The Implementation of an Exercise by Prescription Program in Middle-aged Hypertensive African American Women

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***Abstract*—The purpose of this pilot study was to implement an 8 week exercise by prescription program in a rural community to decrease hypertension and change behaviors regarding physical activity in middle-aged African American women. Participants were asked to complete the International Physical Activity Questionnaire short form, the Exercise Stages of Change (short form) survey, and a manual blood pressure examination pre and post intervention. The sample size consisted of 10 middle-aged African American women with hypertension. Analysis of the descriptive statistics revealed that total time spent walking for at least 10 minutes increased from pre-intervention (M 111.90, SD 237.24) to post-intervention (M 132.10, SD 215.91) Data also indicated a decrease in pulse pressure from pre (M 47.80 SD 9.05) to post (M 47.10 SD 8.46) intervention. This study demonstrates that exercise prescriptions are an effective method of promoting physical activity in middle-aged African American women.**

***Index Terms*—African American Women, Hypertension, Exercise by Prescription**

I. Introduction

According to Banks-Wallace (2007), the reduction of cardiovascular risk factors in African American women is fundamental to the improvement of health in this population. There is a significant relationship between cardiovascular disease and hypertension. Hypertension is considered a major risk factor for coronary heart disease in African American women. In addition, it is well documented that exercise can reduce the incidence of hypertension in women. Hypertension frequently occurs more often in individuals who follow a more sedentary lifestyle as compared to those who are physically active. Research supports walking as being an easy and effective strategy to help combat hypertension in African American women.[1]

II. Background

More than 67 million American adults have been diagnosed with hypertension, which equates to 1 out of every 3 adults.[17] African Americans develop high blood pressure more often, and at an earlier age, than other ethnic groups. Additionally more black women than men have high blood pressure.[17] Blood pressure is a measurement of the force pushing against the walls of your arteries.[2] The Joint National Committee (JNC) on Prevention, Detection, Evaluation and Treatment of High Blood Pressure defines hypertension as having a systolic blood pressure (SBP) of 140 mm Hg or above and a diastolic blood pressure (DBP) of 90 mm Hg or above.[13]

Fifty-four percent of US adults have a sedentary lifestyle.[1] Health care providers routinely recommend exercise as part of the treatment for hypertension. Findings in research indicate that African American women have lower levels of physical activity than other races. Health care providers have become more aware that increasing physical activity helps to combat disorders such as hypertension.[3] The purpose of this project was to implement an exercise by prescription program in a rural community to decrease hypertension and change behaviors regarding physical activity in middle-aged African American women.

A. Exercise

The US Centers for Disease Control and Prevention (CDC) recommends 150 minutes of moderate physical activity such as brisk walking every week.[4] Walking is an effective form of exercise that is beneficial to hypertensive patients.[1] Despite this recommendation, 38.9% of African Americans are not meeting the recommended guidelines for physical activity, and 24.8% are completely sedentary.[14]

Walking is an easy and effective intervention which requires no fee, yet African American women infrequently participate in it. African American women have been identified as having socioeconomic and health disparities, yet health awareness strategies have proven to be ineffective. Robison and Wicks (2012) established that there must be a national effort to promote health care preventative interventions to promote physical activity in African American women.

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III. Methodology

A. Goals and Objectives

The purpose of this study was to implement an exercise by prescription program in a rural community to decrease hypertension and change behaviors regarding physical activity in middle-aged African American women. Institutional Review Board (IRB) approval was granted for this study.

There are moderate risks associated with exercise. Participants were asked to visit their primary care provider for medical clearance prior to participation. Benefits included the possibility of improvement in blood pressure readings in the participants and an opportunity to increase their knowledge of the relationship between exercise behaviors and hypertension. Risks and benefits of participating in the project were explained and listed on the informed consent.

B. Sample

Participants were required to present an exercise prescription to walk and a statement of medical clearance to participate in the program. Hypertensive African American middle-aged women without comorbid conditions, such as diabetes, musculoskeletal, and cardiovascular disease, were asked to participate in the program. The aforementioned conditions would limit the participant's ability to exercise. The final sample consisted of 10 self-identified African American hypertensive women.

C. Setting/Resources

The project was implemented in a rural community located in Alabama over the course of eight weeks. Recruitment occurred by placing flyers around local stores and businesses. Meetings and data collection occurred at a local church. Permission was granted by the church to use their facility. There were no external financial resources available for this project.

D. Intervention

An orientation meeting was held at the local church for participants who were interested in participating in the program. This meeting provided an opportunity for participants to discuss the intervention and an opportunity to ask questions. Informed consents were reviewed and issued for signatures. Baseline blood pressures were obtained and recorded at the initial meeting. Participants were asked to complete a baseline International Physical Activity Questionnaire (IPAQ) short form, an Exercise Stage of Change Questionnaire, and answer questions pertaining to demographics.

The participants were expected to follow their exercise prescriptions and walk for at least 150 minutes weekly for eight weeks. After eight weeks a post-intervention meeting was held, and participants were required to attend. At this meeting materials were collected, and the participants were asked to complete the post-intervention questionnaire. Manual blood pressures were also taken, and the participants were dismissed. Participants were encouraged to continue exercising and to follow the recommended guidelines.

E. Data Collection/Tools

The International Physical Activity Questionnaire short form (IPAQ) and the Exercise Stages of Change (short form) were utilized for data collection on behaviors associated with exercise pre and post intervention. The tools were located on a public domain, and permission was not required.

The IPAQ was designed for observation of physical activity in adults' ages 15-69.[6] There were two versions of the questionnaire, a long form and a short form. For purposes of this project, the short form was utilized. The IPAQ allowed for three levels of scoring regarding physical activity. Category I was considered the lowest level of physical activity, persons in this group were considered sedentary. Category II consisted of those who were moderately active with 3-5 days of exercising over 20 minutes per session. Those persons who were highly active were in Category III, exercising 3 or more days vigorously. Craig, Marshall, and Associates (2003) concluded that the IPAQ was comparable to most other self-report validation studies and its measurement properties were acceptable and reasonable as other physical activity questionnaires. Mader and Associates (2006) tested the reliability and validity of the IPAQ short form. Reliability was good "with a Spearman correlation coefficient range of 0.43-0.68 for measures of continuous data and moderate to fair with Kappa values between 0.32 and 0.46 for dichotomous measures active/inactive".[8]

The Exercise Stages of Change short form was developed by the Cancer Prevention Research Center (CPRC). Permission to utilize the tool was extended by the director of the CPRC, Dr. James Prochaska. This tool provided the definition of exercise and asked a single question to assess the current exercise behavior related to the definition and readiness to change.

> Regular Exercise is any *planned* physical activity (e.g., brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed *3 to 5 times* per week for *20-60 minutes* per session. Exercise does not have to be painful to be effective but should be done at a level that increases your breathing rate and causes you to break a sweat" ("Exercise: Stages of Change," 2013, para. 1).

Kosma and colleagues (2004) conducted a study of predictors of physical activity stage of change using the exercise stage of change questionnaire among adults with physical disabilities. The most accurate of the predictors were the early stages of change; least accurate was the maintenance stage. This study supports the construct validity of the stages of change as predictors.[10] Blaney and colleagues (2012) sought to validate measures of the Transtheoretical Model for exercise in a sample of African American adults. All the participants were asked to complete the Exercise Stages of Change to assess their

readiness according to the algorithm; the reliability and stability of the algorithm has been demonstrated in several studies.[11]

Demographic questions included items such as age, income level, education level, employment status, parental status, and marital status. The initial blood pressure was recorded as well. The pulse pressure was utilized for the analysis of blood pressures in this project. Pulse pressure is the difference between systolic and diastolic blood pressures. The normal pulse pressure is estimated to be 40 mm Hg. Treating hypertension tends to lower pulse pressures.[12] The questionnaires were number coded and were given pre and post intervention. The participant's names and assigned code number were recorded in a code book which was secured in a locked file with the exercise prescriptions and statement of medical clearances.

A spiral notebook and pen were provided to each participant to use as a walking journal. The participants recorded the date and time in minutes spent walking daily. Instructions on daily recording in the journal were demonstrated at the initial meeting with the participants.

IV. Data Analysis

A. Statistical Results

Data were compiled into a dataset and analyzed using SPSS version 21.0. Characteristics of the study sample are found in **Table 1**. The majority of the participants were between the ages of ages 35-40 (60%, $n = 6$), college graduates (70%, $n = 7$), and employed full time (80%, $n = 8$). Fifty percent ($n = 5$) were married with children under the age of 19. Forty percent ($n = 4$) had an income of 60,000 or more.

Table 1. Demographic Characteristics (N=10)

	n (%)
Age in years	
35-40	6 (60%)
41-45	1 (10%)
51-55	1 (10%)
61-64	1 (10%)
Annual Household Income Level	
<20,000	1 (10%)
21,000-39,999	3 (30%)
40,000-59,999	1 (10%)
60,000 or more	4 (40%)
Educational Level	
Some College	2 (20%)
College Graduate	7 (70%)
Employment Status	
Full-time (>35 hours/wk)	8 (80%)
Part-time (<35 hours/wk)	1 (10%)
Retired	1 (10%)
Marital Status	
Single	4 (40%)
Married	5 (50%)
Separated/Divorced	1 (10%)

The mean, standard deviation, range of time spent walking for at least 10 minutes, time spent sitting on weekdays, time spent doing vigorous and moderate activities over past 7 days, and pulse pressure were analyzed pre- intervention and post-intervention. There was an increase in the time spent doing vigorous activities in minutes pre intervention ($M = 37$; $SD = 49.89$) to post-intervention ($M = 97$; $SD = 150.41$). Time spent doing moderate activities in minutes increased from pre-intervention ($M = 39$; $SD = 63.32$) to post- intervention ($M = 115$; $SD = 192.25$). There was also an increase in the time spent walking for at least 10 minutes from pre-intervention ($M = 111.90$; $SD = 237.24$) to post-intervention (132 minutes $M = 132.10$; $SD = 215.91$). Time spent sitting on a week day increased slightly possibly due to the threat of testing.

Mean standard deviation and range of minutes spent walking weekly over the course of 8 weeks is found in **Table 2**. The time spent walking daily in minutes were recorded by participants in walking journals. The minutes spent walking increased from week 1 ($M = 196.10$; $SD = 108.97$) to week 8 ($M = 218.30$; $SD = 85.11$).

Table 2.
Means, standard deviations and ranges for feedback time totals (N = 10)

Variable	*M*	*SD*	Range
Walking during week 1	196.10	108.97	52-420
Walking during week 2	213.60	109.79	106-420
Walking during week 3	202.60	93.26	100-360
Walking during week 4	169.10	106.85	0-300
Walking during week 5	195.00	111.47	50-420
Walking during week 6	187.80	110.14	43-420
Walking during week 7	224.20	112.11	75-420
Walking during week 8	218.30	85.11	120-360

Frequencies of self-reported exercise behavior before and after the intervention are found in **Table 3**. The participants completed the Exercise Stage of Change short form in which they acknowledged whether or not they exercised regularly according to a definition of exercise. There was an increase in the number of participants who exercised regularly for less than 6 months according to the definition from pre- intervention (30%, $n = 3$) to post-intervention (70%, $n = 7$). One person ($n = 1$) answered they were not exercising regularly but planned to begin within the next 6 months. Prior to the intervention 60%

(n = 6) of the participants spent 0 days doing vigorous or moderate physical activity in the past 7 days. At the end of the intervention, only 30% (n = 3) of participants spent 0 days doing vigorous or moderate physical activity.

Table 3. Self-reported amount of physical activity (N=10)

	Pre-intervention		Post intervention	
	n	%	*n*	%
Do you exercise regularly according to the definition?				
Yes, >6 months	3	30	2	20
Yes, <6 months	3	30	7	70
No, but I intend	3	30	1	10
to in next				
30 days				
No, but I intend	1	10	0	0
to in next				
6 months				
During last 7 days, how many days did walk?				
None	3	30	0	0
4 days	0	00	1	10
5 days	3	30	4	40
6 days	1	10	1	10
7 days	3	30	2	20
Days of vigorous physical activity?				
None	6	60	3	30
1 day	1	10	0	0
2 days	0	0	1	10
4 days	1	10	1	10
5 days	1	10	4	40
6 days	1	10	0	0
7 days	0	0	1	10
Days of moderate physical activity				
None	6	60	3	30
2 days	0	0	1	10
3 days	1	10	0	00
4 days	0	0	1	10
5 days	0	0	2	20
6 days	2	20	1	10
7 days	1	10	2	20

Due to the small sample size inferential statistics were not conducted.

V. Limitations

Limitations included the sample size of only 10 participants. There were difficulties recruiting the targeted sample size of 25-35 participants. A small sample size limited data analysis to solely descriptive statistics. A large amount of data was self -reported and could not be independently verified. The participants were asked to complete questionnaires regarding their exercise behavior before, over the course of 8 weeks, and after completing the programs.

VI. System and Practice Impact

A. Discussion of Findings/Outcome

There was an increase in the time spent doing vigorous activities in minutes pre-intervention (M = 37; SD = 49.89) to post-intervention (M = 97; SD = 150.41). Time spent doing moderate activities in minutes increased from pre-intervention (M = 39; SD = 63.32) to post- intervention (M = 115; SD = 192.25). There was also an increase in the time spent walking for at least 10 minutes from pre-intervention (M = 111.90; SD = 237.24) to post- intervention (132 minutes M = 132.10; SD = 215.91). Time spent sitting on a weekday increased slightly possibly due to the threat of testing. The participants completed the Exercise Stage of Change short form in which they acknowledged whether or not they exercise regularly according to a definition of exercise. There was an increase in the participants who exercised regularly for less than 6 months according to the definition from pre- intervention (30%, n = 3) to post- intervention (70%, n = 7). One person (n = 1) answered they were not exercising regularly but planned to begin within the next 6 months. Prior to beginning the intervention 60% (n = 6) of participants spent 0 days doing vigorous or moderate physical activity over past 7 days. At the end of the intervention, only 30% (n = 3) of participants spent 0 days doing vigorous or moderate physical activity.

B. Implications for Practice Chang/Sustainability

According to Baskin and colleagues (2011) regular physical activity helps to reduce hypertension and cardiovascular disease. This project has the opportunity for continued development within the community. Evidence based findings should change clinical and organizational standards because research provides an opportunity to provide improvements in practice and provide high quality, safe care.[16] Further research is needed in the area of exercise prescriptions and their effect on exercise behavior and patterns with a larger sample size.

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