

A Health Literacy-Focused Intervention for Latinos with Hypertension

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ABSTRACT

Latinos in the United States are experiencing increasing incidences of uncontrolled high blood pressure (HBP). Health literacy is an important determinant of adequate HBP self-management, yet no community-based intervention has effectively addressed health literacy in the management of HBP in the target community. The purpose of this study was to test the acceptability and preliminary efficacy of a health literacy-focused HBP intervention in Spanish-speaking Latinos with uncontrolled HBP. Using a one-group pre- and post-test study design, the study intervention was delivered to Spanish-speaking Latinos in Baltimore, MD, who had uncontrolled HBP. The intervention consisted of four weekly group sessions for health literacy training combined with disease knowledge education in HBP management, followed by phone counseling and text messages for 3 months. Seventeen participants received the study intervention. Eleven who completed the follow-up assessment at 16 weeks reported high satisfaction with the intervention. Participation in the intervention resulted in improved blood pressure, numeracy, and psychological outcomes. Our findings support health literacy education as a promising avenue in promoting HBP control among inner-city Spanish-speaking Latinos.

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High blood pressure (HBP) is among the most prevalent chronic conditions in the United States, affecting 1 of every 3 adults (Nwankwo, Yoon, Burt, & Gu, 2013). Approximately 40% of cardiovascular mortalities are attributable to HBP (Benjamin et al., 2017). Latinos experience a substantially higher prevalence of HBP-related complications (e.g., stroke) than their non-Hispanic White counterparts (Pabon-Nau, Cohe, Meigs, & Grant, 2010).

Health literacy is a key determinant of self-management of chronic diseases (Osborn, Cavanaugh, Wallston, & Rothman, 2010). Forty-one percent of Latino adults in the United States are below the basic health literacy level (Kutner, Greenberg, Jin, & Paulsen, 2003). Despite inadequate care and control of HBP, there are few programs in existence targeting Latinos that also address health literacy. We developed a health literacy-focused HBP intervention for Spanish-speaking Latinos—PLAN 4 Success-HBP (Prevention through Lifestyle intervention And Numeracy-HBP).

We hypothesized that participation in the PLAN 4 Success-HBP intervention would reduce blood pressure (BP) and improve health literacy and psychosocial outcomes.

METHODS

Design and Sample

A single-arm pre- and post-test design was used. Participants were recruited via BP screening at health fairs and local markets, word of mouth, and referrals from health clinics. Eligible participants were age 18 years or older, Spanish-speaking, had uncontrolled HBP (i.e., systolic BP [SBP] ≥ 140 mm Hg and/or diastolic BP [DBP] ≥ 90 mm Hg), and had access to a mobile phone. A total of 349 people were screened and 85 were referred for verification appointments. Thirty-one attended the appointments in which trained bilingual staff measured BP three times. The second and third BP readings were averaged to obtain the mean SBP and DBP. Nineteen eligible participants completed the baseline assessment but

two dropped out before the intervention began. Consequently, our intervention was delivered to 17 participants. Six discontinued before the follow-up assessments were done, yielding 11 in the final sample.

PLAN 4 Success-HBP

The PLAN 4 Success-HBP intervention was developed in partnership with hypertensive Spanish-speaking Latinos, health providers, and community health workers. Four focus groups with 18 community representatives were conducted to explore barriers to HBP care along with preferences for desired intervention components and outcomes. The study intervention, which was delivered in Spanish, consisted of four weekly education sessions followed by monthly phone counseling and optional text messaging. The education sessions were focused on health literacy skills training (e.g., HBP-related medical terminology, reading food and medication labels) and disease education. Monthly phone counseling offered an opportunity to revisit self-management skills taught in the group format. Those enrolled in the text messaging segment received a weekly text message inquiring about home-based BP and how many steps they recorded on their pedometers. Participants taking antihypertensive medication(s) received additional reminders.

Procedures

The study protocol was approved by the Johns Hopkins Institutional Review Board. Upon completion of baseline assessment, educational sessions were delivered to groups of 1 to 5 people at a community health center or at an ethnic church (median length = 1.25 hours). The participants

received a phone call within 1 to 2 weeks from the completion of education and monthly thereafter for 3 months. Weekly texts were also sent for 3 months. Data were collected at baseline and at 16 weeks from the start of the intervention by face-to-face interviews.

Measurement

All assessments were done in Spanish. We also collected data on retention, attendance at education sessions, success rates of phone counseling, and text message response rates. Acceptability was measured using a satisfaction survey.

Health literacy was measured by HBP-health literacy scale (HBP-HLS) (Kim, Song, Han, et al, 2012) and the Newest Vital Sign (Weiss, Mays, Martz, et al., 2005). HBP-HLS is a 30-item (correct/incorrect) reading test with evidence of reliability and validity. The Newest Vital Sign (4 items) measures numeracy based on some calculation of the nutritional information presented on a nutrition label.

HBP knowledge was measured by a 10-item knowledge test (Han et al., 2011). This scale has a reliability of 0.85.

We used self-care and self-efficacy scales (20 items each) of the HBP Self-Care Profile (Han, Lee, Commodore-Mensah, & Kim, 2014). Higher scores indicate higher self-care and self-efficacy with evidence of reliability and validity (Han et al., 2014).

We used a modified 8-item Medical Outcomes Study-Social Support Survey (mMOS-SS) (Moser, Stuck, Silliman, Ganz, & Clough-Gorr, 2012) to assess social support. mMOS-SS has evidence of reliability and validity (Moser et al., 2012).

Depression was assessed by the Patient Health Questionnaire-9 (Spitzer, Kroenke, Williams, & the Patient

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Health Questionnaire Primary Care Study Group, 1999). Evidence of reliability, validity, sensitivity, and specificity has been reported (Spitzer et al., 1999).

A short form (13 items) of the Patient Activation Measure (PAM-13) (Hibbard, Mahoney, Stockard, & Tusler, 2005) was used to measure how “activated” the person was in one’s management of HBP. PAM-13 has a reliability of 0.91 and evidence of validity.

We used psychological well-being (7 items) of the HBP Battery of Scales-Reduced Version (Nelsen, Himmelberger, Morrison, Berger, & Markson, 1999) to measure health-related quality of life. This scale has evidence of construct validity and a reliability of 0.70.

Analysis

Analysis was performed using data from the 11 participants who completed both the baseline and 16-week interviews. We used descriptive statistics to summarize study variables and also calculated effect sizes. Paired *t*-tests were used to calculate the common standard deviation for each continuous study variable.

RESULTS

Sample Characteristics

Participants were primarily middle-aged, female, and had a low level of formal education. Almost every participant was employed but had difficulty managing with their current income. Nearly every participant had difficulty with English and no health insurance. More than one-third had a primary care physician and a comorbid condition (Table 1).

Outcome Changes

The mean changes in SBP and DBP were decreases of 24.1 mm Hg and 11.3 mm Hg, respectively; 10 of 11 participants achieved BP control (<140/90 mm Hg) at 16 weeks (Table 2). For health literacy and psychosocial variables, the effect sizes ranged from 0.1 to 1.7 in absolute value. The number of participants taking HBP medication and with a primary physician both increased from baseline to 16 weeks (from 3 to 5 and 4 to 5, respectively).

Feasibility and Acceptability

We achieved a retention rate of 64.7%. Every participant chose to receive text messages. A total of 471 text messages were sent with 63.6% of participants responding to our text message at least once. There was no significant difference in the change in SBP between text responders (>50% of the time) and nonresponders (<50%), although text responders had a greater decrease in SBP (22.8 vs. 17.3 mm Hg). We ob-

TABLE 1
Sample Characteristics at Baseline
(N = 11)

Variable	Median (IQR) ^a or %
Age (years)	54.7 (38.9-62.2)
Female	63.6
< High school education	54.5
Employed (full- or part-time)	90.9
Difficult to manage with current household income	63.6
Proficiency in English	
Being able to take phone calls in English	36.4
Being able to read English newspapers	36.4
Being able to go to American hospitals without help from an interpreter	18.2
Fluent in spoken English	9.1
Insured (Medicaid)	9.1
Comorbidity ^b	45.5
Taking HBP medication	27.3
Have a primary care physician	36.4

Note. HBP = high blood pressure; IQR = interquartile range.
^aIQR (75th percentile minus 25th percentile). ^bComorbidities included high cholesterol (*n* = 2), diabetes (*n* = 1), arthritis (*n* = 1), thyroid dysfunction (*n* = 1).

served a significant difference in DBP change (*p* = .03), with text responders having an average reduction of 17 mm Hg in comparison to an increase in DBP (6.5 mm Hg) for nonresponders.

Every participant would recommend the intervention to others (overall satisfaction = 9.9 on a 10-point scale). Satisfaction ratings with the intervention delivery and utility were also high: educational materials presented in an engaging manner (mean = 3.9 ± 0.3); program ran smoothly (mean = 3.9 ± 0.3); staff responsiveness to questions and concerns (mean = 3.9 ± 0.3); program met expectation (mean = 3.8 ± 0.4), and would use knowledge and skills gained to manage HBP (mean = 3.8 ± 0.4), all scored on a scale of 1 to 4.

DISCUSSION

The study intervention was well received by a sample of Spanish-speaking Latinos with uncontrolled HBP. We had large effect sizes in association with BP, numeracy, HBP self-care, and depression. The sample had a high level of

TABLE 2
Outcomes at Baseline and 16-Week Follow-Up (N = 11)

Variable	Median (IQR) ^a		Mean Change (SD)	Effect Size ^b
	Baseline	16 Weeks		
Average SBP (mm Hg)	145 (131-151)	117 (110-127)	-24.1 (14.7)	-1.6
Average DBP (mm Hg)	88 (81-93)	78 (68-80)	-11.3 (10.8)	-1
HBP health literacy-reading	30 (29-30)	30 (29-30)	0.1 (1.5)	0.1
Health numeracy	2 (2-3)	4 (2-4)	1.2 (1.6)	0.8
HBP knowledge	5 (4-7)	6 (4-7)	0.4 (2.3)	0.2
HBP self-efficacy	75 (60-80)	74 (73-80)	3.8 (10.6)	0.4
HBP self-care	45 (39-52)	67 (60-71)	17.3 (10.1)	1.7
Social support	24 (18-33)	29 (24-36)	1.6 (8.9)	0.2
Depression	6 (3-10)	2 (0-6)	-3.4 (3.3)	-1
Patient activation	42 (30-45)	45 (39-52)	3.3 (15.1)	0.2
Quality of life	27 (23-30)	29 (27-32)	2.7 (4.5)	0.6

Note. DBP = diastolic blood pressure; HBP = high blood pressure; IQR = interquartile range; SBP = systolic blood pressure; SD = standard deviation.
^aIQR (75th percentile minus 25th percentile). ^bMean change from baseline to 16 weeks divided by the standard deviation of the mean paired difference.

HBP literacy-reading at baseline with a minimal change over time. This might have been a result of the Spanish language being phonetic. The phonetic structure violates the design basis of a reading test such as HBP-HLS, which assumes a correspondence between one's reading ability and comprehension (Nurss, Baker, Davis, Parker, & Williams, 1995). For a phonetic language-speaking population, reading comprehension via task-oriented test items may be a more adequate indicator of health literacy.

Other Latino HBP studies had retention rates ranging from 50.5% for a 9-month pharmacy-based intervention (Lai, 2007) to 65.4% for a 6-week education program (Rocha-Goldberg Mdel, et al., 2010) and 100% for a 9-week community health worker intervention (Balcazar, Byrd, Ortiz, Tondapu, & Chavez, 2009). More than one-third of our sample required further accommodation with education sessions because they worked multiple shifts or overtime; this, in turn, caused extra time and cost to the study team. Future interventions targeting Latinos should consider innovative strategies such as using technology to minimize time constraints. In particular, the significant difference in DBP between text messaging responders and nonresponders in the study, coupled with the ease of implementation and positive feedback from participants, warrants future trials with a focus on enhancing the clinical impact of the tailored text messages.

The final sample was small as a convenience sample with limited generalizability. In a probability sample of Latinos

residing in East Baltimore, where the feasibility sample was drawn, about 65% reported having health care coverage (Fonseca-Becker, et al., 2010), in comparison to <10% in our sample. Another limitation is that we assessed participants immediately after they had completed the program, so our findings reflect the short-term impact of the intervention, which may diminish with time.

The study findings provide insights into promising intervention approaches in promoting HBP control among Spanish-speaking Latinos. It is possible that the positive effects of improved numeracy required for day-to-day management of HBP may be more evident after a longer duration than that of our post-treatment follow-up. Our findings also suggest that an improved understanding of the interplay between health literacy and HBP self-care may ensure better HBP management and control in the target community.

REFERENCES

- Balcazar, H. G., Byrd, T. L., Ortiz, M., Tondapu, S.R., & Chavez, M. (2009). A randomized community intervention to improve hypertension control among Mexican Americans: Using the promotoras de salud community outreach model. *Journal of Health Care for the Poor and Underserved*, 20(4), 1079-1094. doi:10.1353/hpu.0.0209
- Benjamin, E. J., Blaha, M. J., Chiuve, S. E., Cushman, M., Das, S. R., Deo, R., . . . Muntner, P.; American Heart Association Statistics Committee and Stroke Statistics Subcommittee. (2017). Heart disease and stroke statistics—2017 update: A report from the American Heart Association. *Circulation*, 135(10), e146-e603. doi:10.1161/CIR.0000000000000485

- Fonseca-Becker, F., Perez-Patron, M. J., Munoz, B., O'Leary, M., Rosario, E., & West, S. K. (2010). Health competence as predictor of access to care among Latinos in Baltimore. *Journal of Immigrant and Minority Health, 12*(3), 354-360. doi:10.1007/s10903-007-9101-7
- Han, H. R., Chan, K., Song, H., Nguyen, T., Lee, J. E., & Kim, M. T. (2011). Development and evaluation of a hypertension knowledge test for Korean hypertensive patients. *Journal of Clinical Hypertension, 13*(10), 750-757. doi:10.1111/j.1751-7176.2011.00497.x
- Han, H. R., Lee, H., Commodore-Mensah, Y., & Kim, M. (2014). Development and validation of the Hypertension Self-care Profile: A practical tool to measure hypertension self-care. *Journal of Cardiovascular Nursing, 29*(3), e11-e20. doi:10.1097/JCN.0b013e3182a3fd46
- Hibbard, J. H., Mahoney, E. R., Stockard, J. & Tusler, M. (2005). Development and testing of a short form of the patient activation measure. *Health Services Research, 40*(6 Pt 1), 1918-1930. doi:10.1111/j.1475-6773.2005.00438.x
- Kim, M. T., Song, H. J., Han, H. R., Song, Y., Nam, S., Nguyen, T. H., . . . Kim, K. B. (2012). Development and validation of the high blood pressure-focused health literacy scale. *Patient Education & Counseling, 87*(2), 165-170. doi:10.1016/j.pec.2011.09.005
- Kutner, M., Greenberg, E., Jin, Y., & Paulsen, C. (2003). *The health literacy of America's adults: Results from the 2003 National Assessment of Adult Literacy*. Retrieved from National Center for Educational Statistics website: <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006483>
- Lai, L. L. (2007). Community pharmacy-based hypertension disease-management program in a Latino/Hispanic-American population. *Consultant Pharmacist, 22*(5), 411-416.
- Moser, A., Stuck, A. E., Silliman, R. A., Ganz, P. A., & Clough-Gorr, K. M. (2012). The eight-item modified Medical Outcomes Study Social Support Survey: Psychometric evaluation showed excellent performance. *Journal of Clinical Epidemiology, 65*(10), 1107-1116. doi:10.1016/j.jclinepi.2012.04.007
- Nelsen, L. M., Himmelberger, D. U., Morrison, A., Berger, M. L. & Markson, L. E. (1999). Quality-of-life questionnaire for patients taking antihypertensive medication. *Clinical Therapeutics, 21*(10), 1771-1787. doi:10.1016/S0149-2918(99)80055-1
- Nurss, J. R., Baker, D. W., Davis, T. C., Parker, R. M., & Williams, M. (1995). Difficulties in functional health literacy screening in Spanish-speaking adults. *Journal of Reading, 38*, 632-637.
- Nwankwo, T., Yoon, S. S., Burt, V., & Gu, Q. (2013). Hypertension among adults in the US: National Health and Nutrition Examination Survey, 2011-2012. *National Center for Health Statistics Data Brief, 13*(133), 1-8.
- Osborn, C. Y., Cavanaugh, K., Wallston, K.A., & Rothman, R. L. (2010). Self-efficacy links health literacy and numeracy to glycemic control. *Journal of Health Communication, 15*(Suppl. 2), 146-158. doi:10.1080/10810730.2010.499980
- Pabon-Nau, L., Cohe, A., Meigs, J., & Grant, R. (2010). Hypertension and diabetes prevalence among U.S. Hispanics by country of origin: The National Health Interview Survey 2000-2005. *Journal of General Internal Medicine, 25*(8), 847-852. doi:10.1007/s11606-010-1335-8
- Rocha-Goldberg Mdel, P., Corsino, L., Batch, B., Voils, C. I., Thorpe, C. T., Bosworth, H. B., & Svetkey, L. P. (2010). Hypertension Improvement Project (HIP) Latino: Results of a pilot study of lifestyle intervention for lowering blood pressure in Latino adults. *Ethnicity & Health, 15*(3), 269-282. doi:10.1080/13557851003674997
- Spitzer, R. L., Kroenke, K., Williams, J. B.; & the Patient Health Questionnaire Primary Care Study Group. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. *Journal of the American Medical Association, 282*, 1737-1744. doi:10.1001/jama.282.18.1737
- Weiss, B. D., Mays, M. Z., Martz, W., Castro, K. M., DeWalt, D. A., Pignone, M. P., . . . Hale, F. A. (2005). Quick assessment of literacy in primary care: The newest vital sign. *Annals of Family Medicine, 3*(6), 514-522. doi:10.1370/afm.405