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Comparison and Effectiveness of Behavioral Cardiovascular Interventions in High Risk Latinos

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Keywords: behavioral interventions; Latino; Hispanic; Cardiac; CVD; Heart Disease; cardiovascular disease; Intervention

Abstract:

Background:

Cardiovascular disease (CVD) is the leading cause of death among Latinos. The use of promotoras, in conjunction with interpersonal and printed nutrition and exercise information can aid in healthy changes in Spanish speaking communities.[8] Designing and delivering culturally appropriate interventions are critical for behavioral and nutritional success of Latinos.

Objective:

This literature review will provide information of the evidence-based behavioral intervention strategies developed for and tested with Latinos in order to inform clinicians of options for supporting improved cardiovascular outcomes in high risk Latinos.

Methods:

A literature search was performed in Pubmed that generated 110 RCT initial studies, four of which met the inclusion criteria after assessment for eligibility based on the following criteria: behavioral lifestyle intervention study, more than 1 CVD risk factor, biological outcomes reported (BP, Cholesterol, LDL, HDL, BMI and others), greater than 18 years old, and sample with 30% greater Hispanics.

Results:

All the studies used promotoras to deliver culturally appropriate interventions that combined nutritional and physical activity classes, walking routes and/or support groups. Hayashi et al showed statistically significant intervention effects, for reduce systolic blood pressure, 10-year CHD Risk score and an increase in physical activity ($p<0.05$). The reduction was by 6 points, making nutritional and physical counseling clinically relevant to potential reduction in blood pressure and improving CVD in Latinos. Furthermore, Balcazar et al demonstrated a reduction in the intervention's cholesterol levels compared to the control group ($p<0.05$). Most studies demonstrated no significant changes in LDL, HDL or BMI.

Conclusion:

This literature review provides initial evidence that culturally appropriate interventions such as using promotoras, bilingual materials/classes, appropriate cultural diet, exercise modifications and establishing a social support network provides potentially efficacious strategies for cardiovascular improvement in high risk Latinas.

Introduction/Background

Cardiovascular disease is the leading cause of death among Latinos.[1,2] According to statistics alone, Latinos with chronic diseases have better outcomes compared to other racial/ethnic minority groups who have consistently worse health outcomes compared to Caucasians even when controlling for socioeconomic status (SES).[3,4] This seemingly counter-intuitive trend can be explained by the "Hispanic Paradox" theory,[2,5] which describes possible explanations for the lower morbidity and mortality of chronic diseases among Hispanics, including cardiovascular disease, compared to other racial and ethnic groups despite Latinos lower SES. The "Hispanic Paradox" is attributed to the better outcomes in Latino health to various factors: 1) recent healthy immigrants to the U.S., 2) lower reporting of illness to government agencies, or 3) when ill, Latinos decide to return to their country of origin.[2,5] A combination of these and other factors likely contribute to the better statistical indicators of the health of Latinos in the U.S.[2,5]

Despite this "Hispanic Paradox," the lack of healthcare coverage, low SES and language barriers of Latinos potentiate a future cardiovascular crisis.[2] Medical and behavioral interventions, with and without the assistance of promotoras (community health workers), have been utilized to improve the outcomes of Latinos with cardiovascular disease.[6,7] Promotoras are key components of many behavioral interventions with Latinos as they share the community's background and language, and understand the needs of the community.[6,7] Designing and delivering culturally appropriate interventions are critical for behavioral and nutritional success of Latinos.[4]

Most behavioral interventions target people's awareness of risk factors and their behaviors to improve exercise and eating habits. The use of promotoras, in conjunction with interpersonal and printed nutrition and exercise information can aid in healthy changes in Spanish speaking communities.[8,9] Research has shown that healthy eating and exercising produces healthy outcomes in people, especially in those with chronic diseases.[9,10] This literature review will provide information on the evidence-base of behavioral intervention strategies developed for and tested with Latinos in order to inform physician's and other clinician's options for supporting improved cardiovascular outcomes in high risk Latinos.

Methods

A literature search was performed in Pubmed using a combination of the following keywords: "Latino/Hispanic", "Cardiac/Heart Disease/Cardiovascular Disease", "Intervention." Only randomized clinical trials (RCTs) were selected. Articles published up to 2014 were included. Inclusion criteria included papers with; 1) Lifestyle behavioral interventions, 2) Patients with no coronary heart disease but with at least 1 cardiovascular disease factor, 3) adults age 18 year and older, 4) more than 30% Hispanic sample, and 5) biological outcomes reported. The outcomes reported were blood pressure, total cholesterol, low density lipoprotein (LDL), high density lipoprotein (HDL), body mass index (BMI) and other relevant factors. The inclusion of these factors was critical for proper comparison of high risk Latinos for cardiovascular disease in behavioral interventions. The following were the cardiovascular disease (CVD) risk factors considered: Systolic blood pressure (SBP) between 130 and 200 mmHg; Diastolic blood pressure (DBP) between 80 and 105 mmHg; Total cholesterol > 180 mg/dL; LDL

cholesterol > 120 mg/dL; HDL Cholesterol < 40 mg/dL; Triglycerides > 150 mg/dL; HbA1c between 6.0 and 11.5%; Fasting plasma glucose between 95 and 400 mg/dL; or diagnosis of Type 2 diabetes. This literature search generated 110 initial studies, 4 of which met the inclusion criteria after assessment for eligibility based on the following criteria: behavioral lifestyle intervention study, more than 1 CVD risk factor, biological outcomes reported, and sample with 30% greater Hispanics.

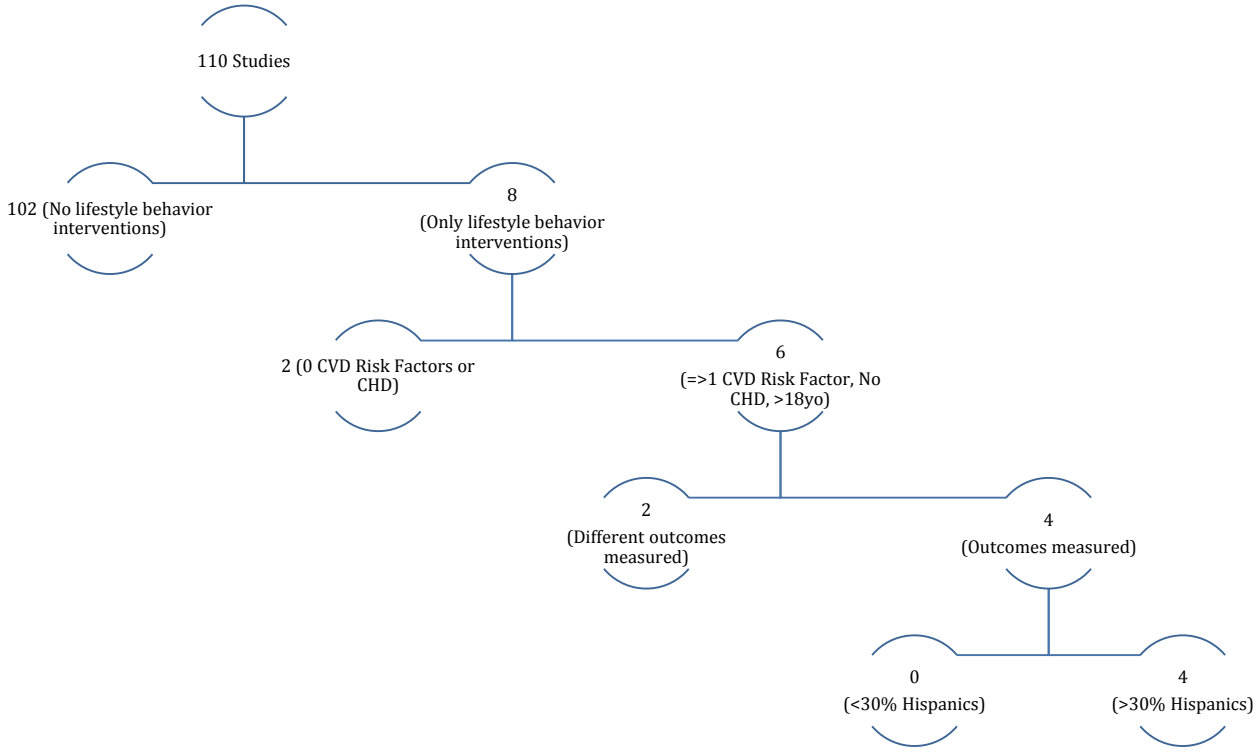

Figure 1.

Results

The four studies that met the eligibility inclusion criteria were all randomized controlled trials. The studies had participants of variable ages (18-75yo) and all had 100% female participants except for Balcazar et al, which had 70% female participants.[1,2,3,4] Hayashi et al, Balcazar et al, and Keller et al used promotoras as allied community health workers to promote and lead the behavioral interventions. Most behavioral interventions focused on educating patients on nutrition, physical activity and good habits, but also developed physical activity plans for patients (Table 1).

Table 1. Study design characteristics

Author, Date, Country	Study Type	% Hispanics	Age	Gender	Other Characteristics	N control/ intervention	Intervention (n)	Duration	Follow Up	Promotoras	Participation Rates
Hayashi, 2010, USA	RCT	100%	40-65	100% - Female	Low income, underinsured	436/433 -	Promotoras delivered 3, 30 minute one-to-one sessions of nutritional and physical activity counseling at 1, 2 and 6 months using the "New Leaf curriculum" at doctors visits.	6 months	12 months	Yes	C: 541→436 (81%) I: 552→433 (78%)
Balcazar, 2010, USA	RCT	90%	30-75	70% - Female	Residing in El Paso, Texas	136/192	Promotoras delivered 2 hrs/week x 8 weeks "Su Corazon, Su Vida" sessions to small groups.	2 months	2 months	Yes	C: 136→126 (93%) I: 192→158 (82%)
Keller, 2008, USA	RCT	100%	45-75	100% - Female	BMI>30 and postmenopausal	G1: 4 G2: 4	Group1: Walking 30 minutes for 3 days/week x 9 months around the neighborhood. Group 2: Walked 30 minutes 5 days/week x 9 months.	9 months	---	Yes	G1: 11→4 (36%) G2: 7→4 (57%)
Poston, 2001, USA	RCT	100%	18-65	100% - Female	Overweight, non-diabetic	135/102	Counseling instructors in a clinical setting assigned participants to 30 minutes of brisk walking 5x/wk.	6 months	6 months	Counselor	C: 185→ 135 (73%) I: 194→ 102 (53%)

Hayashi et al focused on low-income and underinsured patients. Promotoras delivered three 30 minutes one-to-one sessions of nutritional and physical activity counseling at 1-, 2-, and 6-months using the "New Leaf" curriculum at doctors visits.[1] The intervention lasted for 6 months and the participants were followed up after 12 months.[1] Women in the intervention group (n=433) had better eating habits and increased physical activity than the control group (n=436) over time (Table 2). As table 2 illustrates, there was no improvement in cholesterol.[1] There were within group improvements in HDL but no between group improvements.[1] The intervention group also had a reduction in BMI over time ($p<0.05$) but between group differences were not significant. However, within both control and intervention groups there was a reduced systolic blood pressure, and there was also a statistically significant difference in reductions between groups (I: Δ-5.9 vs. C:

Δ-3.7, p=0.038). Furthermore, there was a statistically significant improvement in the 10 year coronary heart disease (CHD) Risk Score in the intervention group compared to the control group (I: Δ-0.009 vs. C: Δ-0.005, p=0.05).

Balcazar et al focused on Latinos in El Paso, Texas, and tested the "Su Corazon, Su Vida" curriculum delivered by promotoras in one 2-hour session per week for 8 weeks.[2] Follow up assessment was done 2 months after. The intervention group (n=192) was given 8 health classes while the control group (n=136) was given only basic educational materials (i.e. pamphlets) at baseline. Both intervention and control groups had improved diastolic blood pressures (see Table 2). The difference between both group's blood pressure was statistically, but not clinically, significant. Participants in the intervention group had improved dietary and exercise habits (i.e. better weight control practices). Also, total cholesterol was 3% lower in the intervention group and LDL cholesterol levels were 5% lower in the interventional group at follow-up.

Table 2. Results for within and between groups[1]

Author, Date, Country	ΔBP (mmHg)	ΔCholesterol (mg/dL)	ΔLDL (mg/dL)	ΔHDL (mg/dL)	ΔBMI (kg/m2)	Other outcomes
Hayashi, 2010, USA	Diastolic C: 77→74 I: 77→73 Systolic C:125→121*[2] I:125→119*	C: 198→199 I: 198→200	---	C: 45→ 467 I: 45→ 48	C: 32→32 I: 32→31	10 year CHD Risk Score: C: 0.071→0.066 (-0.005)* I: 0.069→0.060 (-0.009)* Improvement in eating habits C: 33.1%** I: 58.4%** Improvement in physical activity C: 42.3%** I: 57.3%**
Balcazar, 2010, USA	Distolic C: 141→133** I: 137→132** Systolic C: 89→78** I: 80→ 78**	C: 191→191 I: 198→192	C: 120→120 I: 128→121	C: 43→42 I: 41→41	C: 31.1→31.2 I: 31.7→31.6	Framingham's Score C: 14.3→9.3 I: 15.5→10.8 Triglyceride level (mg/dL) C: 139.1→139.2 I: 134.7→140.9
Keller, 2008, USA[3]	---	I1: 185→202 I2: 189→190	I1: 109→119 I2:109→98	I1: 48→55 I2:49→57	I1: 37→ 30 I2:32→30	Triglycerides (mg/dL) I1: 148→136 I2: 152→171
Poston, 2001, USA[2]	Diastolic C: 73→ 69 **I: 73→71** Systolic C:118→116 I: 116→117	C: 202→193 I:199→188	---	---	C: 34→34 I: 34→33	Triglycerides (mg/dL) C: 129→149 I: 129→140 Activity Levels (kcal/kg/day) C: 36→37 I: 35→36 Activity (Hours/week) C: 11→13 I: 8→11

[1] The data presented from these 4 papers are the changes from baseline to the end of the study.

[2] Between Group comparisons: **p<0.05, **p<0.01*

[3] Keller et al and Poston et al, no p values were given, but SD were given

Keller et al focused on postmenopausal Latina women with a BMI greater than 30. The main behavioral method used was walking groups.[3]. Promotoras developed walking routes for "walking groups" who had been assigned to the same group. Group 1 (n=4) had to walk 30 minutes for 3 days per week for 9 months while group 2 (n=4) walked 30 minutes 5 days per week for 9 months. There were absolute increases in blood pressure for both groups over time. There was a decrease in LDL levels for the 5-day per week group over the study period (see Table 2). There were also absolute reductions in BMI for both groups, but no in between differences over the 9 months.

Poston et al focused on Latina women who were overweight and non-diabetic. The intervention was led by counseling instructors in a clinical setting and was based on social cognitive theory by encouraging participants to exercise more by managing personal and social pressures, including social reinforcement, in hopes of improving cardiovascular risk factors.[4] Clinical instructors assisted participants in finding ways to increase physical activity in their daily routine (i.e. taking stairs). The control group participants (n=135) were given basic educational materials. Each participant in the intervention group (n=102) was assigned to 30 minutes of brisk walking 5 times a week for 6 months. Blood pressure, cholesterol, LDL, HDL, BMI and Triglycerides levels after 6 months were not statistically significant for differences between the control and intervention groups over time.

Discussion:

Considering the applicability of using these behavioral interventions to reduce cardiovascular disease in high risk Latinos we must consider both statistical and clinical significance. Hayashi et al showed that the use of promotoras delivering competent and culturally appropriate behavioral interventions may reduce blood pressure and the 10-year CHD risk in high risk Latinas.[1] Balcazar et al. showed that the difference between the intervention and control group blood pressure was statistically significant, however, they were not clinically significant (i.e., improvements were very small). Keller et al found no overall improvements and no p-values for significance tests were given due to the small sample size of n=8 total, therefore, we cannot conclude much of the results.[3] The Latina "buddy" walking system led by a promotora may still be a viable strategy to reduce cardiovascular risk in high risk Latinos/a[3], but more research with a larger sample size is needed. The study conducted by Poston et al., found that the intervention did not increase physical activity or improve CVD risk factors, although contamination of the control group may partially account for this outcome.[4] Contamination resulted because randomization was done by street blocks rather than individually. The study was not completely randomized as individuals were randomized from pre-established social groups (i.e. neighbors, coworkers and family members), which can also account for the discrepancy in outcomes.[4]

The differences in results can be appreciated by looking at the intensity and duration of the interventions. Hayashi et al used 3, 30 minute one-to-one sessions of nutritional and physical activity counseling at 1, 2 and 6 months using the "New Leaf curriculum" and demonstrated evidence for efficacy of the intervention.[1] Balcazar et al delivered the "Su Corazon, Su Vida" sessions with promotoras to small groups for 2 hours per week for 8 weeks and found statistically, but not clinically, significant group differences. Keller et

al used promotoras to organize two intervention-walking groups, one that walked 30 minutes for 3 days and the second one 30 minutes for 5 days for 9 months, but the small sample of n=8 limited statistical power for observing group differences, in limitations due to an active intervention delivered to the comparison group[3]. Poston et al. used counseling instructions to assign participants to 30 minutes of brisk walking 5 times per week for 6 months, but did not find significant group differences due to a combination of external intervention contamination and imperfect randomization procedures.[4]

Across all the studies, only Hayashi et al had statistically significant intervention effects, for reduce systolic blood pressure. The reduction was by 6 points, making it clinically relevant to potential reduction in blood pressure in Latinos. Hayashi et al also showed a significant reduction in the 10-year CHD Risk score in the interventional group compared to the control group. Balcazar et al showed a statistical significant reduction in diastolic blood pressure but not a clinical reduction. However, Balcazar demonstrated a reduction in the intervention's cholesterol levels compared to the control group. Most studies demonstrated no significant reduction in LDL, increase in HDL levels or changes in BMI between the control and intervention groups.

Overall, there are major limitations to these studies because most significant reductions were observed within groups but not between control and intervention groups. This was due to various factors such as the low sample sizes of some studies such as Keller et al. Furthermore, the short term follow up, such as Balcazar et al's 2 months, could have contributed to nonsignificant results between the control and interventional groups. Thus, these and other factors limited the impact of the studies.

Conclusion

This literature review provides initial evidence that culturally appropriate interventions such as using promotoras, bilingual materials/classes, appropriate cultural diet, exercise modifications and establishing a social support network provides potentially efficacious strategies for cardiovascular improvement in high risk Latinos. Further research must still be conducted to clarify the effectiveness of behavioral interventions in high risk Latinos/a. Overall, longer follow-up periods and additional controlled intervention trials need to be conducted to ascertain the optimal intervention strategies, cost-effectiveness, participant/system burden and health effects of behavioral and lifestyle interventions in high risk Latinos.

References

1. Hayashi T, et al. Lifestyle intervention, behavioral changes, and improvement in cardiovascular risk profiles in the California WISEWOMAN project. J Womens Health (Larchmt). 2010 Jun;19(6):1129-38. doi: 10.1089/jwh.2009.1631.

2. Balcázar HG[1], et al. A promotores de salud intervention to reduce cardiovascular disease risk in a high-risk Hispanic border population, 2005-2008. Prev Chronic Dis. 2010 Mar;7(2):A28. Epub 2010 Feb 15.

3. Keller CS[1], Cantue A. Camina por Salud: walking in Mexican-American women. Appl Nurs Res. 2008 May;21(2):110-3. doi: 10.1016/j.apnr.2006.12.003.

4. Poston WS 2nd. Evaluation of a culturally appropriate intervention to increase physical activity. Am J. Health Behav. 2001. July-Aug: 25(4): 396-406

5. Sorlie P, Backlund E, Johnson N, Rogot E. Mortality by Hispanic status in the United States. JAMA 1993;270(20):2464-8.

6. Brownstein J, et al. Community health workers as interventionists in the prevention and control of heart disease and stroke. Am J Prev Med 2005;29(5 Suppl 1):128-33.

7. Eng E, Parker E, Harlan C. Lay health advisor intervention strategies: a continuum from natural helping to paraprofessional helping. Health Educ Behav 1997;24(4):413-7.

8. Elder J, et al. Interpersonal and print nutrition communication for a Spanish-dominant Latino population: Secretos de la Buena Vida. Health Psychol 2005;24(1):49-57.

9. Staten L, et al. Pasos Adelante: the effectiveness of a community-based chronic disease prevention program. Prev Chronic Dis 2005;2(1). http://www.cdc.gov/pcd/issues/2005/jan/04_0075.htm. Accessed November 16, 2014.

10. Medina A, et al. Promotores de salud: educating Hispanic communities on heart-healthy living. Am J Health Educ 2007;38(4):194-202.