



Blood Pressure Control for African American Parents and Children: Feasibility and Initial Outcomes of a Faith-based Intervention Pilot Study

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Abstract

The overall purpose was to determine the feasibility and initial outcomes of a faith-based intervention to improve blood pressure (BP) control in African American (AA) parents/guardians and their children, using a pre/post without control group design. Sample included AA parents and children (n=17) from three churches in North Florida. Health behaviors (daily servings of fruits/vegetables [F/V], minutes of physical activity [PA]) and physical health (BMI, systolic BP and diastolic SB) were examined. Data were analyzed using descriptive statistics, paired t-tests, and correlations. Feasibility outcomes showed high attendance (91% children, 88% parents) and completion (100%) rates. F/V significantly increased at post-test in adults ($p=.02$) and approached significance in children ($p=.07$). Positive trends at post-test were noted in PA, BMI, SBP and DBP in both groups. There were significant correlations at post-test for F/V ($p=.01$) and SBP ($p=.006$) for the parent/child dyads. Findings suggest that the intervention was feasible and has promise to improve health outcomes.

Keywords

African Americans; blood pressure; church-based health interventions

Cover Page Footnote

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ABSTRACT

The overall purpose was to determine the feasibility and initial outcomes of a faith-based intervention to improve blood pressure (BP) control in African American (AA) parents/guardians and their children, using a pre/post without control group design. Sample included AA parents and children (n=17) from three churches in North Florida. Health behaviors (daily servings of fruits/vegetables [F/V], minutes of physical activity [PA]) and physical health (BMI, systolic BP and diastolic SB) were examined. Data were analyzed using descriptive statistics, paired t-tests, and correlations. Feasibility outcomes showed high attendance (91% children, 88% parents) and completion (100%) rates. F/V significantly increased at post-test in adults ($p=.02$) and approached significance in children ($p=.07$). Positive trends at post-test were noted in PA, BMI, SBP and DBP in both groups. There were significant correlations at post-test for F/V ($p=.01$) and SBP ($p=.006$) for the parent/child dyads. Findings suggest that the intervention was feasible and has promise to improve health outcomes.

Keywords: African Americans, blood pressure, church-based health intervention

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death in the United States (Mozaffarian et al., 2015). For African Americans, who comprise 14% of the U.S. population, CVD is of particular concern. National data show that African Americans experience higher age-adjusted morbidity and mortality rates than Caucasians for both heart disease and stroke (Mozaffarian et al., 2015). Elevated blood pressure is a key risk factor for morbidity and

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mortality related to heart disease and stroke for this population. Other CVD risk factors for African Americans include excess body weight, sedentary lifestyle and diet, including low consumption of fruits and vegetables and high consumption of fat, salt and sugar (Blanck et al., 2011; Fulgoni et al., 2007; Rooks & Whitfield, 2004). To address these health issues in African Americans, Healthy People 2020 recommends health interventions in community-based settings (USHHS, 2015).

Faith-based organizations such as churches are key community organizations for African Americans, where, in contrast to general trends (Gallup, 2013), participation rates for this population have continued to increase (Barnes, 2009). Historically, churches have provided spiritual renewal for African Americans during times of mistreatment and discrimination and have served as centers for social, economic and political development (Billingsley, 2003; Woodson, 1972). In addition, African American adults perceive that they benefit from participation in faith settings (Chatters, Taylor, Lincoln & Schroepfer, 2002; Phillips, Wilmoth & Marks, 2012; Taylor, Chatters & Nguyen, 2013), especially parents with children who are more likely than parents without children to receive support from faith organization members (Chatters, et al., 2002). Further, there is considerable evidence that health outcomes, such as increased fruit and vegetable consumption, increased physical activity, lower BMI and lower blood pressure, can occur as a result of faith-based health programming in this population (Baruth, Wilcox, Laken, Bopp & Saunders, 2008; Campbell et al., 1999; Crook et al., 2009; Peterson, Atwood & Yates, 2002; Wilcox et al., 2007; Yanek, Becker, Moy, Gittelsohn & Koffman, 2001).

However, there are ongoing issues in faith-based health research. One key issue is sustaining health behavior change in individuals after the intervention (Campbell et al., 2007). This issue is complicated by the fact that health interventions in churches are often “faith-placed.” Faith-placed interventions are conducted at the church site but do not involve the church in a substantial way, thus a sustainable structure to provide on-going support for health behavior change is not established (Campbell et al., 2007; Dodani, 2011). One way to address this issue is to engage family members within faith settings so that parents and children can learn and adopt healthy behaviors together (McFatrigh et al., 2013; Skouteris et al., 2012). With families as key pillars for African Americans churches (Billingsley & Caldwell, 1991), a family approach would build on African American cultural values of faith and family, and provide support systems within the household for initiating, developing and maintaining health behaviors. However, no studies could be found in the faith-based health research literature that used this model. Examining the outcomes of a faith-based intervention with family members would contribute to the literature and provide an opportunity to investigate health outcomes within a family context.

Purpose

The overall purpose of this study was to determine the feasibility and initial outcomes of a faith-based intervention to improve blood pressure control in African American parents/guardians and their children. Specifically, the objectives of the study were to 1) determine the feasibility outcomes (attendance and completion rates) for parents/guardians and children), and 2) determine the extent that the intervention would do the following for parents/guardians and their children (12-21 years of age): a) improve health behaviors (increase daily servings of fruits and vegetables, increase daily minutes of physical activity); b) improve

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physical health (decrease and/or maintain body mass index [BMI]), decrease and/or maintain blood pressure levels); and c) demonstrate a relationship between parent and child health outcome changes. Background characteristics of age, gender, education, marital status, health status, blood pressure exam, and use of hypertension medicine were examined descriptively in the study.

Theoretical Framework and Related Literature

The socio-ecological (SE) model was utilized as the underlying theoretical framework for this pilot study. The SE model includes four interrelated and inter-reliant elements: intrapersonal (individual characteristics that influence behavior), interpersonal (social networks and social support from family, friends and church members), organizational (policies, facilities and organizational structures) and environmental/policy (broad community or societal resources) (McLeory, Bibeau, Steckler, & Glanz, 1988). In this paper, intrapersonal (individual) and interpersonal (parent-child) health behaviors and physical health were examined with implications for the organizational level (faith-based or church setting).

The faith-based literature supports the SE theoretical model. With regard to the intrapersonal level of the SE model, there is considerable evidence that faith-based health interventions can improve food choice patterns at the individual level in African American adults, including increasing daily consumption of fruits and vegetables (Bowen et al. 2004, 2009; Campbell et al., 2007). In addition, faith-based health programs emphasizing physical activity can increase participation in physical activity at the individual level for African American adults (Bopp, Peterson & Webb, 2012; Wilcox, Laken, Parrott, et al., 2010; Young & Stewart, 2006) and also result in a positive change in BMI (Bopp et al., 2009) and blood pressure (Campbell et al., 2007; Yanek et al., 2001). In relation to the interpersonal level, the literature suggests that there are associations between parent and child health behavior change. For example, Hansen and others found parent consumption of fruit and vegetables was positively correlated with fruit and vegetable intake in adolescent girls (Hansen, Neumark-Stainer, Eisenberg, Story & Wall, 2005). With regard to physical activity, Madsen and others found, in a ten year longitudinal study of African American and Caucasian girls and their parents with retention rates of 91% and 88% respectively, that when girls had parents who exercised greater than three times a week, the girls were 50% more active than those whose parents did not exercise (Madsen, McCulloch & Crawford, 2009). Also, in a community-based study that examined the role of parents and the home environment in the physical activity of African American girls, Adkins and others found that parent self-efficacy and parental support for completing physical activity were positively correlated with the daughters' activity level (Adkins, Sherwood & Story, 2004). Finally, although this study does not directly address the organizational level, there are implications for the organizational level because intra- and inter-level changes are within the context of individuals and families who are members of faith-based organizations. Further, health ministry formation took place as a part of the overall project.

Hypotheses

Based on the literature and theoretical framework, we hypothesize that: 1) a majority of parents/guardians and their children will attend and complete the intervention; 2) health behaviors (increased daily servings of fruits and vegetables, increased daily minutes of physical activity) of parent/guardians and their children will improve from pre-test to post-test; 3)

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physical health (decreased and/or maintained BMI, decreased and/or maintained blood pressure levels) of parents/guardians and their children will improve from pre-test to post-test; and 4) there will be a relationship between parent and child health outcome changes.

METHODS

Design and Sample

A pre/post without control group design was used in this pilot study that included the health outcomes (fruit and vegetable consumption, physical activity, BMI and blood pressure) as a result of the intervention. In this design, the initial effectiveness of the intervention was tested using a selected sample of parents/guardians and their children with pre-test scores used as the control (Tuckman & Harper, 2012).

The sample for the pilot study included parents/guardians and their children recruited from three churches in North Florida. Churches were recruited through articles in the local newspaper and through contacts with local clergy. As a part of the recruitment process, interviews were conducted with pastors to determine why the church was interested in the project, membership demographics, whether or not the church had an active health ministry, church structure, and pastor's attitude toward health and wellness. Decisions for inclusion were based on size of congregation (at least 100 members), no current health ministry, and positive attitude of pastor toward health and wellness. Four churches responded to the recruitment process and three were selected for the project, based on the criteria. Each pastor was asked to identify two or three church leaders who would serve as health leaders. Pastors and health leaders then worked together to identify the families using the following criteria: a) a parent/guardian and child (12-21 years of age) living in the same household, b) commitment to project participation, and c) willingness to support health programming in the church after completion of the project. Diagnosed hypertension was not a selection criterion since the purpose of the project was to determine the initial outcomes of an intervention to control blood pressure in a natural community setting. The desired sample for adults was three per church ($3 \times 3 = 9$) and one child per adult per church ($1 \times 3 \times 3 = 9$). The final purposive sample of families included 10 adults and 7 children, including seven adult/child dyads plus one additional adult per church. In each instance, the additional adult was one of the parents or another member of a household (i.e., dyads: $7 \times 2 = 14$; other adult = 3).

Intervention

The intervention, CHECK YOUR HYPertension, was an intensive faith-based program developed by the investigators and tailored for the church setting to address hypertension as a risk for cardiovascular disease which is prevalent in North Florida (USHSS, 2014). The title, "CHECK YOUR HYPE", incorporated contemporary colloquial African American language that refers to "hype" as an exaggeration and "checking" which means to "realize your current position in any of many situations." Thus "CHECK YOUR HYPE" relates to the need to manage blood pressure which can sometimes be out of control in this population. The intervention was a total of nine weeks including: a) Session 1: pre-test data collection, b) Session 2: project kick-off and orientation, c) Sessions 3-8: content sessions, and d) Session 9: post-test. The length of the intervention allowed for keeping participants interested and retained in the project, based on the

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our previous work with churches in the local area (Ralston, et al., 2007; Williams, Ralston, Young-Clark & Coccia, 2014).

The intervention, designed to incorporate best practices from the adult education and faith-based literature, included two-hour weekly sessions held for the recruited participants from the three churches with the following components (see Figure 1): a) spiritual moments, b) a healthy meal, c) presentations by health providers, d) hands-on activities, e) prevention tips and f) homework assignments. The components reflect the intrapersonal, interpersonal and organizational levels of the socio-ecological model in that they focused on improving individual and parent-child health and also involved church leadership.

The kick-off and orientation to the project included a motivational talk on the importance of church-based health. The six content sessions on key content related to blood pressure control and more broadly cardiovascular health included: African American health, understanding hypertension, family history, nutrition, physical activity, and managing stress. These sessions helped to promote health knowledge, which was important considering the low levels of health literacy associated with African Americans (Paaschhe-Orlow et al., 2004; Shea et al., 2004). Information retention was promoted through hands on activities (Morgan & Holmes, 2012). Strategies used throughout the sessions incorporated learning principles consistent with both youth and adults (Camino, 2000). For example, care was taken to have short, interactive presentations by the health providers to keep both age groups engaged (Murdock & Paterson, 2002). Also, the protocol for each session included family members together providing testimonies about health tips they had tried during the week or outcomes of homework assignments. Finally, at the end of each session, participants divided into small groups for application activities (games and competitions) that involved all family members.

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Figure 1. CHECK YOUR HYPertension Intervention Model

Intervention Component	Best Practice	Theoretical Mechanism
Spiritual Moments	Infuse spiritual	Interpersonal, Organization
Prayer		
Bible reading		
Healthy Meals	Role modeling	Intrapersonal, Interpersonal
Meals met DASH criteria		
Recipes provided		
Sessions	Promote health literacy	Intrapersonal, Interpersonal
Kick-off/Orientation		
African American health		
Understanding hypertension		
Family history		
Lifestyle-Food/Nutrition		
Lifestyle-Physical activity		
Lifestyle-Managing stress		
Hands-on Activities	Retain information	Intrapersonal, Interpersonal
Activity sheets		
Games		
Competitions		
Sample exercises		
Prevention Tips	Ensure participation	Intrapersonal, Interpersonal
Getting more steps per day		
Eating more fruits and vegetables		
Drinking more water		
Using healthy oils and seasonings		
Getting blood pressure checked		
Homework Assignments	Sustain learning	Intrapersonal, Interpersonal
Ideas for carrying out the prevention tip during the week		
Exhibits and materials in church	Sustain learning	Organizational
Recognition Event	Efficacy	Intrapersonal, Interpersonal, Organizational

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Church health leaders were involved through sharing prevention tips (e.g., getting more steps per day, eating more fruits and vegetables, drinking more water) under the guidance of the project team. Other key features included homework assignments to promote learning within the family context (Morgan & Holmes, 2012), materials shared with health leaders for display in churches to reinforce learning, and t-shirts to promote camaraderie. Following all of the sessions, a recognition event was held with each family receiving a plaque to recognize achievement and a \$50 gift card to a discount store.

All sessions were held at a local community center in North Florida. Community centers as well as other community-based settings are increasingly used for church services (Daniel, 2009; Martinez, 2012), especially with the growth of non-denominational churches (Suh & Russell, 2015). Thus this location was appropriate for a faith-based intervention. Fidelity procedures included ensuring intervention delivery, receipt and enactment (Bellg et al., 2004). Delivery consistency procedures included outlining the intervention protocol prior to beginning the project so that the content and flow were developed thoroughly, and holding weekly meetings with staff to debrief each session, assess progress and troubleshoot any problems. Intervention receipt procedures included getting feedback from participants on session speakers and food served mid-way through the intervention to determine their satisfaction with the sessions, and checking on the extent they completed homework assignments through informal interaction and testimonials during the sessions. Intervention enactment was determined through completion of pre-test and post-test data collection.

Instruments and Clinical Measures

Questionnaire: A self-report questionnaire was developed for the pilot study to determine background characteristics and health behaviors of the family participants. The instrument was reviewed by the project staff for content and face validity, pilot tested with a small group of adults not in the current study, and then revised. The following items were used for this study:

Daily servings of fruits and vegetables. A one-item measure was used to determine daily servings of fruit and vegetables (“On average, what is the number of fruit/vegetable servings that you eat daily? A serving is considered ½ cup or one piece of whole fruit.”). Used extensively in previous dietary studies (Hebert et al., 2001; Peterson et al., 2008; Thompson, et al., 2002), this single item is considered valid for use in health behavior studies (Peterson et al., 2008). To determine validity, a major study was conducted that compared the item’s use with multiple 24 hour recalls (24HR), considered the gold standard in food consumption surveys. The item was positively correlated over time with 24HR ($r=0.45$ baseline, 0.50 follow-up), slightly underestimated fruit and vegetable intake, indicated no treatment effects, and was considered adequate when investigating intervention effects (Peterson et al., 2008). An inter-measure reliability of $r=0.56$ was determined for the item when correlated with mean servings from a 61-item food frequency questionnaire (Hunt et al., 1998).

Daily minutes of physical activity. A one-item measure was used to determine daily minutes of physical activity (“How many minutes of physical activity do you get daily? Examples of physical activity would be walking, running, gardening, housework, exercise class, among others.”) Physical activity measures using a single item have been used extensively in previous studies (Milton, Bull & Bauman, 2011). In a study to determine reliability and validity of a one item physical activity measure using “past week” and “past month” as a timeframe,

researchers found that the past week measure showed strong reproducibility ($r=0.72-0.82$), modest concurrent validity ($r=0.53$) with the validated Global Physical Activity Questionnaire, and strong agreement with current physical activity recommendations ($\kappa=0.63$, 95% CI 0.54 to 0.72) (Milton et al., 2011). Using “daily” as the timeframe is consistent with other physical activity measures used with youth (e.g., National Youth Physical Activity and Nutrition Survey) (CDC, 2015) and with adults (e.g., Yale Physical Activity Survey) (Dipietro, Caspersen, Ostefeld & Nadel, 1993).

Clinical Measurements: Clinical measurements included weight (in kilograms to the nearest tenth), height (using stadiometer, standing stature without shoes recorded in cm), calculation of BMI (kg/m^2), and blood pressure (three readings using non-dominant arm, sitting position).

Data Collection Protocol

Florida State University Institutional Review Board approved the protocol for the study. Data were collected from the family participants during evening sessions in January and March 2009. Questionnaires were administered to the families by project team members in a large room at the community center, and clinical measurements were collected by trained staff in adjacent private rooms. A medical advisor was present at data collection sessions to provide confidential consultations with participants.

Data Analysis

Data were coded, entered and then analyzed using SPSS version 16.0. Descriptive statistics and paired t-tests were used to analyze the individual data. Correlations of pre/post-test parent-child dyads were used to analyze the family data (in the three families where there were two parents in the sample, only one parent was randomly assigned for the correlation analysis). For children, BMI z-scores were used as recommended by the U.S. Centers for Disease Control and Prevention (CDC, 2002). The level of significance established for the pilot study was $p<.05$.

RESULTS

Background Characteristics

As shown in Table 1, of the 10 adult participants, six were female. Four were 36 to 42 years of age and two each were in the 43-49 and 50-56 age categories. Seven were high school graduates and two had completed some college (data not shown). Six adult participants were married, and two each were single and divorced. With regard to health status, four of the adult participants had high blood pressure, two had high cholesterol and one had diabetes. Eight of the adult participants had regular blood pressure exams and two had these exams occasionally. Five of the adult participants used blood pressure medication. For the seven children, four were female and three were male. Three of the children were 12-13, two were 16-17, and two were 18-20 years of age.

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Table 1. Background Characteristics of Family Members (n=17)

Adults (n=10)	Number	Percent	Children (n=7)	Number	Percent
Gender			Gender		
Female	6	60	Female	4	57
Male	4	40	Male	3	43
Age			Age		
18-21	0	0	12-13	3	43
22-28	0	0	14-15	0	0
29-35	2	20	16-17	2	28.5
36-42	4	40	18-20	2	28.5
43-49	2	20			
50-56	2	20			
57-63	0	0			
64+	0	0			
Marital Status					
Single	2	20			
Married	6	60			
Divorced	2	20			
Health Status					
Cancer	0	0			
Diabetes	1	10			
High blood pressure	4	40			
High cholesterol	2	20			
HIV/AIDS	0	0			
Sickle cell anemia	0	0			
BP Exam					
Regularly	8	80			
Occasionally	2	20			
Never	0	0			
BP Medication Use					
Yes	5	50			
No	5	50			

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Feasibility Outcomes

The average attendance for the total sample (n=17) for seven sessions (the kick-off/orientation and six content sessions) was 6.47(\pm 0.62). Children had slightly higher attendance rates than the parents (91% and 88%, respectively). Both groups achieved a completion rate of 100% (Table 2).

Table 2. Attendance and Completion Data

	Session Attendance (%)	Intervention Completion (%)
Children (n=7)	91	100
Parents (n=10)	88	100
Total Sample (n=17)	89	100

Health Outcomes

Paired t-test results for the children and adults are presented in Table 3. Children increased their average daily servings of fruit and vegetables from 2.43 (\pm 1.39) at pre-test to 3.93 (\pm 1.81) at post-test, which approached significance (p=.07). Adults significantly increased their intake of fruit and vegetables from 2.00 (\pm 1.50) at pre-test to 3.17 (\pm 1.39) at post-test (p=.02). With regard to physical activity, children increased their daily minutes from 98.42 (\pm 111.03) to 160.83 (\pm 224.99) while adults increased their daily minutes from 55.83 (\pm 28.18) to 62.50 (\pm 24.03).

Clinical outcomes show that the BMI z-scores for children were 0.96 (\pm 0.90) at pre-test and 1.04(\pm 0.82) at post-test (representing percentiles of 77.17 and 79.50, respectively). These data suggest that the children were at desirable percentiles at both pre-test and post-test (a score between 5th and 85th percentile is considered desirable) (Hunt, Stoddard, Peterson et al., 1998). For adults, the pre-test BMI was 35.91 (\pm 9.0) and the post-test BMI was 35.73 (\pm 9.2). Child participants decreased both systolic and diastolic blood pressure from 115.04 (\pm 12.04) to 109.39 (\pm 6.05) and 72.14 (\pm 9.26) to 70.19 (\pm 3.87), respectively. For adults, two BP analyses were conducted, one with all participants and a second with three outliers removed. In the initial analysis, average systolic BP readings were 130.51 (\pm 12.52) at pre-test and 131.60 (\pm 14.65) at post-test, and diastolic BP was 80.91 (\pm 9.05) and 80.09 (\pm 9.43), respectively. With the outliers removed, systolic BP decreased from 130.91 (\pm 11.69) to 127.10 (\pm 12.99) from pre-test to post-test while diastolic blood pressure declined from 76.91 (\pm 6.25) to 75.61 (\pm 7.08), respectively (Table 2). Follow-up descriptive data showed that the same five adult participants who were using BP medication at pre-test also were using BP medication at post-test. In addition, similar to the pre-test, eight of the ten adult participants indicated they had their blood pressure checked in the past six months (data not shown). Five of these eight adult participants improved their blood pressure from pre-test to post-test (systolic from 133.16 \pm 14.67 to 126.88 \pm 14.59; diastolic from 83.34 \pm 7.41 to 78.72 \pm 10.16, respectively).

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Variables noting significant health outcome changes or a trend toward change were further explored to determine parent-child correlates of change. The pre-test values of daily servings of fruit and vegetables, daily minutes of physical activity, systolic blood pressure, and diastolic blood pressure for the parent-child dyads were not significantly correlated (F-statistic of 0.57, 1.32, and 2.14, respectively). At post-test, daily servings of fruit and vegetables and systolic blood pressure for the parent-child dyads were significantly correlated (F-statistics of 11.61 and 13.44, $p=0.01$ and $p=0.006$, respectively). Neither diastolic blood pressure nor physical activity was significantly correlated at post-test (F-statistic of 0.62 and -0.213 respectively).

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Table 3. Paired T-Tests Results		Adults Participants				Child Participants			
		Pre-Test Mean (SD)	Post-Test Mean (SD)	T-Value	P	Pre-Test Mean (SD)	Post-Test Mean (SD)	T-Value	P
Daily Servings of Fruit & Vegetables n=9 adults, 7 children		2.00 (±1.50)	3.17 (±1.39)	-2.69	.027	2.43 (±1.39)	3.93 (±1.81)	-2.17	.073
Daily Minutes of Physical Activity n=6 adults, 6 children		55.83 (±28.18)	62.50 (±24.03)	-0.35	.739	98.42 (±111.03)	160.83 (±224.99)	0.49	.656
Body Mass Index n=9, adults, 6 children		35.91 (±9.0)	35.73 (±9.2)	0.31	.768	0.96 ^a (±0.90)	1.04 ^b (±0.82)	-1.30 ^c	.240
Systolic Blood Pressure n=7 adults, ^d 7 children		130.91 (±11.69)	127.10 (±12.99)	0.94	.383	115.04 (±12.04)	109.39 (±6.05)	1.35	.255
Diastolic Blood Pressure n=7 adults, ^d 7 children		76.91 (±6.25)	75.61 (±7.08)	0.49	.642	72.14 (±9.26)	70.19 (±3.87)	.542	.607

Note: Sample sizes varied due to missing data. ^aPercentile at Pre-test: 77.17 (25.37), ^bPercentile at Post-test: 79.50 (21.61), ^cPercentile T-value: -1.16, ^dOutlier data removed for three participants. With outlier data included average systolic BP readings were 130.51 (±12.52) at pre-test and 131.60 (±14.65) at post-test, and diastolic BP was 80.91 (±9.05) and 80.09 (±9.43), respectively.

DISCUSSION

The overall purpose of this study was to determine the feasibility and initial outcomes of a faith-based intervention to improve blood pressure control in African American parents/guardians and their children. In general, the results support findings of previous faith-based health research. The increases in daily servings of fruit and vegetables and in minutes of daily physical activity for child and adult participants at post-test are consistent with other faith-based studies (Baruth et al., 2008; Campbell et al., 1999; Crook et al., 2009; Peterson et al., 2002; Wilcox et al., 2007; Yanek et al., 2001). Of interest as well is the significant correlation in change of fruit and vegetable consumption for the parent-child dyads, indicating that household changes in dietary behavior may have been occurring as a result of the intervention which is also consistent with the literature (Hansen et al., 2005).

The clinical outcomes show relatively stable BMI's for both adults and children. These results are not surprising considering the short length of the intervention and the fact that a healthy lifestyle rather than weight loss was emphasized. Consistent with other faith-based studies (Campbell et al., 2007; Wilcox et al., 2007), blood pressure results show declines in systolic and diastolic blood pressure for both groups. Although the child sample had blood pressure readings that were in normal ranges at both pre-test and post-test, the decline suggests that the intervention may have had an impact which is important considering that some of these children were in households where adults had high blood pressure. For the adult participants, the results for systolic blood pressure at both pre-test and post-test are at the pre-hypertensive stage. Thus the decline, although small, is promising for helping these participants control their hypertension. Finally, the parent-child data show a significant correlation at post-test for systolic blood pressure, again indicating possible positive family health behavior changes at the household level (Adkins et al., 2004; Hansen et al., 2005).

There are some cautionary notes in the data. An examination of the standard deviations showed that the physical activity data for children had great variability. Thus, the increase in physical activity at post-test should be viewed with caution. It could be that the child participants had difficulty interpreting and then consistently responding to this question. For the adults, the lack of significant findings regarding physical activity may reflect the difficulty in working on two goals simultaneously, thus using a two-phase approach where goals are worked on sequentially may improve results. Finally, there were three adult outliers for the blood pressure data, demonstrating that some participants are in a constant struggle to bring their hypertension under control and the intervention with these individuals will require more in-depth work.

This pilot study provides some support for the socio-ecological model in that the intervention may have played a role in bringing about health behavior change at the individual level. Further, there is some support for interpersonal level change considering the significant findings for health outcome change in fruit and vegetable intake and systolic blood pressure in the parent-child groups. Finally, the pilot study findings have implications for the organizational level in that the intervention included active participation of health leaders and pastors especially in providing the spiritual moments and prevention tips. Although much more work needs to be done to determine the extent that the intervention supports the theoretical framework, this paper does demonstrate that multi-level outcomes for this faith-based intervention to improve health of African Americans can be examined.

There are several limitations in this study that should be highlighted. First, the hand selection of the family participants by the pastors and health leaders introduces a bias in the outcomes. These family members might be more motivated to change health behaviors than other church members. Although random assignment might be difficult in the church setting, developing a pool of participants who meet the study criteria and randomly selecting from this pool might be a partial solution. In addition to this issue, the small sample size is another limitation. Because this was a pilot study, the sample size was kept small but there is the broader issue of how many participants would be needed to yield at least moderate effect sizes. And would this sample size be feasible for the intervention? We conducted a power analysis using fruit and vegetable intake, a significant variable. The effect size for increased fruit and vegetable intake in this study was 0.37 which is a moderate effect. Based on the power analysis using $\alpha=0.05$ and $\beta=0.90$ to achieve a significant t-test, we would need a total sample of 79 participants. That sample size would not be feasible considering the need for interactive sessions. Based on this current model it would be necessary to divide the participants into two cohorts of approximately 40 participants each in order to see significant changes in fruit and vegetable intake. Conversely, by using formative evaluation data from the pilot intervention we hypothesize that in subsequent trials this intervention can be improved which may result in an increased effect size. If we were to increase the effect size to achieve a large effect size of 0.50, we would only need a sample of 42 participants to get significance.

In planning for a broader study, clearly more rigorous methodology will need to be employed. A quasi-experimental design (pre/post with comparison group) would be needed along with more in depth fidelity measures. In particular, for fidelity, more information would be needed about the extent that church leaders fulfilled their responsibilities in beginning to increase health awareness in their churches (e.g., displaying materials). Further, additional data would strengthen the study, including validated, multi-item measures for fruit and vegetable consumption and physical activity and also psycho-social measures (e.g., self-efficacy, religiosity) to determine the extent to which they might moderate outcomes. Finally, data on what parents did with their children to improve health behavior change would be helpful in explaining the effect of the intervention with families. Thus, the pilot has allowed the opportunity to develop and test the initial outcomes of the intervention but future studies will need to incorporate more rigor to determine true effectiveness.

CONCLUSION

The findings of this study suggest that a faith-based health intervention for African American parents/guardians and their children is feasible. In addition, this study suggests that this short-term, intensive intervention may result in some possible modest increases in daily fruit and vegetable intake and positive trends towards increases in daily physical activity and blood pressure in family participants. The challenge will be to determine whether or not health outcomes can be sustained in the parent and child participants over time. Further, to more fully explore the socio-ecological theoretical model, the broader impact on other family members in the household and on faith-based health program development will be important to examine. Thus, future studies that incorporate rigorous designs to determine the effectiveness of this faith-based health model are needed.

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