente* (CSV) (a community-based clinic), with support from a Centers for Disease Control and Prevention and Association of Schools of Public Health (CDC-ASPH) grant.

As part of its mission, AYUDA provides residents of the Lower Valley of El Paso with a variety of free community services, including health promotion and disease prevention activities. The clinic, CSV, provides clinical services as well as health education services from trained *promotoras*. The *promotoras* from CSV provided training to a total of 20 new *promotoras*, using the National Heart, Lung and Blood Institute's (NHLBI) SPSC *promotora* curriculum *Your Heart, Your Life*.¹⁴ This curriculum is considered one of the best available educational materials for addressing cardiovascular disease risk factors in the Hispanic/Latino community in the U.S. and has been used extensively by our team.^{9-11,13} The training was conducted by experienced *promotoras* from CSV using previously tested training methodologies.^{9-11,13} The training consisted of four days of education and guided practice using the *Your Heart, Your Life promotora* curriculum.

Promotoras from CSV and AYUDA also participated in the development of additional educational materials to complement the *Your Heart, Your Life* curriculum. A module was specifically designed for hypertension control with a photonovela highlighting examples of how to control high blood pressure using a family approach. The photonovela included many examples that built the theme of family support and family interactions for engaging a family member in lifestyle changes or behaviors and/or attitudes related to control of blood pressure and use of medicines, stress control, and visit to the doctor. To develop the photonovela, one of the team members (with expertise in the use of health promotion theory applied to community outreach research [TB]) led a team, using a theory-based approach. A community assessment was launched as part of this feasibility project to investigate factors associated with hypertension awareness for treatment and control, perceived barriers to hypertension control, stage of change around several hypertension control behaviors, and attitudes about behaviors to control hypertension. One hundred and twenty-six subjects were interviewed, 75 from Ciudad Juarez and 51 from El Paso (data not shown here). The results of the survey were also used to guide the development of the new module for hypertension control and the development of the photonovela themes.

Through a series of iterations (guided by theoretical constructs including attitudes, self-efficacy, outcome expectations, modeling, reinforcement, social norms and skills), which included discussions with *promotoras* from AYUDA and CSV, sketches of materials for three vignettes were developed and tested until consensus was reached for the final narratives and colored pictorials. The three topics for the vignettes were: 1) control of blood pressure and use of medicines, 2) control of stress, and 3) visiting the doctor.

Setting and participants. The feasibility pilot intervention was launched in collaboration with AYUDA and focused on medically underserved adults of Mexican origin residing in the Lower Valley of El Paso, Texas. The Lower Valley includes five

ZIP code areas, and Hispanics make up a larger portion of this area (92%) than they do of the rest of El Paso. This area is characterized by low socioeconomic status, with approximately 29% of its population under the federal poverty level. A staggering 50% of residents of the Lower Valley are without a high school diploma. Participants were recruited from this target area served by AYUDA in the Lower Valley of El Paso. Flyers and posters advertizing the program were posted at AYUDA. Participants were eligible if they had been diagnosed with hypertension by a doctor and if they were willing to be randomized as either participants in the intervention or as controls. Randomization was conducted after participants were deemed eligible, and then proceeded using sequentially numbered slips of paper indicating group assignment based on random numbers. A total of 58 participants were enrolled as part of the intervention group and 40 participants as controls. The Institutional Review Board of the Univ. of Texas Health Science Center in Houston, School of Public Health approved the study. Participants provided informed consent and received a variety of small incentives (including food coupons, household products, and gifts) from AYUDA for their participation.

Intervention. The community feasibility pilot program was a nine-week *promotora* intervention that consisted of the Spanish version of six *Your Heart, Your Life* educational modules with the addition of the new hypertension module (specifically designed for this project in Spanish) with a photonovela (which was also designed in Spanish for the project) delivered by *promotoras de salud* from AYUDA (the hypertension module and photonovela are available upon request). Four *promotoras de salud* worked in pairs and delivered the educational modules in Spanish in two-hour sessions during weeks 1, 2, 3, and 8 for groups of approximately 15–20 participants each. *Promotoras* were compensated by AYUDA for their work implementing the program. The NHLBI *Your Heart, Your Life* educational modules were delivered to the intervention groups as follows: week 1—*What you need to know about high blood pressure, salt and sodium*, and the new module, *How to control your blood pressure*; week 2—*Be more physically active* and *Eat less fat, saturated fat, cholesterol*; week 3—*Maintain a healthy weight* and *Make heart-healthy eating a family affair*; week 8—*Eat healthy even when time or money is tight*. The program for weeks 4 through 7 consisted of follow-up telephone calls to answer questions and discuss what lifestyle changes (e.g., changes in weight, salt and sodium consumption) were made by participants that were consistent with the educational modules taken during weeks 1–3, and to schedule make-up classes for participants who missed any class during those weeks. Through this method of re-scheduling classes, the program achieved 100% participation from the intervention group (58 participants).

The control group received Spanish educational materials related to overall health issues in week 1. Assessments were conducted in both the intervention and control groups as follows: baseline, three weeks and nine-weeks post-baseline assessments of blood pressure (three readings); baseline and nine-weeks post-baseline assessments of acculturation, psychosocial factors, socio-demographics, theoretical constructs related to behavior, and self-reported behavior associated with control of high blood pressure, using a survey instrument developed for the study. The survey was pilot-tested prior to implementation. Results are presented for baseline and nine-weeks post-baseline

comparisons. A summary of the study design and program intervention activities is presented in Table 1.

Outcome measures and data collection. Several outcome measurements were used to evaluate the nine-week intervention. These included: 1) clinical measures of blood pressure, BMI, and waist circumference; 2) self-reported behaviors associated with

Table 1.

STUDY DESIGN AND PROGRAM INTERVENTION ACTIVITIES

Randomized control group	Randomized intervention group
N=40	N=58
9-week study	9-week study
Measurement interval = 9 weeks	Measurement interval = 9 weeks
Data collections for outcome data: weeks 1 and 9	Data collections for outcome data: weeks 1 and 9
No program intervention. Participants received educational materials at baseline.	Program Intervention: 6 educational modules of <i>Your Heart, Your Life (Su Corazon Su Vida)</i> + new hypertension module that included a photonovela.
	Program Schedule By Week
	Week 1 Module: What you need to know about high blood pressure, salt and sodium; + New Module: How to control your blood pressure. Baseline assessments prior to class
	Week 2 Modules: Be more physically active and eat less fat, saturated fat, cholesterol.
	Week 3 Modules: Maintain a healthy weight and make heart-healthy eating a family affair.
	Weeks 4, 5, 6, 7 Follow-up telephone calls to discuss lifestyle changes and make-up classes
	Week 8 Module: Eat healthy even when time or money is tight.
	Week 9 After program assessments

control of high blood pressure; and 3) changes in attitudes and beliefs about behaviors and blood pressure. A trained research assistant performed all of the blood pressure measurements at one-minute intervals and in triplicate for the baseline, three-week, and nine-week assessments, using a commercial automated electronic device for self-measurement of blood pressure, which was tested periodically for accuracy. The median value of three blood pressure measurements was used because, on occasion, one of the three values differed from the others. All data collection was performed at AYUDA. Weight and height were measured at baseline and used to calculate BMI (kg/m^2) for all study participants. Waist circumference was measured using a tape measure to record values in inches. Classification of overweight and obesity was determined by using conventional BMI cut-off points. Weight-related indicators of obesity including waist circumference have been shown to be predictors of blood pressure.¹⁵

A Spanish-English questionnaire was developed, tested, and implemented for the collection of data on socio-demographic characteristics, acculturation (including stressors of migration mobility, acculturative stress), and family cohesiveness, in addition to a variety of behavioral constructs, to assess factors associated with control of blood pressure. The questionnaire used validated measures from previous studies associated with acculturation,¹⁶ acculturative stress,¹⁷ family cohesiveness,^{8,17} and the behavioral measures from the SPSC *promotora* interventions.¹¹ Acculturation was measured using a five-item scale developed by Castro and Balcazar.¹⁶ For stressors of migration mobility, three questions were used in the context of how stressful it was to move to U.S. associated with: 1) feeling discriminated against, 2) lacking access to familiar things in the community, and 3) being unable to speak the language or to communicate with others. The behavioral constructs included: 1) *perceived susceptibility* (feeling that high blood pressure puts them at risk, three questions); 2) *perceived severity* (feeling that high blood pressure is a serious condition, four questions); 3) *perceived benefits* (benefits of behaviors that will help them control blood pressure, seven questions); 4) *perceived barriers* (feeling that it is difficult to control their high blood pressure, nine questions); 5) *self-efficacy* (confidence in the ability to perform certain behaviors to control high blood pressure, six questions); 6) *readiness for change for exercise* (two questions); *intentions to increase fruit and vegetable intake* (two questions); *intentions to reduce fat* (one question); and *intentions to reduce dietary salt and sodium* (two questions). Finally, the *My Habits Scale*, previously tested in several SPSC *promotora* models,^{9, 11,13} was used to assess participants' heart-healthy behaviors associated with the salt and sodium consumption scale (10 items); cholesterol and fat scale (10 items); and the weight control practices scale. These subscales have shown acceptable reliabilities (Cronbach alpha coefficients $>.70$) in similar *promotora* studies conducted by Balcazar and his team.¹¹

Statistical analysis. To examine differences between intervention and control groups at baseline for categorical data, chi-squared (χ^2) and Fisher's Exact test were conducted. Mean differences for acculturation, immigration, and behavioral constructs from blood pressure control for intervention and control groups at baseline were examined based on independent samples t-test. Logistic regression and analysis of covariance were used to test differences in outcomes (behavioral and clinical) between intervention and control groups at nine weeks after adjusting for baseline values, gender and employ-

ment status. Changes in frequency categories for blood pressure were tested using the McNemar test. *The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7)* was used to determine categories of blood pressure.¹⁸

Results

Descriptive characteristics at baseline. A total of 98 participants enrolled in the randomized community trial (58 in the intervention group and 40 in the control group). Comparison of baseline characteristics between the intervention and control groups shown in Table 2 yielded only two statistically significant differences: gender and employment status. The mean age in years was 54.9 and 49.7, respectively, for intervention and control groups (data not shown in Table). Of the intervention group, a total of 87.9% was female, while 65% of the control group was female. A total of 86.2% of the intervention group reported not being currently employed, in contrast to 62.5% of the control group. Both groups had little formal education (96.5% and 86.1% less than high school for intervention and control groups, respectively). In both groups, over 60% were married. Approximately 60% of participants in both groups responded that they were unable to get by with their household income. Of the intervention group, 69% reported having no health insurance, compared with 75% of the control group. In both groups more than 82% were born in Mexico.

Social and behavioral constructs at baseline. Data from the baseline assessments describing a variety of social and behavioral variables including acculturation, stressors of migration, family cohesiveness, acculturative stress, and the series of health behavior constructs for hypertension control and heart healthy behaviors are shown in Table 3 for a comparison between intervention and control groups. In general, level of acculturation (as measured by the General Index of Acculturation) was low (in the range of 1.4 to 1.6 for intervention and control groups, respectively). The same was true for stressors of migration and acculturative stress showing these groups had low stress due to migration or acculturation. Both groups showed high levels of family cohesiveness. None of the social constructs were statistically significantly different at baseline between experimental and control groups.

Table 3 also describes the mean scores of the behavioral constructs that were measured in relation to control of high blood pressure. Both groups felt that high blood pressure is a serious condition (*perceived severity*) that puts them at risk for other health conditions (*perceived susceptibility*). Statistically significant differences between groups were found in terms of perceived benefits that certain behaviors will help to control blood pressure and self-efficacy for performing certain behaviors to control blood pressure. The intervention group saw fewer benefits, but had more self-efficacy about performing the heart healthy behaviors at baseline. The heart-healthy behavior scale for cholesterol-and-fat-healthy habits showed a statistically significant difference at baseline between experimental and control groups. There were no significant differences at baseline between the experimental and control groups for the intention variables (data not shown).

Table 2.**COMPARISON OF BASELINE CHARACTERISTICS FOR INTERVENTION AND CONTROL GROUPS**

Characteristics	Intervention group N=58 (%)	Control group N=40 (%)	P-value (Fisher's Exact)
Sex (%)			
Males	7 (12.1)	14 (35.0)	0.0120
Females	51 (87.9)	26 (65.0)	
Marital status (%)			
Never married	2 (3.4)	5 (12.5)	0.1415
Married or living together	36 (62.1)	28 (70.0)	
Separated	5 (8.6)	1 (2.5)	
Divorced	4 (6.9)	0	
Widow	11 (19.0)	6 (15.0)	
Education (%)			
Less than high school	44 (96.5)	26 (86.1)	0.2632
Technical school	14 (3.5)	14 (35.0)	
Employment status (%)			
Currently employed	8 (13.8)	15 (37.5)	0.0083
Not currently employed	50 (86.2)	25 (62.5)	
In terms of household income, I consider myself (%)			
Very well off	1 (1.7)	0	0.9010
Well off	0	0	
Getting by	20 (34.5)	15 (37.5)	
Not getting by	37 (63.8)	25 (62.5)	
Annual household income			
Less than \$5,000	20 (35.1)	16 (40.0)	0.3375
Between \$5,000 to \$15,000	28 (49.1)	14 (35.0)	
More than \$15,000	10 (15.8)	10 (25.0)	
Health insurance (%)			
Self (no insurance)	40 (69.0)	30 (75.0)	0.5226
Private insurance	1 (1.7)	0	
Medicare + Medicaid	14 (24.1)	8 (20.0)	
Other	3 (5.2)	2 (5.0)	
Place of birth (%)			
U.S.	6 (10.3)	7 (17.5)	0.3694
Mexico	52 (89.7)	33 (82.5)	

Table 3.**ACCULTURATION, IMMIGRATION AND BEHAVIORAL CONSTRUCTS FOR BLOOD PRESSURE CONTROL FOR INTERVENTION AND CONTROL GROUPS AT BASELINE**

Characteristics	Intervention group (N=58) mean, standard	Control group (N=40) mean, standard	P-value (t-test)
Gindex score/acculturation (1-5) 1 = Low acculturation 5 = High acculturation	1.47(0.58)	1.62(0.72)	0.237
Stress due to migration (0-5) 0 = Low stress 5 = High stress	1.65(1.12)	1.22(1.01)	0.067
Family cohesiveness (1-6) 1 = Low cohesiveness 6 = High cohesiveness	5.49(0.83)	5.47(0.66)	0.890
Acculturative stress (1-5) 1 = Low stress 5 = High stress	1.68(0.83)	1.48(0.50)	0.171
Perceived susceptibility (1-4) 1 = High perceived susceptibility 4 = Low perceived susceptibility	1.22(0.33)	1.36(0.45)	0.097
Perceived severity (1-4) 1 = High perceived severity 4 = Low perceived severity	1.18(0.37)	1.26(0.40)	0.366
Perceived benefits (1-4) 1 = High perceived benefits 4 = Low perceived benefits	2.00(0.48)	1.35(0.44)	0.005
Perceived barriers (1-4) 1 = Low perceived barriers 4 = High perceived barriers	1.14(0.27)	2.64(0.45)	0.284
Self efficacy (1-4) 1 = High self efficacy 4 = Low self efficacy	2.55(0.87)	2.97(0.80)	0.015
Salt and sodium healthy habits (1-4) 1 = Bad habits (never) 4 = Good habits (always)	1.74(0.33)	1.69(0.33)	0.490
Cholesterol and fat healthy habits (1-4) 1 = Bad habits (never) 4 = Good habits (always)	1.57(0.50)	1.36(0.54)	0.050

Clinical data at baseline. Clinical data from the baseline assessment of BMI (kg/m^2), blood pressure readings (mmHg), and waist circumference (inches) were also evaluated (data not shown in tables). The mean BMI at baseline was 31.5 and 32.5, respectively, for intervention and control groups. A total of 27.5% and 32.5% of participants were classified as overweight and 58.6% and 57.5% as obese for intervention and control groups, respectively, using standard classification cut-off points of BMI. The mean waist circumference was 41.6 and 41.5 inches for intervention and control groups. Approximately 95% of both groups reported using medication to control blood pressure. Interestingly, close to 20% of the sample of participants in both groups responded that they *sometimes* take medications exactly as prescribed by the doctor (*vs. always, rarely, or never* doing so). A total of 75% responded that they always take medications exactly as prescribed by the doctor. None of the differences between intervention and control groups were statistically significant. The mean blood pressure (based on individual medians of three blood pressure readings) at baseline was 133.0 for systolic (SBP) and 81.3 for diastolic (DBP) for the intervention group. For the control group it was 132.0 and 85.7, respectively, for SBP and DBP.

Follow-up results after nine-week intervention. *Health behavior constructs.* Results for the health behavior constructs and heart-healthy behaviors at nine weeks for pre-post assessments (baseline versus after nine-week intervention) controlling for baseline values, gender, and employment status are shown in Table 4. Perceived benefits and two heart-healthy behaviors (salt and sodium, and cholesterol and fat) were shown to be statistically significantly different between the intervention and control groups at nine weeks. Two variables (perceived severity and weight-control health habits) were found to be marginally significantly different. The intervention group performed better than the control group based on the health behavior constructs and the heart-healthy behaviors.

Clinical data: Waist circumference and blood pressure. None of the clinical variables were found to be significantly different between intervention and control groups after adjusting for confounders. Using the JNC 7 classification of high blood pressure, some patterns emerged that were considered positive in direction; this was particularly true for the cut-off points associated with normal and pre-hypertension (see Table 5). That is, for the intervention group, 22% of the subjects were classified in the normal category at baseline and, after 9 weeks, the percentage increased to 26%; for the control group, the percentages were 18% at baseline and 15% after nine weeks, thus showing a negative decline. For pre-hypertension, the results showed that for the intervention group there was a decrease among subjects from 45% to 33% from the baseline assessment to after nine weeks, compared with an increase from 43% to 65% in the control group. The actual number of cases that changed categories is small, as can be seen in Table 5; therefore, these results should be interpreted with caution.

Discussion

Acceptance of the program. The results of this pilot feasibility program and the community activities performed as a result of this study point to several successes. The program was able to engage two community partners, AYUDA and CSV for the

Table 4.**A COMPARISON OF INTERVENTION AND CONTROL GROUPS AT 9 WEEKS AFTER ADJUSTING FOR THE BASELINE VALUES, GENDER AND EMPLOYMENT STATUS**

Characteristics	Intervention group (N=58)		Control group (N=40)		P-value
	Pre Means	Post Means	Pre Means	Post Means	
Perceived susceptibility 1 = High, 4 = Low	1.22	1.10	1.36	1.24	0.158
Perceived severity 1 = High, 4 = Low	1.18	1.10	1.26	1.26	0.076
Perceived benefits 1 = High, 4 = Low	2.00	1.06	1.35	1.26	0.019*
Perceived barriers 1 = Low, 4 = High	1.14	2.64	2.64	2.77	0.556
Self efficacy 1 = High, 4 = Low	2.55	2.00	2.97	2.29	0.435
Salt and sodium healthy habits 1 = Bad (Never), 4 = Good	1.74	1.81	1.69	1.67	0.036*
Cholesterol and fat healthy habits 1 = Bad (Never), 4 = Good	1.57	1.78	1.36	1.52	0.022*
Weight control healthy habits 1 = Bad (Never), 4 = Good	1.51	1.78	1.39	1.51	0.082

*Statistically significant differences ($p < 0.05$) between pre-post 9 week program for Intervention and Control Groups.

purpose of developing a community-centered approach using the train-the-trainer model. This train-the-trainer methodology worked and provided a capacity-building opportunity for 20 *promotoras* from many community-based organizations who received the NHLBI SPSC *Your Heart, Your Life* training. Four *promotoras* from AYUDA successfully delivered the intervention. The leverage obtained through this CDC-ASPH funded project enhanced the visibility of the UT School of Public Health Regional Campus as a community partner interested in CBPR, and in the delivery of community intervention programs that participants in the community in the Lower Valley of El Paso want and accept.

This feasibility study produced two culturally-appropriate health education materials, the photonovela and the hypertension module, which were developed specifically

Table 5.**BLOOD PRESSURE CHANGES IN INTERVENTION AND CONTROL GROUPS USING THE JNC 7 CLASSIFICATION**

	Intervention group N=58			Control group N=40		
	Base- line	After 9 weeks	% In- crease	Base- line	After 9 weeks	% In- crease
SBP <120 mm Hg and DBP <80 mm Hg (normal)	22% n=13	26% n=15	+15%	18% n=7	15% n=6	-16%
SBP 120-139 mm Hg and/or DBP 80-89 mm Hg (Pre hypertension)	45% n=26	33% n=19	-27%	43% n=17	65% n=20	+15%
SBP 140-159 mm Hg and/or DBP 90-99 mm Hg (Stage I)	22% n=13	29% n=17	+31%	25% n=10	25% n=10	0%
SBP >160 mm Hg and/or DBP >100 mm Hg (Stage II)	10% n=6	12% n=7	+16%	15% n=6	10% n=4	-33%

SBP = systolic blood pressure
DBP = diastolic blood pressure

for low-literacy, low-acculturated Mexican Americans living in El Paso, Texas. These educational materials designed for people who suffer from high blood pressure were received well by program participants. These materials could be used in many Spanish-speaking Hispanic/Mexican American communities outside El Paso (free copies of both educational materials can be obtained from the principal investigator, HB). This project was able to leverage further support to AUYDA through additional funds from General Mills (as part of the *Angeles de Mi Corazon Initiative*) that were secured to continue building activities of hypertension control in the community. Finally, a randomized community trial was successfully implemented with 98 subjects of Mexican descent from the Lower Valley of El Paso with the support of AYUDA and CSV.

Perceived effectiveness of program. This pilot program shows positive effects, most evident in a few behavioral constructs such as perceived benefits and in changes in dietary/food habits associated with control of blood pressure. These results are very encouraging, given the short duration of the program (nine weeks), and the fact that this project was conceptualized from the beginning as a feasibility study. Of particular interest for this feasibility study is the richness of socio-demographic data that the study

was able to collect from all participants (intervention and control) including context-specific elements of acculturation, migration mobility, and family cohesiveness.

This pilot study was also able to confirm the prevalence of obesity among Mexican Americans living in the border region.¹⁹ More than 50% of participants in both groups were obese. *Promotoras de salud* from AYUDA were able to apply the different NHLBI SPSC *Your Heart, Your Life* educational modules to begin addressing high blood pressure in the context of an overall approach to CVD risk-reduction (given the high level of obesity observed) in addition to including a new module specific for the control of blood pressure. The program results associated with the behavioral constructs are encouraging and should be confirmed with longer interventions to observe effects in high blood pressure reduction. To our knowledge this is the first tailor-made culturally-focused intervention strategy developed for Mexican Americans living in the U.S.-Mexico border region to control blood pressure and associated risk factors.

Ability to demonstrate blood pressure control. The intervention was not able to show significant positive changes in blood pressure reduction. Reasons for the lack of intervention effects include the short duration of the program, and the difficulty in monitoring use of medications to account for variation in the appropriateness of prescription medication use at the time of the intervention.

Lessons learned. The participants from this El Paso border community were not highly acculturated to the U.S., which was expected in view of the fact that the majority of participants were born in Mexico. The data on stressors of migration mobility, and acculturative stress confirm the notion that, in border communities, the constructs of acculturation, mobility between borders, and stressors due to acculturation have meanings different from those they have for Mexican American immigrant populations who live far from the border.²⁰ However, the results showing high family cohesiveness are consistent with previous demonstrations of the high value that Hispanics place on the family.¹⁶⁻¹⁷

Additional lessons learned from the project included: 1) working with communities is an art in itself; researchers and providers must be sensitive in acknowledging the competing needs of the people while working on controlling blood pressure; 2) the *promotora* model is effective for community outreach, and should be supported at all stages of the program (conceptualization, implementation, monitoring, and evaluation);²¹⁻²⁵ 3) community members engage in programs that they feel are tailor-made for them and speak to them; 4) the photonovela and the activities of the *Your Heart, Your Life* curriculum are good examples of culturally appropriate health education strategies.²⁶ Finally, the intervention should be extended to cover at least 12 months from baseline to allow for adequate follow-up activities that may include *promotora* activities designed to engage participants in behavioral change and adherence to blood pressure control regimens, including medication. Support groups, coaching, and pledges (or *compromisos*) are possible activities to be implemented with the help of *promotoras*.⁹

Study limitations. This feasibility study has several limitations. Due to the fact that program participants from both groups (intervention and control) came from the same target area and from the same community-based organization, it was difficult to avoid group contamination. However, the extent to which this contamination existed was not apparent based on discussions from AYUDA staff. The lack of effects seen for

hypertension control is likely a result of the short duration of the intervention. The positive results of the behavioral constructs measured in the intervention suggest that expanding the program will be beneficial for participants (at least for a 12-month period). Benefits may include more opportunities for participants to engage in dialogue with the *promotoras* and with their own families about lifestyle changes that can be gradually incorporated for improving/maintaining blood pressure control. The use of the new educational materials such as the photonovela can serve as a good tool to facilitate this dialogue among participants and their families.

Another key limitation was the lack of assessment and monitoring of medication use in both groups. This area of the program must be expanded to include a well-developed assessment and monitoring plan for capturing type of medication prescribed, recommendations from doctors and pharmacists about frequency of use, and adherence to medication use as prescribed. Well-trained *promotoras* can be great supports for carrying out data collection activities associated with medications including adherence. The new educational materials (photonovela and module) developed for this project can be used by *promotoras* as guides for developing a variety of activities related to medication usage and adherence.

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Notes

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