



Impact of Delivering a Healthy Lifestyle Intervention: *Promotora* Findings from *Familias Sanas y Activas II*

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Abstract

Background: Community health workers, *promotoras*, have been identified as effective change agents of their community members' health behaviors and health status. However, few studies have examined the effects of delivering an intervention on the *promotoras* themselves. **Objectives:** This study assessed whether *promotoras* delivering a healthy lifestyle intervention for adults improved their health behaviors and health status from baseline to 6- and 12-months post-baseline. **Methods:** Volunteer *promotoras* were trained to promote healthy lifestyles including physical activity through workshops and free group exercise classes throughout their communities. Twenty completed all required trainings and delivered at least one class during the period between baseline and 12-month assessments. The *promotoras* were measured on the following variables: Systolic and diastolic blood pressure, waist circumference, weight, and height. Additionally, they reported their health behaviors and status including moderate-to-vigorous physical activity, beverage consumption, sleep duration, and depressive symptoms. **Results:** Repeated measures ANOVAs showed statistically significant decreases from baseline to 6 months for systolic blood pressure ($p \leq 0.05$), diastolic blood pressure ($p \leq 0.001$) and body mass index ($p \leq 0.05$). Changes in self-reported measures were not statistically significant although trends were observed with increases in water consumption. **Conclusions:** Findings from this study suggest positive effects associated with delivery of a PA intervention. This is one of the first studies to focus on a cohort of *promotoras* to examine health outcomes from delivering a healthy lifestyle intervention. It is important to further explore these impacts on the community health workers as they have become increasingly essential to the health of some communities.

Key words: Intervention; *Promotoras*; Physical activity; Obesity; Hispanic/Latino

Background

Since the 1950s, health promotion and disease prevention programs in the United States have used the Community Health Worker (CHW) model to address various health issues affecting underserved and vulnerable populations [1]. The model is based on the formal and informal social networks of a community [2]. Through these networks, CHWs conduct outreach, lead communal events, deliver health education, provide support to others, and advocate for organizational and community changes [3]. CHWs empower individuals to take action in their homes, workplaces, and communities to promote health and prevent disease [4]. In the U.S. Latino community, a *promotor* (or more commonly a *promotora*, referring to a female CHW), is the term used to refer to this trusted community member who understands the needs of the community being served [5]. In part, given their language skills, *promotoras* often serve as a liaison between health and social service organizations and their communities [6]. Research has shown that interventions delivered by *promotoras* have been successful at preventing and controlling cardiovascular disease [7] and diabetes [8], improving asthma management, and cervical cancer and mammography screening [9].

To achieve these aims in both research and practice, implementation of the model involves the

federally qualified health centers, community and faith-based organizations, hospitals) [10]. Generally, CHWs must meet certain qualifications before they are able to fulfil their roles in their organizations and communities. Although *promotoras* have been involved in promoting health for decades, few studies have tested the impact of delivering an intervention on the *promotoras* themselves. One study found that after two years of delivering a health intervention, participant health improvements such as increased levels of physical activity, increased healthy eating, and smoking cessation contributed to the lay health advisors' confidence and efficiency in providing assistance and community referrals [11]. Another study found that increased involvement within one's community improved networking abilities, which resulted in the election of lay health advisors to sit on a board of directors within their local health agency [12]. This research is consistent with though differs from research demonstrating improvements in knowledge, attitudes, and behaviors following a CHW training [1,13]. The present study is the first, to our knowledge, that focuses on examining improvements among *promotoras* following the delivery of a healthy lifestyle and group exercise intervention.

Objectives

This study assessed the impact of *promotoras* delivering a healthy lifestyle intervention on their health behaviors and

health outcomes from baseline to six- and 12 months post-baseline. Outcome measures included measured systolic blood pressure, diastolic blood pressure, waist circumference, weight, and height. Self-reported measures included moderate-to-vigorous physical activity (MVPA), sugary beverage and water consumption, sleep duration, and depressive symptoms.

Methods

Study design

This is a non-experimental study in which *promotoras* were recruited and trained to deliver an 11-session healthy lifestyle intervention and twice weekly group exercise classes of moderate intensity over at least a year's period between October 1, 2009 and September 29, 2014. Assessments of the *promotoras* were taken at three time-points: prior to intervention implementation (i.e., baseline) and then six and 12 months later. This study examined the effects of delivering the intervention on the *promotoras* themselves. Institutional Review Board approval was obtained from San Diego State University and the University of California San Diego.

Setting

The *promotoras* were residents of four communities (San Ysidro, Chula Vista, Imperial Beach, and Bonita) in South San Diego County, California, along the US-Mexico Border. The South Bay region of San Diego County includes approximately 469,455 residents, 59.8% of whom are Hispanic. Over a quarter of the South San Diego region's population (27.7%) is between the ages of 25-44 years of age and 25.1% has a household income less than \$35,000. Seventy-seven percent of the population completed a high school education or higher [14]. This is different when compared to the 2010 US population statistics, where 16.3% identified as Latino or Hispanic, median age was 37 years, and 86% had completed a high school education or higher [15].

Intervention description

Familias Sanas y Activas (FSA) II was the core research project of the San Diego Prevention Research Center during its second funding cycle from the Centers for Disease Control and Prevention [2]. In the first cycle, FSA I, the volunteer CHW model was used to deliver a PA intervention to the residents of San Diego's South Bay community. The decision to involve volunteer CHWs was made in collaboration with the SDPRC's Community Engagement Committee (CEC), representatives of various South San Diego County agencies, to maximize program sustainability. FSA I was effective at improving community residents' health behaviors and health outcomes, including waist circumference and depressive symptoms [16]. In the second model, FSA II, we expanded the program to include 11 healthy lifestyle classes delivered in a group setting once a week usually immediately prior to a

group exercise class. This component was added to increase the motivation of participants to attend the group exercise classes by introducing topics that were more relevant to community members compared with PA. The classes were also designed to increase social cohesion by engendering feelings of working toward common goals. In addition, we contracted with three community agencies to hire a part time coordinator who worked between 12 and 24 hours per week to support the *promotoras* affiliated with their agency. Herein we describe the FSA II intervention.

Promotora screening and selection

Recruitment of *promotoras* was conducted via community networks, word of mouth, and flyers. Interested individuals filled out an application and were interviewed by a Site Coordinator and the SDPRC Intervention Coordinator. *Promotoras* were selected based on a set of criteria identified by the SDPRC investigators, staff and partners: be between 18-55 years of age; physically able to deliver group exercise classes (see details below); required to live in San Diego County including Bonita, Chula Vista, Imperial Beach, or San Ysidro; have bilingual (Spanish/English) or monolingual (Spanish) skills; and intend to remain in the study area for the next 12 months. The interview also assessed the potential *promotoras'* own experience with exercise and their motivation for wanting to lead healthy lifestyle and group exercise classes, as well as their experience working in the community, dealing with conflict, and leading communities in a change process. To ensure that they were physically able to lead the group exercise classes, all *promotoras* were screened using the Physical Activity Readiness Questionnaire (PAR-Q; 17). The PAR-Q is used to identify those who have pre-existing conditions or symptoms that may increase their risk for injury while engaging in PA. If a *promotora* answered yes to any of the PAR-Q questions, she was given a Physical Activity Readiness Medical Examination (PARMed-X) to secure permission from her doctor to participate. If the form was not signed, the *promotora* was not allowed to participate. The PARMed-X is a PA-specific checklist used by a physician with patients who have had positive responses to the (PAR-Q) [17]. All protocols were enforced to protect the *promotoras*. During the interview, *promotoras* were assigned a score for each of the 13 questions from 0 to 3, 0 indicating not qualified to 3 indicating superior skills and knowledge. Final scores were derived by averaging the scores assigned by the Site Coordinator and the Intervention Coordinator. Selection of *promotoras* was based on final scores, eligibility criteria and connection with the coordinator and site coordinator. Prior to commencement of training, *promotoras* were consented and asked to sign a contract. As a part of the contract, *promotoras* agreed to attend the initial program training, booster training sessions, and meetings, have good communication with her site coordinator, keep up-to-date records of participant attendance, and make safety a priority by becoming certified in CPR/First Aid through the American Red Cross. In addition, they had to agree to deliver the 11

healthy lifestyle classes twice with 10-20 participants each and provide exercise classes twice a week for 12 months.

Promotor training

A curriculum was developed for the *promotoras* to assist in their delivering 11 healthy lifestyle classes on topics that included: self-esteem, PA, healthy eating, sleep, communication and relationships, emotional health, weight control, disaster preparedness, advocacy, and depression. *Promotoras* received 13 three-hour theory-based training sessions (39 hours) and three 3-hour exercise training sessions (9 hours). As part of the healthy lifestyle training, the *promotoras* were taught how to elicit health behavior change by supporting participants to set SMART goals, identify potential barriers and solutions to those barriers. Each session started with a review of the previous week's goals, followed by a discussion and reflection of the content for that week's session, setting of new weekly goals for the *promotora* and her family, and an assessment of the potential barriers and their solutions.

As a part of the exercise training, *promotoras* were taught how to design, choreograph, choose music, and appropriate exercises or dances steps for each part of an exercise routine. Additional group exercise training topics such as cueing and other instructional techniques were added as a result of our experience in FSA I (AyalaSDPRC). Monthly booster dance trainings of approximately one hour each were provided free of charge that included: Zumba, Bollywood, Calypso, Bachata, Salsa, Belly Dancing, Peruvian full body methods, and a session that addressed involving children in exercise. Additionally, most *promotoras* obtained a Zumba certification prior to instructing exercise classes.

Once *promotoras* completed the trainings, they took a post-training test to assess knowledge and skills acquired. *Promotoras* were required to obtain at least an 80% on the written test before beginning classes. If they did not pass, they were asked to study the materials again and re-take the test. In addition, they were assessed on their readiness to deliver the intervention by implementing one session of the healthy lifestyle curriculum and choreographing and instructing one exercise routine with the other *promotoras* serving as their class participants. *Promotoras* were provided with qualitative feedback both verbally and on paper about the session by the site coordinator and intervention coordinator, including strengths and areas for improvement. Finally, *promotoras* were required to be CPR-certified before beginning classes.

Once approved for intervention delivery, intervention staff began working with the *promotoras* to identify possible exercise class locations. Locations were identified based on proximity to the *promotora*, hours of availability, and required to be non-carpeted to prevent knee injuries. Preferred hours were 8 am-10 am or 6 pm-8 pm. Schools and recreation center locations were preferred. Once a location was identified, intervention staff, *promotoras* and Site Coordinators set a start date and began promoting the classes. Due to challenges in identifying locations that matched the *promotora's*

preferences and availability, some *promotoras* did not begin classes for six months post training.

Promotora incentives

A budget of \$500 was encumbered for each *promotora* that met funder guidelines. *Promotoras* were told they had \$275 to spend on trainings or conferences related to exercise or healthy living. Seventy-five dollars was set aside for CPR certification. The remaining \$150 was used as part of a point system to increase engagement and participation of the *promotoras* in study-related activities. More specifically, those who participated in additional activities outside of the two class minimum per week accrued points that were used to purchase personal items such as exercise clothing, sneakers, music, and exercise DVDs. Additional activities included community events such as health fairs, school and community fairs, etc., to help promote their classes and assist in recruiting participants for the research study. *Promotoras* also received points for attending SDPRC meetings, supporting other *promotoras*, and attending trainings. Each point was valued at \$1.00. Points had to be spent by the end of each program year. In addition, *promotoras* who taught at least two classes per week received a \$35 gas card per month; *promotoras* who taught one received a gas card of \$17.50.

Promotora support

Promotoras met three times during each quarter of the program year. The first month of the quarter was an hour long individual meeting with her site coordinator to review her plan, review progress towards previous goals, and set new goals. The second month of the quarter involved a group meeting of approximately 2 hours with the other *promotoras* supervised by the same site coordinator (i.e., agency-specific), and the third month involved all of the FSA *promotoras* meeting together as a group for approximately two and a half hours. Given evidence that volunteer satisfaction is driven as much by achieving professional development goals as it is by providing support to other [18], each *promotora* worked with her site coordinator to develop a personal development plan by identifying trainings, classes, conferences and other capacity building activities that fit with the *promotora's* personal development plan. Monthly three hour-long exercise booster trainings were organized for the *promotoras* at a local recreation center on Saturdays. The site coordinators continuously shared opportunities for trainings, workshops, and community events to build the *promotoras'* capacity.

Evaluation procedures

Following receipt of informed consent from the *promotora*, baseline measurements were taken including: systolic and diastolic blood pressure, waist circumference, weight, and height. In addition, an interviewer-administered survey was completed in the language of the *promotora's* choice and involving an evaluation assistant who did not interact with the *promotoras* in their intervention activities.

These same procedures were repeated at six- and 12-months post-baseline.

Measured variables

Research assistants measured the *promotoras*' blood pressure with an Omron (Bannockburn, IL) automatic blood pressure monitor with ComFit cuff using National Health and Nutrition and Examination Survey (NHANES) Anthropometry Procedures Manual [19]. Waist circumference was measured in cm with a non-stretch measurement tape using NHANES protocols [19]. Research assistants were instructed to collect two waist circumference measurements and repeated the process until the two measurements had a difference of 2.0 cm from one another and then averaged the two measurements. Using the 2009 NHANES protocols, weight measurements were obtained by collecting a minimum of three assessments that did not differ by 0.5 kilograms from one another, and 1.0 cm used to measure height collected in the same manner [19]. Body Mass Index (BMI) was calculated using weight in kilograms and height in meters square.

Self-reported variables

Self-reported PA was obtained utilizing the Global Physical Activity Questionnaire [20]. This questionnaire obtains information on the *promotoras*' work/household, leisure-time, and transportation PA. For this study, MET-minutes of MVPA was calculated for each *promotora* with higher scores representing more time spent engaging in MVPA [16]. Self-reported sugary beverage and water consumption were measured based on the number of eight ounce glasses consumed, ranging from 1 glass per week or less to 4+ glasses per day. Servings were recoded into daily consumption, with higher scores representing more daily servings of sugary beverages and water consumed. Sleep duration was obtained by asking the *promotoras* to report usual bedtime and wake time on an average weekday and weekend, and computing the total hours and minutes of sleep on an average evening. The 10 item Center for Epidemiological Studies Short Depression Scale (CESD-10) was used to assess *promotoras*' depressive symptomology in the previous week. These questions asked about recent feelings of guilt, insignificance, and helplessness; loss of appetite, problems sleeping, and overall mood [21]. A higher score represented more frequent negative or depressed feelings and/or emotions.

Demographic questions were based on the 2005 Behavioral Risk Factor Surveillance System survey [22] and included: age, race/ethnicity, marital status, and employment status. Marital status was dichotomized into 1=married (married or living as married) and 0=not married (divorced, widowed, separated, or never been married). Employment status was dichotomized as 1=employed for wages (including self-employed) versus 0=unemployed (including homemaker, student, retired, unable to work). Household income was collected using ranges and then the midpoint of these ranges

was used to determine whether the household lived below the 2010 Federal Poverty threshold based on the income and household size. Education level completed was dichotomized as 1=completed high school (preparatory school in Mexico) or more versus 0=less than a high school education in the U.S. or in Mexico.

Data analyses

Descriptive statistics (e.g., means, frequencies) were used to characterize the *promotoras* and their involvement in the intervention. Repeated measures ANOVAs compared the changes in measured and self-reported outcomes from baseline to six- and 12-months post-baseline. Mauchly's Test of Sphericity was used to test violation of the assumption of homogeneity of covariance. If the test was not violated, sphericity was assumed. If the test was violated, significance would be smaller than 0.05 and we followed the Greenhouse-Geisser procedure to correct for violation of sphericity in the repeated measures ANOVA.

Results

Recruitment of *promotoras*

After meeting the new study inclusion criteria, six *promotoras* from the previous funding cycle were selected for the present study. From among 29 new individuals interviewed to become a *promotora*, nine were not selected to participate for the following reasons: two were ineligible due to age and residency outside of the South San Diego County area; one did not complete the interview process; one would not commit to conducting the group exercise classes twice a week; and five were among the lowest scores of all of the *promotoras* interviewed and were not selected due to the number of positions needing to be filled. The 26 *promotoras* were consented and completed the baseline assessment protocol. Ultimately 20 completed all trainings and evaluation protocols, and delivered at least one class during the 12 month period. These 20 *promotoras* compared with the six *promotoras* who did not complete the training or did not teach exercise classes within the first year, were significantly more likely to be married, but did not differ on employment status, education level, or poverty level.

The 20 *promotoras* were Latina women between 18-69 years of age ($M=39.8$, $SD=8.4$) who reported that they were either bilingual or monolingual Spanish-speakers. The majority of *promotoras* were married (85%). Three-fourths (75%) of the *promotoras* had at least a high school education and 68% had an annual household income below the Federal Poverty Level. Half of the *promotoras* considered themselves homemakers (50%; Table 1).

Promotor participation

Promotora participation is shown in Table 2. Although *promotoras* committed themselves to one year of volunteering

upon study entry, the average length of time that *promotoras* remained in the program was 3.63 years (SD=1.72).

Characteristics	Mean (SD) or n (%)
Age in years	39.8 (8.4)
Female	20 (100.0)
Married or living as married	17 (85.0)
High school education or more	15 (75.0)
Below the federal poverty level ¹	13 (68.4)
Homemaker	10 (50.0)
¹ Income not reported by 1 <i>promotora</i>	

Table 1: Demographic characteristics of *promotoras* leading the *Familias Sanas y Activas II* intervention, South San Diego County, CA (N=20).

Between baseline and 12 months, *promotoras* participated in an average of 31 hours (SD=7.8) of exercise training and 13 hours (SD=15.2) of non-exercise training (including GED classes, computer classes, health trainings, etc.). Outside of the trainings, *promotoras* were asked to participate in FSA meetings with their site coordinators and other *promotoras*. On average during this 12 month period, *promotoras* participated in 29 hours (SD=18.2) of FSA-related activities. During their first year, most *promotoras* taught two classes per week with the number of classes ranging from two to five per week. *Promotoras* attended on average of five events each during this period. Some *promotoras* spent an additional 10 hours covering other *promotoras*' classes in their absence. Each *promotora* used nearly the entire \$500 stipend provided for capacity building activities and trainings in their first year (Table 2).

	Baseline M (SD)	6 months M (SD)	0-6 p-value	12 months M (SD)	6-12 p-value
Measured variables					
Systolic blood pressure, mm Hg	129.4 (18.2)	120.95 (16.5)	0.04	123.8 (15.8)	0.004
Diastolic blood pressure, mm Hg	79.7 (10.1)	69.9 (8.4)	0.001	76.0 (10.6)	0.01
Waist circumference, cm	91.4 (10.6)	90.1 (10.2)	n.s.	91.1 (10.3)	n.s.
Body mass index, kg/m ²	26.6 (4.8)	26.1 (4.9)	0.005	26.5 (4.7)	n.s.
Self-reported variables					
Total MET minutes of MVPA per week	7878 (7043)	5590 (6074)	n.s.	3783 (2757)	n.s.
Daily servings of sugary beverages (inc non-diet soda)	0.6 (0.6)	0.6 (1.1)	n.s.	0.6 (1.1)	n.s.
Daily servings of water	2.8 (1.5)	3.5 (0.9)	0.08	3.9 (0.7)	n.s.
Hours of sleep per night	7.8 (0.9)	7.8 (0.8)	n.s.	7.9 (1.9)	n.s.
Depressive symptoms*	2.8 (2.0)	3.5 (2.8)	n.s.	1.9 (2.2)	0.02
*Lower scores indicate fewer depressive symptoms					

Table 3: Intervention effects on measured and self-reported outcomes among *promotoras* delivering a healthy lifestyle intervention, South San Diego County, CA (N=20).

No significant changes were noted for minutes of self-reported MVPA, servings of sugary beverages, and hours of

Hours	Mean (SD) or Median (range)
Hours dedicated to exercise training	30.9(7.8)
Hours dedicated to non-exercise training	13.1(15.2)
Average number of exercise classes taught per week	2(2-5)
Hours dedicated to all FSA activities	28.7(18.2)
Number of community events attended	5.5(3.8)
Hours provided additional program support	10(50.0)
Average amount of stipend spent (of \$500)	\$492.0(164.6)

Table 2: *Promotora* participation between baseline and 12 months (N=20).

Intervention effects on *promotoras*' measured and self-reported outcomes

Significant decreases were observed in selected health outcomes from baseline to six months: systolic blood pressure reduced from 129.4 mm Hg to 120.95 mm Hg (p=0.04), diastolic blood pressure reduced from 79.7 mm Hg to 69.9 mm Hg (p<0.001), and body mass index from 26.6 kg/m² to 26.1 kg/m² (p=0.005). Changes from six to 12 months were not significant for BMI, but increases were observed for systolic and diastolic blood pressure (p=0.004 and p=0.01, respectively). Changes in waist circumference were not significant at any time point (Table 3).

sleep. The mean number of MET-minutes spent in MVPA decreased, from baseline (7878 MET-minutes) to six months

(5590 MET-minutes) and to 12 months (3783 MET-minutes). There was a trend to suggest that mean daily servings of water increased from baseline (2.8) to six months (3.5; $p=0.08$), with continued increases at 12 months (3.9) though not statistically significant. Mean week-day hours of sleep remained the same from baseline (7.8 hrs) to 6 months (7.8 hrs), and increased from six months to 12 months (7.9 hrs). The presence of depressive symptoms increased from baseline (2.8) to (3.5) at six months, but significantly decreased from six months to 12 months (1.9; $p=0.02$).

Discussion

The purpose of this study was to assess the impact of *promotoras* delivering a healthy lifestyle and group exercise intervention on their own health behaviors and health outcomes over a 12-months period. This study is unique in its focus on the *promotoras* delivering the intervention versus the community receiving the intervention. This is the first study to our knowledge primarily focusing on the health benefits of delivering an intervention and examining the impacts of *promotor* training and intervention delivery on their health behaviors and health status.

Statistically significant decreases from baseline to six months were found for three of the measured variables: systolic blood pressure, diastolic blood pressure, and body mass index. Overall, changes in the mean values for self-reported measures were not statistically significant although some indicated positive changes associated with the *promotoras*' participation in the *Familias Sanas y Activas* study, such as increased consumption of water at both six months. In addition, decreases in mean depressive symptoms at 12 months were significant. Also, while not statistically significant, mean waist circumference was observed to decrease from baseline to six months.

Some limitations were identified including the small sample size and the measurement of PA using self-report. This study's sample size limits our ability to detect statistical significance within the study and limits the generalizability of study findings. Another limitation of this study is that PA outcomes were measured through self-report. Given that *promotoras* were aware of the purpose of the intervention and the importance of PA, self-reports may have been biased. Consequently, the intervention may have had a more positive and significant effect in terms of increasing the PA engagement of *promotoras* than is indicated by the results.

Conclusion

While the present study findings varied, they do suggest positive effects associated with the delivery of a PA intervention. Future interventions involving *promotoras* should focus on better understanding the effects of intervention delivery on *promotoras*' health and whether these changes also impact outcomes in participants who may be viewed *promotoras* as role models.

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