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Approximately two thirds of those older than 60 years have a hypertension diagnosis. The aim of our program, Health Coaches for Hypertension Control, is to improve hypertension self-management among rural residents older than 60 years through education and support offered by trained community volunteers called Health Coaches. Participants received baseline and follow-up health risk appraisals with blood work, educational materials, and items such as blood pressure monitors and pedometers. Data were collected at baseline, 8 weeks, and 16 weeks on 146 participants who demonstrated statistically significant increases in hypertension-related knowledge from baseline to 8 weeks that persisted at 16 weeks, as well as significant improvements in stage of readiness to change behaviors and in actual behaviors. Furthermore, clinically significant decreases in all outcome measures were observed, with statistically significant changes in systolic blood pressure (−5.781 mmHg; $p = .001$*), weight (−2.475 lb;* $p < .001$*), and glucose (−5.096 mg/dl;* $p = .004$*) after adjusting for multiple comparisons. Although 40.4% of participants met the Healthy People 2020 definition of controlled hypertension at baseline, the proportion of participants meeting this definition at 16 weeks postintervention increased to 51.0%. This article describes a university–community–hospital system model that effectively promotes hypertension self-management in a rural Appalachian community.*

Keywords: *cardiovascular disease; chronic disease; health education; lay health advisors; community health workers*

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INTRODUCTION

According to the *Heart Disease and Stroke Statistics-2013 Update*, 33.0% of U.S. adults older than 20 years of age have hypertension and the prevalence is nearly equal between men and women (Go et al., 2013). The most recent National Health and Nutrition Examination Survey found that 30.1% of those age 40 to 59 years and 65.4% of those older than 60 years have a hypertension diagnosis (Hajjar & Kotchen, 2003). The goal of the program described in this article is to improve hypertension control among participants older than 60 years, which is directly aligned with the Healthy People 2020 Heart Disease and Stroke objective: HDS-12—to increase the proportion of adults with hypertension who have it under control from 43.7% to 61.2% (U.S. Department of Health and Human Services, 2013).

BACKGROUND

Sixty-two percent of cerebrovascular disease and 49% of ischemic heart disease are explained by suboptimal blood pressure (>115 mmHg systolic blood pressure; World Health Organization, 2003), and hypertension is the most modifiable risk factor for cardiovascular disease (Lloyd-Jones & O'Donnell, 2004). Experts recommend that patients with hypertension receive appropriate counseling to make lifestyle

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changes (Halm & Amoako, 2008). The Joint National Committee 7 states that lifestyle modifications could result in these approximate reductions in systolic blood pressure: reduce weight to body mass index of 18.5 to 24.9 (5-20 mmHg/10-kg weight loss), adopt DASH (Dietary Approach to Stop Hypertension) eating plan (8-14 mmHg), reduce dietary sodium to <100 mmol (2-8 mmHg), increase physical activity to 30 minutes most days (4-9 mmHg), and limit alcohol consumption (2-4 mmHg; Chobanian et al., 2003). The American Heart Association (AHA; 2013) also recommends that those with hypertension practice stress management.

Additionally, research has shown that home monitoring of blood pressure improves blood pressure control, with patients having fewer office visits and lower costs per year than those receiving usual care (Rogers et al., 2001; Soghikian et al., 1992). Studies have concluded that encouraging patients to become active participants in their care and providing them with skills and confidence for active self-management improve hypertension control (Naik, Kallen, Walder, & Street, 2008). The Committee on Public Health Priorities to Reduce and Control Hypertension in the U.S. Population made recommendations in their 2010 report that included the provision of "community-based support for individuals with hypertension through community health workers (CHWs) who are trained in dietary and physical activity counseling" (National Research Council, 2010, p. 5).

Community Health Workers

CHWs are natural helpers who can be effective in facilitating education, behavior change, health self-management, and access to health care among underserved and hard-to-reach populations. Use of CHWs is a cost-effective strategy in facilitating individuals' adherence to recommended health behavior changes, self-management of their health conditions, and access to health care (Brownstein et al., 2005): specifically, in promoting hypertension self-management (Brownstein et al., 2007).

The Centers for Disease Control and Prevention (2011) report, *Addressing Chronic Disease Through Community Health Workers: A Policy and Systems-Level Approach*, cited research supporting the efficacy of CHWs in improving control of hypertension among high-risk populations and reducing related mortality. Specifically, integrating CHWs into multidisciplinary health teams improved patients' ability in keeping appointments, adhering to prescribed regimens, and reducing risk behaviors.

In addition to the traditional skills of a CHW such as community outreach and advocacy, we added skills such as behavior change motivation strategies used by wellness coaches and content areas such as medication management used by patient educators focused on chronic disease self-management. We trained community volunteers to be "Health Coaches" for our project, which is built on a collaboration between physicians, health department practitioners, and university researchers to improve hypertension control among older patients. This article describes how a combination of evidence-based health promotion practices was used to develop an intervention to increase hypertension self-management.

METHOD/STRATEGIES/INTERVENTION APPLICATIONS

The research team developed a self-management education program called "Health Coaches for Hypertension Control" (HCHC) guided by the organizing framework of the chronic care model, which addresses improvement of health care at the community, organization, practice, and patient levels (http://www.improvingchroniccare.org). The chronic care model component Self-Management Support was provided by the health coaches, who educated participants on hypertension self-management and on ways to access community resources that support self-management. The program also incorporated stages of change and several processes from the transtheoretical model. The health risk appraisal used in the program for baseline and outcome measures included items measuring stages of change regarding nutritional behaviors, physical activity, stress management, and weight management. Several strategies used in educational sessions were based on the transtheoretical model constructs such as building "self-efficacy"; exercising "self-liberation" through the development of an action plan, which is an example of a firm commitment to change; and "helping relationships" where social support was provided by Health Coaches and fellow participants. Strategies for behavior change provided in program sessions included "counterconditioning," "reinforcement management," and "stimulus control" (Prochaska, Redding, & Evers, 2002).

Community residents of a rural Appalachian county diagnosed with hypertension and older than 60 years were enrolled in the program. Participants were recruited through presentations to civic groups, church newsletters, newspaper ads, radio spots, and a letter from physician providers. Of those who were eligible and initially interested in the program, 70 were not enrolled for the following reasons: 39 had scheduling conflicts with class times, 19 decided not to participate

after learning more about the program, 9 did not return follow-up enrollment phone call, and 3 did not have transportation. Ultimately, 205 community participants were enrolled, and of those, 59 were considered "lost to follow-up" because we were not able to collect 16-week outcome (clinical data) measures. Thus, the final data set included 146 participants (a 71.22% participation rate).

The program includes eight core modules along with eight supplemental modules in nutrition and physical activity. All modules were developed for those with low educational attainment and health literacy. Module topics are based on recommendations by the Joint National Committee 7 (Chobanian et al., 2003). Within each module, educational strategies recommended by the Robert Wood Johnson Foundation for chronic disease self-management programs are included: problem solving to identify problems, barriers, and solutions; building self-efficacy and skills; individualized action plans including both short-term and long-term goals; and self-monitoring progress toward goals (DeMilto, 2000). Additionally, we integrated motivation strategies such as identifying personal values, from wellness coaching approaches. Materials from the Centers for Disease Control and Prevention CHW sourcebook, *A Training Manual for Preventing Heart Disease and Stroke*; and the National Institutes of Health, *Your Heart, Your Life: A Lay Health Educator's Manual* (2013); and several materials from the National Heart, Lung and Blood Institute (NHLBI) were integrated into training and class materials. We also developed a personal health diary customized to hypertension control behaviors in which participants could monitor their progress in changing behaviors and managing blood pressure.

Community volunteers, trained by the research team as health coaches for the project, delivered the educational sessions in a small-group format using a scripted health coach manual. During sessions, participants received a notebook with interactive session activities and supplies such as blood pressure monitors appropriate for home use, pedometers, cookbooks, and relaxation CDs. Health coaches ensured that participants gained the skills and confidence they needed to use these tools effectively in hypertension self-management.

Health coach trainees were recruited from the local community through face-to-face invitations at church and civic functions, organizational newsletters, and ads in the local newspaper and radio. Interested individuals attended an orientation session about the program and gave permission for a criminal background check. Those individuals interested in becoming health coaches successfully completed a 30-hour training before delivering classes. The training built knowledge in each of the module content areas as well as in learning theory, communication strategies, and behavior change strategies. At the completion of training, the health coaches were required to score at least 80% on a knowledge test. They were also required to score at least 80% on the Collaborative Institutional Training Initiative (CITI) offered through the university partner for education about human subjects protection. Additionally, through role-plays incorporated in the training, health coaches demonstrated proficiency in using blood pressure monitors and pedometers as well as in classroom instruction techniques. The training concluded with an observation of currently active health coaches leading a class.

Each of the eight core modules and eight supplemental modules is approximately 1.5 hours in length and includes several experiential learning activities. Before the eight classes begin, participants attend a preliminary session for collection of informed consent documents approved by the internal review board of the university partner and baseline measures. During the first regular class meetings, health coaches and participants get acquainted and discuss how to develop personal action plans and monitor behaviors with a personal health diary. Following the initial meetings, health coaches meet weekly with participants for an additional 7 weeks to implement core modules on the following:

Basics of Hypertension Control: Participants are given an overview of lifestyle behaviors including medication management required for hypertension control and are provided with a blood pressure monitor they are taught to use.

Nutrition: This module focuses on weight management and the DASH diet, which has been proven effective in reducing hypertension in numerous studies (Appel et al., 2003; Sacks et al., 2001).

Physical Activity: Weight control is also covered in this module, which includes opportunities to develop personalized plans to increase physical activity as recommended by the Task Force on Community Preventive Services (2002). Additional content includes special considerations for being physically active with hypertension, such as using caution with resistance training (LakeShore Research Collaborative, 2013).

Tobacco Use: This module was developed in collaboration with the local health department and incorporates their tobacco use cessation materials along with information about smoking cessation programs.

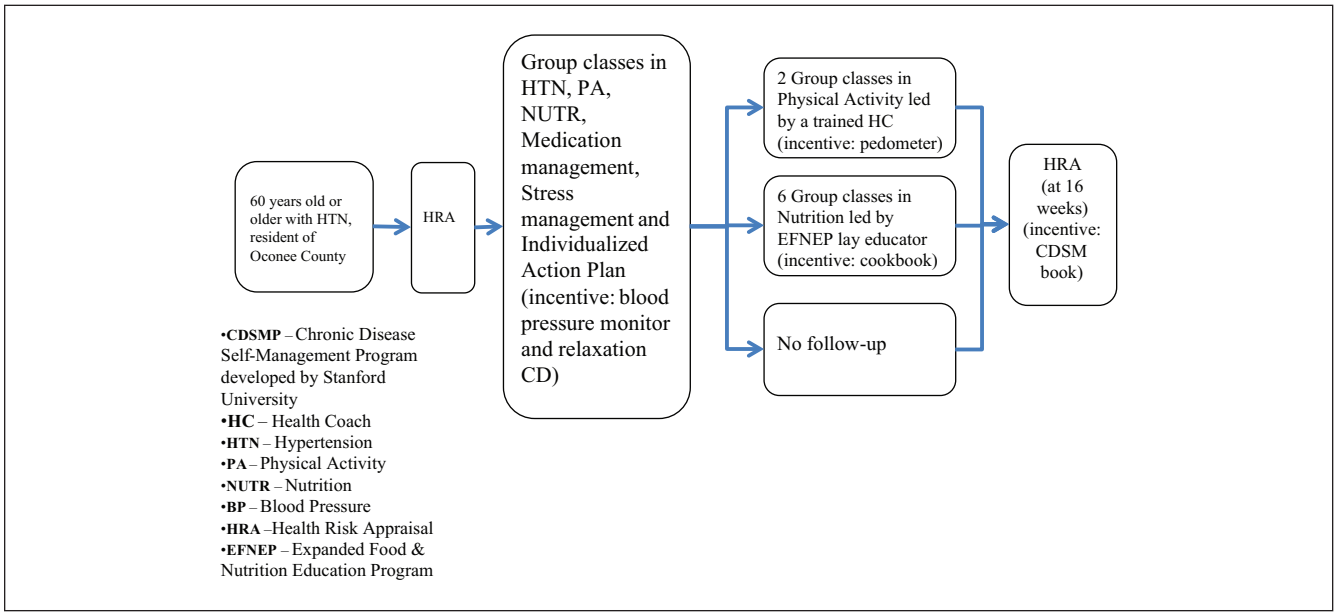

FIGURE 1 Intervention Design

Stress Management: Recommended relaxation techniques to manage stress and improve blood pressure are taught in this module (Blumenthal, Sherwood, Gullette, Georgiades, & Tweedy, 2002; Charlesworth, Williams, Baer, & 1984; García-Vera, Sanz, & Labrador, 2004) and participants receive a stress management CD.

Medication Management: In this module, participants learn how their hypertension medications work and develop a personalized medication management plan. Krousel-Wood and Frohlich (2009) found that the high rate of hypertension medication nonadherence could be attributed to the patients' lack of understanding of the disease and its medications, and a study in rural Alabama revealed that patients improved adherence to a wide range of hypertension medication regimens when enrolled in a medication-monitoring and education intervention (Taylor, Byrd, & Krueger, 2003).

Long-Term Action Plan: The eighth and final core module focuses on the development of a long-term, personal action plan to continue hypertension control activities for the next 8 weeks. The action plan is guided by the results of the baseline health risk Appraisal.

After completing the eight core modules, participants are invited to take an additional six weekly classes in nutrition and an additional two classes in physical activity, which were developed in response to participant requests. The supplemental nutrition classes emphasize additional skill building in reading food labels and shopping for and preparing healthy foods. These nutrition classes were created for the Expanded Food and Nutrition Education Program funded by the U.S. Department of Agriculture and implemented by land grant university extension programs. In this project, a retired Expanded Food and Nutrition Education Program educator offers the supplemental classes. The supplemental physical activity classes build on the core module by providing additional information and skill building in establishing a personalized physical activity plan, reducing risk of injury, maintaining increased activity levels, preventing relapse into sedentary behavior, and using a pedometer for goal setting and self-monitoring of progress. These classes are taught by health coaches who volunteer to specialize in this area through additional training by the research team.

Based on our analytic sample of $n = 146$ for this article, 104 (71.23% of participants) completed seven to eight core classes, 88 (61.97% of participants) completed one to two optional physical activity classes, and 74 (50.68% of participants) completed four to six optional nutrition classes. We have not yet examined if these classes (and other factors like gender, use of health diary, etc.) affected any of our outcomes as the purpose of this article is to explain the intervention (see Figure 1) and look at global effects. These additional research questions will be explored in future studies.

MEASURES

Program impacts were measured by assessing participant knowledge and several psychosocial factors related to self-management at baseline, 8 weeks, and 16 weeks. All items were evaluated for appropriateness for those with low educational attainment and health literacy. To assess participant knowledge, we used a 17-item survey that included 2 to 5 items related to several program-specific domains: hypertension, physical activity, nutrition, stress management, tobacco use, and medication management. Each item has one correct response and three distracters. The participant knowledge survey contains items from an item pool developed by project staff after reviewing documents developed by the NHLBI and the AHA. Knowledge survey items were ultimately selected by staff and health coaches together.

To assess participant psychosocial mediators of behavior, we used a 28-item survey, consisting of four scales (with 4 to 10 items each) that measure beliefs about hypertension self-management effectiveness and importance, hypertension self-management confidence, and perceived competence for hypertension self-management. For all scales, participants used a 7-point response set to indicate the degree to which they believe statements are true. The Perceived Competence Scale for Hypertension self-management, is an adaptation of the Perceived Competence Scale, which is a short, 4-item questionnaire, designed to assess constructs from self-determination theory. The other scales were adapted from instruments (previously available at http://healthdisparities.net/training_manuals_and_tools.htm) that were used in another project (Dye, Haley-Zitlin, & Willoughby, 2003). The project team adapted the items to be specific to participant beliefs about the seriousness of hypertension, the effectiveness of different tasks of hypertension management, and self-efficacy about performing those tasks.

Process evaluation was used to assess program completeness, fidelity, and participant satisfaction. *Program completeness and fidelity* was evaluated via self-report health coach session adaptation logs and direct observation by the program evaluator. Direct observation was used by the program evaluator to assess *dose delivered* (completeness) via nine items measuring the degree to which health coaches employed module-specific essential elements. *Social interaction* (fidelity) was assessed via six items measuring the degree to which health coaches and participants interacted in positive ways. *Teaching effectiveness* (fidelity) was assessed via six items, with multiple indicators each, measuring the degree to which health coaches were organized, provided role modeling, used learning tools, and encouraged critical thinking. *Satisfaction* was evaluated via participant feedback at the end of each group session.

The health risk appraisal, Personal Wellness Profile™(PWP) by Wellsource, Inc., was used to collect impact and outcome data at baseline and 16 weeks. PWP impact measures include readiness to change items and self-reported behavior items. PWP outcome measures include systolic and diastolic blood pressure (mmHg), weight (lb), waist circumference (in.), as well as fasting total, high-density lipoprotein, and low-density lipoprotein cholesterol (mg/dl); triglycerides (mg/dl); and glucose (mg/dl). The PWP has undergone a content validation by researchers at the University of Florida and has been reviewed and certified by the National Committee for Quality Assurance as a high-quality health risk assessment. Fitness items are based on the American College of Sports Medicine and the AHA fitness standards and guidelines. Coronary risk factors are taken from the National Institutes of Health and NHLBI guidelines, including the Adult Treatment Panel–3 guidelines on coronary risk assessment and recommendations. Diabetes risk factors are based on the American Diabetes Association's guidelines for risk assessment and prevention.

Statistical Analysis and Power

All statistical analyses were performed using IBM SPSS Statistics Version 20 (IBM Corp., 2011). Descriptive statistics were used to determine the distribution of demographics and health issues among participants and to examine the distribution of continuous and categorical variables. Changes in impact and outcome measures were compared using two-tailed tests of differences between dependent proportions (McNemar's test) or means (Student's *t* test). For all results, statistical significance was set at $\alpha = .05$. To protect the family-wise error rate, critical alpha values were appropriately adjusted for multiple comparisons using a Bonferronni correction for multiple comparisons: α/number of comparisons. An a priori power calculation was computed using G*Power 3.1.2 (Faul, Erdfelder, Buchner, & Lang, 2009). For a two-tailed test of differences between two dependent means (matched pairs), with error probability (α) fixed at .05, power ($1 - \beta$) fixed at .80, and with an estimated small to medium ($f = 0.25$) effect size, we determined that a total sample size of 128 was necessary to detect statistically significant differences.

TABLE 1
Participant Demographics and Cardiac-Related Health Issues

Demographic/Health Issue	*Distribution*
Age, years	
Minimum	59
Maximum	89
M (*SD*)	71.55 (6.48)
Sex, *n* (%)	
Female	100 (68.5)
Male	46 (31.5)
Race/ethnicity, *n* (%)	
White	125 (85.6)
Black/African American	15 (10.3)
Hispanic	1 (0.7)
Other	2 (1.4)
Missing	3 (2.1)
Cardiac-related health issues[a] (%)	
Diabetes	20.8
Emphysema, bronchitis, or asthma	10.9
Stroke	8.7
Congestive heart failure	5.6
Heart attack, angina, bypass, or angioplasty	5.6
Kidney disease	4.7

a. Self-report of a diagnosis with specific health issue(s).

RESULTS

To date, we have complete outcome (clinical) data on 146 study participants, who were predominantly female (68.5%) and White (85.6%), with an average age of 71.55 years (range = 59-89). With respect to comorbidities, a higher proportion reported diabetes (20.8%), followed by lung disease (10.9%), stroke (8.7%), congestive heart failure (5.6%), heart attack (5.6%), and kidney disease (4.7%; see Table 1).

For process evaluation, we employed several methods to measure and assess the degree to which the program was implemented as intended and was perceived by the participants. *Dose received* was evaluated via participant attendance in the core group sessions and found to be 87.5%. With respect to *program completeness and fidelity*, we noted small adaptations to 65% of sessions delivered, 100% of which were deemed appropriate and not seen by the research team as potential threats to program fidelity. One example of a modification was based on reports from health coaches and participants that they needed more time to cover all material for some sessions so we lengthened sessions from 1 hour to 1½ hours. Health coaches also suggested adding some visual aids to reinforce specific topics, which was done after the research team determined they were from evidence-based sources and did not conflict with program content. Overall, health coaches demonstrated high levels of completeness and dose delivered with average scores on the direct observation form at 3.88 on a 4-point scale. Participants reported high levels of satisfaction with health coach performance (average rating of 4.78 on a 5-point scale) and with the program materials (4.66 on a 5-point scale).

Of the participants who completed baseline, 8 weeks, and 16 weeks assessments, we observed a statistically significant increase in hypertension-related knowledge with 69.01% correct at baseline, 77.10% correct at 8 weeks, and 77.30% correct at 16 weeks. There was little change in baseline, 8 weeks and 16 weeks mean responses for the psychosocial mediators *hypertension self-management effectiveness* (5.31, 5.65, and 5.59, respectively), *hypertension self-management importance* (6.47, 6.67, and 6.67, respectively), *hypertension self-management confidence* (5.83, 6.22, and 6.19, respectively), and *perceived competence for hypertension self-management* (5.21, 5.99, and 6.16, respectively), due to the high levels of endorsement at each measurement time point.

Except for tobacco use, there were positive trends in movement of readiness to change from "cognitive" stages toward stages of "behavioral" action from baseline to 16 weeks postintervention. After adjusting for multiple comparisons, statistically significant movement from cognitive stages to behavioral stages were observed for readiness to be physically active ($p < .001$), to practice good eating habits ($p < .001$), to lose weight or maintain a healthy weight ($p < .001$), to handle stress well ($p = .001$), and to live an overall healthy lifestyle ($p < .001$). In addition, we observed statistically significant changes in self-reported consumption of fruits and vegetables ($p = .002$), in self-reported effort to eat primarily low-fat foods ($p < .001$), and in self-reported ability to cope with life stress ($p < .001$) after adjusting for multiple comparisons (see Table 2).

We observed changes in all clinical measures in the appropriate direction; however, only changes in systolic BP (−5.781 mmHg; $p = .001$), weight (−2.475 lb; $p < .001$), and fasting glucose (−5.096 mg/dl; $p = .004$) were statistically significantly different after adjusting for multiple comparisons (see Table 3). Furthermore,

TABLE 2
Changes in Pre–Post Readiness to Change and Self-Reported Behaviors

	Baseline, n *(%)*	*16 Weeks Follow-Up,* n *(%)*	p[a]
Readiness to change (indicate how ready you are to . . .)			
Not smoke or use tobacco	*n* = 106	*n* = 107	.289
I haven't thought about changing	8 (7.5)	4 (3.7)	
I plan to change (in next 6 months)	2 (1.9)	1 (0.9)	
I plan to change this month	3 (2.8)	3 (2.8)	
I recently started doing this	0 (0.0)	0 (0.0)	
I do this regularly (within past 6 months)	93 (87.7)	99 (92.5)	
Be physically active	*n* = 140	*n* = 136	<.001
I haven't thought about changing	11 (7.9)	4 (2.9)	
I plan to change (in next 6 months)	13 (8 .3)	10 (7.4)	
I plan to change this month	25 (17.9)	8 (5.9)	
I recently started doing this	28 (20.0)	43 (31.6)	
I do this regularly (within past 6 months)	63 (45.0)	71 (52.2)	
Practice good eating habits	*n* = 139	*n* = 135	<.001
I haven't thought about changing	2 (1.4)	2 (1.5)	
I plan to change (in next 6 months)	13 (9.4)	5 (3.7)	
I plan to change this month	28 (20.1)	4 (3.0)	
I recently started doing this	38 (27.3)	49 (36.3)	
I do this regularly (within past 6 months)	58 (41.7)	75 (55.6)	
Lose weight or maintain a healthy weight	*n* = 138	*n* = 131	<.001
I haven't thought about changing	4 (2.9)	5 (3.8)	
I plan to change (in next 6 months)	22 (15.9)	5 (3.8)	
I plan to change this month	31 (22.5)	13 (9.9)	
I recently started doing this	37 (26.8)	57 (43.5)	
I do this regularly (within past 6 months)	44 (31.9)	51 (38.9)	
Handle stress well	*n* = 135	*n* = 133	.001
I haven't thought about changing	8 (5.9)	7 (5.3)	
I plan to change (in next 6 months)	14 (10.4)	5 (3.8)	
I plan to change this month	24 (17.8)	10 (7.5)	
I recently started doing this	27 (20.0)	35 (26.3)	
I do this regularly (within past 6 months)	62 (45.9)	76 (57.1)	
Live an overall healthy lifestyle	*n* = 140	*n* = 135	<.001
I haven't thought about changing	5 (3.6)	2 (1.5)	
I plan to change (in next 6 months)	11 (7.9)	4 (3.0)	
I plan to change this month	31 (22.1)	6 (4.4)	
I recently started doing this	27 (19.3)	30 (22.2)	
I do this regularly (within past 6 months)	66 (47.1)	93 (68.9)	
Self-reported behaviors			
Do you currently smoke?	*n* = 146	*n* = 140	1.000
Yes	4 (2.7)	3 (2.1)	
No	142 (97.3)	137 (97.9)	

(continued)

TABLE 2 (CONTINUED)

	Baseline, n *(%)*	*16 Weeks Follow-Up,* n *(%)*	p[a]
How many days per week do you engage in aerobic exercise of at least 20 to 30 minutes duration (e.g., brisk walking, active gardening)?	*n* = 145	*n* = 142	.009
None	36 (24.8)	15 (10.6)	
1-2 days	33 (22.8)	34 (23.9)	
3-4 days	47 (32.4)	50 (35.2)	
>5 days	29 (20.0)	43 (30.3)	
How many servings of fruits and vegetables do you usually eat per day?	*n* = 146	*n* = 143	.002
<1	24 (16.4)	12 (8.4)	
2	33 (22.6)	28 (19.6)	
3	46 (31.5)	33 (23.10	
4	22 (15.1)	31 (21.7)	
>5	21 (14.4)	39 (27.3)	
Do you eat primarily whole-grain breads and cereals?	*n* = 126	*n* = 128	.581
Yes	103 (81.7)	107 (83.6)	
No	23 (18.3)	21 (16.4)	
Do you make a serious attempt to eat primarily low-fat foods?	*n* = 127	*n* = 129	<.001
Yes	88 (69.3)	113 (87.6)	
No	39 (30.74)	16 (12.4)	
Do you cope well with stress in your life?	*n* =126	*n* = 129	<.001
Yes	82 (65.1)	102 (79.1)	
No	44 (34.9)	27 (20.9)	

a. McNemar's test used to examine pretest to posttest changes; thus items with more than two responses were dichotomized. Original response formats are presented in Table 2 so the reader can gain a better understanding of "movement" in the measures. Answers to readiness items were dichotomized into a cognitive category (precontemplation, contemplation, preparation) and behavioral category (action and maintenance). Under self-reported behaviors, exercise item responses were dichotomized as less than 5 days or 5 or more days (the intervention promoted a goal of at least 5 days of activity each week). The fruits and vegetables item responses were categorized as less than five servings or five or more servings (the intervention promoted the Dietary Approach to Stop Hypertension diet emphasis on five or more servings of fruits and vegetables daily). There are six comparisons for readiness to change and for self-reported behavior items; thus we used a Bonferonni critical alpha adjustment to protect the family-wise error rate: α/number of comparisons = .05/6 = .0083.

we observed that 40.4% of our analytic sample met the Healthy People 2020 definition of controlled hypertension ("mean systolic blood pressure less than 140 mmHg and mean diastolic blood pressure less than 90 mmHg") at baseline; this percentage increased to 51.0% at 16 weeks postintervention.

DISCUSSION

Recent data from National Health and Nutrition Examination Survey revealed that even small changes in blood pressure of 2 to 3 mmHg could result in a 25% to 50% decrease in the incidence of hypertension, resulting in an annual reduction of stroke, coronary heart disease, and all-cause mortality by 6%, 4%, and 3%, respectively (Halm & Amoako, 2008). Walsh et al. (2006) also found that even small reductions in high blood pressure have major impacts in clinical outcomes and health care spending. Our project has demonstrated the ability to reduce mean systolic blood pressure by 5 mmHg, indicating the potential to reduce stroke, coronary heart disease, and all-cause mortality among program participants.

This community-based program effectively incorporates trained volunteers to promote sustainability of the program by reducing program costs and to benefit from

TABLE 3
Changes in Pre–Post Clinical Measures

	Baseline		*16 Weeks Follow-Up*		*Significance*	
Measure	M	SD	M	SD	*Difference*	p[a]
Systolic blood pressure (mmHg)	146.31	18.027	140.53	19.245	−5.781	.001
Diastolic blood pressure (mmHg)	77.65	10.25	76.53	9.186	−1.116	.128
Weight (lb)	184.24	42.328	181.77	41.349	−2.475	.000
Waist circumference (in.)	41.62	37.042	38.32	5.698	−3.401	.253
Total cholesterol (mg/dl)	185.76	44.261	183.28	42.738	−2.477	.309
High-density lipoprotein cholesterol (mg/dl)	53.74	15.286	53.37	14.724	−0.370	.523
Low-density lipoprotein cholesterol (mg/dl)	105.74	35.845	104.60	37.063	−1.144	.467
Triglycerides (mg/dl)	137.73	75.775	126.55	65.216	−11.171	.016
Glucose (mg/dl)	110.20	34.739	105.10	32.430	−5.096	.004

a. Student's *t* test. Bonferroni-corrected alpha level for multiple comparisons: .05/9 = .0055.

a valuable resource of the county our program serves: retired professionals seeking civic engagement and volunteer opportunities. The Civic Engagement in an Older America project emphasized that retirees desire meaningful work throughout their later years and recommended their engagement in addressing important community needs through both paid and unpaid work (http://www.agingsociety.org/agingsociety/civic%20engagement/about_civic_engagement.htm). This desire for meaningful work was described by one health coach in an anonymous feedback form:

> It (the program) truly does offer a benefit not only for the client, but for the health coach who gains countless rewards by serving others. I think it is so important to note that not only has the program helped the client, but your program helps those that you train to become health coaches. The self awareness gained during the classroom sessions for those that are not fully familiar with chronic conditions/nutrition will help those community members as well. So, not only are you reaching "clients" but you are teaching those that are becoming health coaches to become more aware of their own lifestyles. . . . when the client does make a change, no matter how small, you become there (sp) biggest fan, and that is AWESOME!

The health coaches sustain their interest in volunteering for the program not only through the satisfaction they gain from their role but also through the camaraderie they share with their fellow health coaches in monthly meetings and through team teaching. As evidence of continued interest, many health coaches who served in an earlier program delivered from 2006 to 2010 have continued to serve in the project conducted from 2010 to 2013 that is described in this article.

Using trained community volunteers has advantages with program costs, but volunteers are also more likely to take breaks from the program for vacations and other personal reasons; therefore, it is necessary to conduct at least two trainings a year in order to maintain an adequate number of coaches to deliver classes as enrollment continues to increase. Our current health coaches have become effective recruiters for new health coaches, and we have found that newspaper ads for health coach trainees have also been a successful recruiting tool. Since the inception of the 3-year program, several former participants have chosen to be trained as health coaches as they stated that they are eager to help others achieve the same health improvements they have experienced. All past participants of HCHC classes are invited to attend an annual reunion where health coaches and participants share how the program has influenced them. Ideally, booster sessions would be offered to past participants to assist with behavior change maintenance, but funding for the program is primarily concerned with reaching as many people as possible with the core program; therefore efforts have focused on recruiting and serving new participants rather than offering continued services to past participants. However, past participant–led support groups could be organized to allow sustained contact and support.

CONCLUSIONS

The use of trained indigenous volunteers to deliver hypertension self-management programming is a promising community-based, cost-effective approach for reaching the Healthy People 2020 goal of increasing by 40% the proportion of people diagnosed with hypertension who are successfully controlling blood pressure. Although 40.4% of our analytic sample met this Healthy People 2020 definition of controlled hypertension at baseline, the proportion of HCHC participants meeting this definition at 16 weeks postintervention increased to 51.0%. Thus, HCHC has proven to be promising in reducing systolic blood pressure of participants, most of who were already under a physician's care, indicating that our intervention provides "value-added" benefits above usual care. Feedback from participants and health coaches has been very positive, and physicians who referred their patients to the program were pleased to see their patients become more efficacious self-managers, with many of them bringing their personal health diary to medical appointments. Overall, HCHC has proven to be a promising approach to improving hypertension self-management among rural populations, and the program's standardized manuals and educational materials could be readily used in other rural communities.

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