ORIGINAL
Research

JoEllen Wilbur, PhD, RN, FAAN, Lynne T. Braun, PhD, APN, FAAN,
Susan W. Buchholz, PhD, APN, Arlene M. Miller, PhD, RN, FAAN,
Louis Fogg, PhD, Shannon Halloway, PhD, RN,
and Michael E. Schoeny, PhD

Randomized Controlled Trial of Lifestyle Walking for African American Women: Blood Pressure Outcomes

Abstract: *The aim of this study was to test the effects of a lifestyle physical activity intervention (group meetings alone vs supplemented by personal or automated calls) on changes in systolic/diastolic blood pressures from baseline to 24 and 48 weeks among African American women. This was a randomized controlled trial with intervention conditions randomly assigned across 6 community health care sites. Participants were 288 sedentary African American women without major signs/symptoms of cardiovascular disease. Each intervention had 6 group meetings over 48 weeks, with 1 of 3 options between meetings: (1) no calls, (2) personal motivational calls, or (3) automated motivational calls. Blood pressures were taken at baseline, 24 weeks, and 48 weeks. Separate analyses were conducted using blood pressure classifications from the 2003 and 2017 high blood pressure guidelines. Average blood pressures decreased approximately 3 mm Hg for systolic and 2 mm Hg for diastolic from baseline to 48 weeks, with no differences between conditions. For both 2003 and 2017 blood pressure*

classifications, the risk ratio (odds of moving to a lower classification) was 1.44 for each assessment ($P < .001$). This lifestyle walking intervention appears beneficial in lowering blood pressure across blood pressure classifications in midlife African American women.

Keywords: physical activity; blood pressure; African American; women

results in nearly \$330 billion in health care spending.¹ Across both sexes, all age groups, and all ethnicities, non-Hispanic black women have the highest prevalence of hypertension (46%) and cardiovascular disease (47%).¹ A meta-analysis showed a direct relationship between level of blood pressure and stroke, ischemic heart disease, and other cardiovascular causes of mortality.³ For example, epidemiological evidence

More than 34% of Americans 20 years of age and older have hypertension (high blood pressure), with prevalence increasing with age for both men and women.^{1,2} By the age of 65, women's prevalence of hypertension surpasses that of men's (65% vs 63%).¹ Hypertension is a leading risk factor for cardiovascular disease, which affects 92.1 million Americans and

showed that systolic blood pressure differences as small as 2 mm Hg in middle-aged adults can reduce stroke mortality by 10%.³

Physical activity is a modifiable health behavior associated with many health benefits, including prevention of hypertension, and is linked to lower blood pressure in individuals with and without hypertension.⁴ Despite the

DOI: 10.1177/1559827618801761. From the College of Nursing, Rush University, Chicago, Illinois. Address correspondence to: JoEllen Wilbur, PhD, APN, FAAN, College of Nursing, Rush University, 600 S Paulina, Ste 1062A, Chicago, IL 60612; e-mail: JoEllen_Wilbur@rush.edu.

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known benefits of physical activity, a minority of Americans meet the recommended guidelines of 150 minutes of moderate-vigorous physical activity per week,⁵ with non-Hispanic black women having the lowest prevalence for meeting guidelines (35.0% vs 50.3% for non-Hispanic black men and 50.9% for white women).¹ Thus, targeted physical activity interventions should be implemented to increase physical activity in this population at risk for hypertension.

Walking programs are an effective strategy for increasing and sustaining lifestyle physical activity,^{6,7} and women favor lifestyle interventions compared with structured exercise sessions in the gym or laboratory settings.^{8,9} Walking requires no equipment, can be done in and around the home or work place, and is cost-effective. A recent systematic review of 16 lifestyle walking programs with samples that were predominantly women revealed reductions in both systolic blood pressure (3.58 mm Hg) and diastolic blood pressure (1.54 mm Hg).⁷ In the one study that reported race and ethnicity, however, only 17% of the sample was African American,¹⁰ suggesting that we do not yet completely understand the benefits of walking for African American women.

We identified 18 physical activity interventions culturally designed for African American adults, with samples $\geq 80\%$ women. Of these 18 studies, only 6 examined changes in blood pressure.¹¹⁻¹⁶ Interventions for these 6 studies were on average 10.7 weeks, and group-based physical activity took place in churches/faith-based communities ($n = 3$), community centers ($n = 2$), or a gym setting ($n = 1$). Of these 6 studies, only 2 studies found significant improvements in blood pressure at the end of the active intervention.^{11,12,14} Furthermore, only one study examined blood pressure effects during maintenance.¹¹ They found improvement during maintenance but not at the end of the active intervention. However, consistent with a weakness noted in prior study reviews of physical activity interventions and changes in blood

pressure, that study had high attrition.¹⁷ Not including dropouts may have inflated the findings. More attention needs to be given to physical activity intervention effects, including lifestyle walking (walking obtained at leisure, occupational, household, transport) on blood pressure during the maintenance phase.

To our knowledge, physical activity clinical trials have not examined changes or improvements in blood pressure classifications that provide the definition of high blood pressure. The 2003 guidelines for awareness, prevention, treatment, and control of high blood pressure classified hypertension as a systolic pressure of 140 mm Hg or greater or a diastolic pressure of 90 mm Hg or greater (Table 1).^{18,19} Findings from a recent clinical trial, however, showed persons randomly assigned to a systolic blood pressure target of less than 120 mm Hg systolic versus a target less than 140 mm Hg systolic had fewer cardiovascular events.²⁰ This study contributed to lowering the definition of high blood pressure. The 2017 guidelines for awareness, prevention, and control of high blood pressure now classify 120 to 129 mm Hg systolic with less than 80 mm Hg diastolic as elevated blood pressure, and 130 mm Hg or greater systolic or 80 mm Hg or greater diastolic as hypertension (Table 1).¹⁹ Examination of the changes based on blood pressure classifications will provide a better understanding of the benefits of physical activity.

The purpose of this secondary analysis was to examine the impact of a lifestyle walking intervention on change in blood pressure in midlife African American women from baseline through assessments at 24 weeks (end of active intervention) and 48 weeks (end of a less intensive maintenance intervention). The program included 3 treatment conditions: group meetings alone, group meetings plus personal telephone calls, and group meetings plus automated telephone phone calls. Using both the 2003 and new 2017 guidelines for awareness, prevention, and control of high blood pressure,^{18,19} the aims of

these analyses are to (1) examine change in systolic, diastolic, and blood pressure classifications from baseline through 48 weeks and (2) determine if the changes in blood pressure differ by physical activity intervention condition. We hypothesized that blood pressure would decrease in all 3 intervention conditions but would decrease more in the 2 intervention conditions with telephone calls than in the group-only condition.

Methods

Design

Full details of the randomized clinical trial design from the parent study are available elsewhere.²¹ Briefly, a cluster-randomized, Latin-square design in which the order of intervention delivery was counterbalanced across 6 community sites was used to compare the 3 intervention conditions.²² The sites were randomized by the project statistician using a random number-generating function from Excel to create a site assignment worksheet for the 3 waves of the study (6 sites $\times$ 3 waves = 18 intervention groups). Each site received a new condition after the prior wave finished. Recruitment started February 2010 and ended October 2012, while follow-up ended October 2013. Data collectors were blinded to study allocation. Institutional review boards from 2 universities approved the study.

Setting and Sample

Described in full detail earlier,^{21,23} inclusion criteria were the following: (1) African American female; (2) between the ages of 40 and 65 years; (3) participated in moderate-vigorous physical activity less than 3 times a week; (4) systolic blood pressure < 160 mm Hg and diastolic blood pressure < 100 mm Hg; (5) if taking antihypertensive medication, it had to be stable for 3 months prior to enrollment to minimize potential impact on study outcomes; and (6) if diabetic, A1C < 9 . Exclusion criteria were the following: (1) major signs or symptoms suggestive of pulmonary or cardiovascular disease or

Table 1.

Blood Pressure Classifications by 2003 and 2017 Guidelines.

Classification	Systolic (mm Hg)		Diastolic (mm Hg)
2003 guidelines			
Normal	<120	and	<80
Prehypertension	120-139	or	80-89
Hypertension			
Stage 1	140-159	or	90-99
Stage 2	≥160	or	≥100
2017 guidelines			
Normal	<120	and	<80
Elevated	120-129	and	<80
Hypertension			
Stage 1	130-139	or	80-90
Stage 2	≥140	or	≥90

disabilities that would prevent regular participation in physical activity, such as walking, as determined by the Physical Activity Readiness Questionnaire,²⁴ and (2) self-reported history of myocardial infarction or stroke. African American women were recruited from Chicago communities where the 6 community health care sites were located. The sites were located in or bordering predominantly African American or near low-income census tracts.²⁵ Among retention strategies described earlier was \$40 for completing each study assessment (baseline, 24 weeks, and 48 weeks) and a pedometer given to participants at study completion.²⁶

All participants provided informed written consent. A total of 288 women were screened eligible for the study and are included in these analyses. Sixteen women withdrew or missed the 24-week assessment (total 272), and 12 women withdrew or were lost to follow-up at 48 weeks (total 260).²¹ Health problems (n = 5), time constraints (n = 5), and family issues (n = 7) were the primary

reasons for withdrawal. As reported earlier, the mean age of the women at baseline was 53 years (range = 40-65). Over one third (36.8%) of the women had one child or more under age 18; just under half had a college degree or higher (49.5%); and 60.4% had a family income of less than \$60 000.²¹ The 28 women who did not complete the 48-week assessment were significantly younger (49.3 years vs 53.5 years, $P < .001$).

Intervention

The Women's Lifestyle Physical Activity Program has been described in detail elsewhere.²¹ Briefly, women in all 3 intervention conditions participated in group meetings, which consisted of 5 meetings over the 24-week active intervention phase followed by a sixth "booster" meeting offered midway through the 24-week maintenance intervention phase. The manualized group meetings were facilitated by predominately African American nurses. Group meetings consisted of individual

time with the facilitator to discuss physical activity goal setting and to receive feedback on progress toward goals. The goal was to increase the woman's physical activity by at least 3000 steps per day above baseline.²⁷ The women received an accelerometer/ pedometer to monitor their steps and entered their steps daily or weekly into an automated telephone computer-linked system for review at the group meeting. Group discussion time began with a short video featuring African American women role models demonstrating skills, sharing experiences, and sharing challenges. At the group meeting, strategies consistent with social cognitive theory, including self-regulation, behavioral rehearsal, vicarious experience, and behavioral capability, were applied systematically to overcome barriers, increase self-efficacy, and develop realistic outcome expectations.²⁸

Six groups (96 participants in total) received the personal call condition from their nurse facilitator between group meetings. Motivational interviewing techniques were used to help women explore and resolve ambivalence about increasing physical activity.²⁹ The calls were tailored to match each woman's needs, experiences, barriers, motivation, and confidence.³⁰ During the active intervention phase, women received 6 motivational calls; one motivational call was made before and one after the booster group meeting (total 2) during the maintenance intervention phase.

Six groups (97 participants in total) received the automated call condition between group meetings (6 calls during the active phase and 2 calls during the maintenance phase). The calls were structured to match the content and delivery of person-delivered calls and were recorded by an African American singer/actress. Each call offered a menu of selections for information. The menu of 15 topics (23 items) included ways to incorporate physical activity into daily life and the benefits of becoming more active. Options were changed to reflect information pertinent to the season of the year. At the end, women were asked to enter their next step goal and their

Table 2.Systolic and Diastolic Blood Pressure at Baseline, 24 Weeks, and 48 Weeks by Treatment Condition (N = 288)^a.

Measure	Treatment Condition	Baseline			24 Weeks			48 Weeks		
		n	M	SD	n	M	SD	n	M	SD
Systolic BP (mm Hg)	WWP	94	125.8	16.0	89	125.2	16.2	88	121.5	16.1
	WWP + PC	95	125.7	14.2	93	124.5	14.0	86	124.8	14.9
	WWP + AC	96	127.9	13.7	90	128.7	14.8	86	124.4	14.5
	Total	285	126.5	14.6	272	126.1	15.1	260	123.6	15.2
Diastolic BP (mm Hg)	WWP	94	79.3	9.9	89	77.5	9.5	88	76.4	10.9
	WWP + PC	95	79.7	8.9	93	78.5	10.3	86	78.8	9.9
	WWP + AC	96	80.9	8.2	90	80.2	10.5	86	78.3	10.3
	Total	285	80.0	9.0	272	78.8	10.1	260	77.8	10.4

Abbreviations: M, mean; SD, standard deviation; BP, blood pressure.

^aSample sizes may not total 288 due to missing data.

confidence (0-10) in meeting the goal. Women with confidence below 8 were encouraged to adjust physical activity goals to increase confidence. Six groups (95 women in total) had no contact between the group visits except reminder calls for upcoming meetings and automated reminder calls to report steps in the automated telephone computer-linked system.

Measures

All women were asked at baseline if their health care provider was currently prescribing blood pressure medication for them. Blood pressure, the primary outcome for these analyses, was measured at baseline, 24 weeks (end of active intervention), and 48 weeks (end of limited maintenance intervention). Blood pressure was measured by a validated electronic BP device (Omron HEM-907XL automated BP machine),³¹ with appropriate cuff size, using guidelines recommended by the National High Blood Pressure Education Program.^{18,19} Women were seated at rest for 15 to 30 minutes, and they confirmed they had not ingested caffeine, exercised, or smoked within 30 minutes. Clothing

was removed from both arms, and the woman was seated with her feet flat on the floor and her arm supported at heart level.³² Blood pressure was taken on the right and left arms. Two additional systolic and diastolic blood pressures were taken from the arm with the highest blood pressure, and the 3 values were averaged.^{32,33} Blood pressures were classified according to both the 2003 and 2017 guidelines for awareness, prevention, and control of high blood pressure (Table 1).^{18,19}

Analyses

Descriptive analyses, including means and standard deviations for systolic and diastolic blood pressure (mm Hg), were done for all available data at baseline, 24 weeks, and 48 weeks. For the 2003 and 2017 blood pressure classifications, separate contingency tables were constructed for baseline to 24 weeks and baseline to 48 weeks.^{18,19}

Multilevel growth models were conducted to assess change over time (baseline, 24 weeks, and 48 weeks) in blood pressure (linear models) and blood pressure classifications (logistic ordinal models). These models included

terms for condition, time (coded 0 for baseline, 1 for 24 weeks, and 2 for 48 weeks), and the condition × time interaction. These models employed maximum likelihood estimation, allowing all cases (N = 288) to be included in the analyses, regardless of missing assessments.

Results

A total of 47.5% of the women reported that their health care provider currently prescribed blood pressure medication for them. Table 2 shows the means and standard deviations for systolic and diastolic blood pressure by treatment condition at baseline, 24 weeks, and 48 weeks. The average blood pressures decreased approximately 3 mm Hg for systolic and 2 mm Hg for diastolic from baseline to 48 weeks. Tables 3 and 4 show contingency tables for the 2003 and 2017 blood pressure classifications, respectively.^{18,19}

In Tables 3 and 4, the diagonal (bold font) represents cases whose classifications were unchanged from baseline to the corresponding follow-up

Table 3.Change in Blood Pressure Classifications From Baseline to 24 and 48 Weeks by Baseline Classifications Using 2003 Guidelines^a.

Baseline Classification					
24-Week Classification	Optimal	Prehypertension	Stage 1 HTN	Stage 2 HTN	Total
Optimal	43 (55%)	27 (23%)	8 (11%)	0 (0%)	78 (29%)
Prehypertension	29 (37%)	70 (59%)	33 (46%)	0 (0%)	132 (49%)
Stage I HTN	3 (4%)	21 (17%)	24 (33%)	0 (0%)	48 (18%)
Stage II HTN	3 (4%)	1 (1%)	7 (10%)	0 (0%)	11 (4%)
Baseline total	78 (29%)	119 (44%)	72 (27%)	0 (0%)	269 (100%)
Baseline Classification					
48-Week Classification	Optimal	Prehypertension	Stage 1 HTN	Stage 2 HTN	Total
Optimal	48 (65%)	43 (38%)	10 (14%)	0 (0%)	101 (39%)
Prehypertension	22 (30%)	53 (47%)	37 (52%)	0 (0%)	112 (44%)
Stage I HTN	3 (4%)	14 (13%)	21 (30%)	0 (0%)	38 (15%)
Stage II HTN	1 (1%)	2 (2%)	3 (4%)	0 (0%)	6 (2%)
Baseline total	74 (29%)	112 (43%)	71 (28%)	0 (0%)	257 (100%)

Abbreviation: HTN, hypertension.

^aBold text along the diagonal represents no change. Above the diagonal represents improvement; below the diagonal represents worsening.**Table 4.**Change in Blood Pressure Classification From Baseline to 24 Weeks and 48 Weeks by Baseline Classification Using 2017 Guidelines^a.

Baseline Classification					
24-Week Classification	Normal	Elevated	Stage 1 HTN	Stage 2 HTN	Total
Normal	43 (55%)	9 (27%)	18 (21%)	8 (11%)	78 (29%)
Elevated	8 (10%)	5 (15%)	11 (13%)	5 (7%)	29 (11%)
Stage 1 HTN	21 (27%)	12 (35%)	42 (49%)	28 (39%)	103 (38%)
Stage 2 HTN	6 (8%)	8 (23%)	14 (17%)	31 (43%)	59 (22%)
Baseline total	78 (29%)	34 (13%)	85 (31%)	72 (27%)	269 (100%)
Baseline Classification					
48-Week Classification	Normal	Elevated	Stage 1 HTN	Stage 2 HTN	Total
Normal	48 (65%)	15 (47%)	28 (35%)	10 (14%)	101 (39%)
Elevated	7 (10%)	4 (12%)	9 (11%)	7 (10%)	27 (11%)
Stage 1 HTN	15 (20%)	8 (25%)	32 (40%)	30 (42%)	85 (33%)
Stage 2 HTN	4 (5%)	5 (16%)	11 (14%)	24 (34%)	44 (17%)
Baseline total	74 (29%)	32 (13%)	80 (31%)	71 (28%)	257 (100%)

Abbreviation: HTN, hypertension.

^aBold text along the diagonal represents no change. Above the diagonal represents improvement; below the diagonal represents worsening.

Table 5.

Multilevel Growth Models Assessing Blood Pressure and Blood Pressure Categories (Using 2003 And 2017 Classifications Separately) Across the 48-Week Time Span.

Parameter	Systolic BP, Est (SE)	Diastolic BP, Est (SE)	BP Category (2003), Est (SE) ^a	BP Category (2017), Est (SE) ^a
Intercept/thresholds ^b				
1	126.40 (1.44) ^{***}	79.20 (0.89) ^{***}	−5.01 (0.45) ^{***}	−1.79 (0.31) ^{***}
2			−1.73 (0.29) ^{***}	0.60 (0.29) [*]
3			1.37 (0.28) ^{***}	1.38 (0.30) ^{***}
Study arm (WWP only is reference)				
WWP + AC	2.27 (2.02)	1.93 (1.25)	0.44 (0.37)	0.44 (0.40)
WWP + PC	−0.74 (2.02)	0.28 (1.26)	−0.03 (0.37)	0.06 (0.40)
Time	−2.16 (0.79) ^{**}	−1.30 (0.53) [*]	−0.56 (0.17) ^{**}	−0.52 (0.17) ^{**}
Time × Study arm (WWP only is reference)				
WWP + AC	0.55 (1.12)	0.13 (0.75)	0.24 (0.23)	0.15 (0.24)
WWP + PC	1.44 (1.12)	0.78 (0.75)	0.37 (0.23)	0.34 (0.23)

Abbreviations: BP, blood pressure; Est, estimate; SE, standard error.

^aEstimates and standard errors are for the log-odds in the ordinal mixed models.

^bFor ordinal models with 4 levels, there are 3 threshold estimates.

* $P < .05$. ** $P < .01$. *** $P < .001$.

assessment. Cases above the diagonal improved, while cases below the diagonal worsened. Under the 2003 blood pressure classifications, 25.2% of cases improved from baseline to 24 weeks, 23.8% worsened, and 50.9% stayed the same. From baseline to 48 weeks, 35.4% improved, 17.3% worsened, and 47.2% stayed the same. Under the 2017 blood pressure classifications, 29.4% of cases improved from baseline to 24 weeks, 25.7% worsened, and 45.0% stayed the same. From baseline to 48 weeks, 38.6% improved, 19.2% worsened, and 42.1% stayed the same.

Table 5 presents the results of the multilevel growth models. Across all 4 outcomes (systolic BP, diastolic BP, classification 2003, and classification 2017), the results showed significant improvements over time. For systolic blood pressure, participants averaged a

significant decrease of 1.51 (SE = 0.46) mm Hg per assessment, $F(1, 270) = 10.75$, $P = .001$. Dividing by the baseline standard deviation (14.6), this corresponds to an effect size of $d = 0.10$ at 24 weeks and $d = 0.21$ at 48 weeks. Variation by condition for systolic blood pressure was nonsignificant for baseline level, $F(2, 253) = 1.21$, $P = .299$, and for change over time, $F(2, 253) = 0.84$, $P = .432$. For diastolic blood pressure, participants averaged a significant decrease of 0.99 (SE = 0.31) mm Hg per assessment, $F(1, 270) = 10.14$, $P = .002$. Dividing by the baseline standard deviation (9.0), this corresponds to an effect size of $d = 0.11$ at 24 weeks and $d = 0.22$ at 48 weeks. Variation by condition for diastolic blood pressure was nonsignificant for baseline level, $F(2, 253) = 1.39$, $P = .251$, and for change over time, $F(2, 253) = 0.61$, $P = .543$.

For the 2003 blood pressure classifications, the risk ratio (odds of improving [ie, moving to a *lower* classification]) was 1.44 for each assessment, $F(1, 270) = 14.56$, $P < .001$. Variation by condition for the 2003 blood pressure classifications was nonsignificant for baseline level, $F(2, 251) = 1.07$, $P = .344$, and for change over time, $F(2, 251) = 1.44$, $P = .238$. For the 2017 blood pressure classifications, the risk ratio was 1.44 for each assessment, $F(1, 270) = 13.57$, $P < .001$. Variation by condition for the 2017 blood pressure classifications was nonsignificant for baseline level, $F(2, 251) = 0.71$, $P = .495$, and for change over time, $F(2, 251) = 1.01$, $P = .367$. Supplemental analyses (not presented) assessed curvilinear (quadratic) change over time and found no evidence of significant quadratic slopes; therefore, only linear slopes are presented.

Discussion

Examination of the women's baseline blood pressures using the 2003 guidelines for awareness, prevention, and control of high blood pressure revealed that approximately 27% of the women were classified as stage 1 hypertension, while none was classified as stage 2 hypertension.¹⁸ When using the 2017 guidelines, however, 31% of the women were classified as stage 1 hypertension, and approximately 27% were classified as stage 2 hypertension.¹⁹ The stricter guidelines therefore classify approximately one third more women (31% vs 58%) as having stage 1 or higher hypertension.

In earlier analyses, when we used the National Health and Nutrition Examination Survey (NHANES) definition of hypertension (meeting the 2003 stage 1 or higher classification [systolic ≥ 140 mm Hg or diastolic ≥ 90 mm Hg] and/or were currently being prescribed antihypertensive medication by their health care provider),³⁴ we reported that 58% of the women participating in the study at baseline had hypertension.³⁵ As expected, this was somewhat higher than the 46% hypertension rate for all non-Hispanic black women 20 years of age or over (NHANES).¹ The difference is likely due to the fact that the NHANES sample included a broader age range of women. No comparative data are available for hypertension defined as meeting the 2017 stage 1 or higher blood pressure classification (systolic ≥ 130 mm Hg or diastolic ≥ 80 mm Hg) and/or currently being prescribed antihypertensive medication by their health care provider.¹⁹ However, among our women meeting these criteria, the percentage with hypertension rose to 75%. Considering the high percentage of African American women at risk for cardiovascular disease and stroke due to hypertension, earlier targeting with strategies to lower and maintain blood pressure under 120 mm Hg systolic and 80 mm Hg diastolic is essential.

Consistent with findings from a recent systematic review of lifestyle walking programs that showed on average a 3.6

mm Hg reduction in systolic blood pressure and 1.5 mm Hg in diastolic blood pressure,⁷ we found decreases of approximately 2.9 mm Hg for systolic and 2.2 mm Hg for diastolic blood pressure. This meets a standard, as noted earlier, that systolic blood pressure differences as small as 2 mm Hg in middle-aged adults can reduce stroke mortality by 10%.³

Our results showing significant linear effects, but not quadratic effects, of walking on blood pressure suggest that the reason for failing to find significant effects in previous physical activity intervention studies with African American women may have been that the follow-up period was inadequate to allow for detection of mean effects. Similar to the present study, the one study that followed participants past the active intervention phase saw significant improvement in blood pressure only at the end of the maintenance phase.¹¹

There are some limitations to this study. First, there were only 3 assessments (baseline, 24 weeks, and 48 weeks); therefore, the analysis is not highly powered to assess curvilinear change. Second, we did not include a no-exercise control group, limiting our ability to confidently attribute changes in blood pressure to the intervention. However, previous studies that included no-exercise control groups found no significant blood pressure change in the control groups.⁷

There are also study strengths. Failure to account for dropouts was a criticism of physical activity and hypertension studies in early reviews.¹⁷ Thus, findings yielded an overestimate of improvement in blood pressure. A strength of our study was that we included an intent-to-treat analysis and statistical model that included all cases regardless of study dropout, thus providing an unbiased estimate. Another strength is that the intervention had both an active intervention phase and a limited intervention maintenance phase covering approximately 1 year. This allowed added time to observe blood pressure changes. Also, unlike many prior studies, study retention was high at the end of

active intervention assessments (94%) and at the end of a less intensive maintenance intervention assessment (90%). Therefore, the study sample was adequately powered to show changes in blood pressure. As identified earlier, the women participating in this study had higher educational levels than the median for Chicago (49% vs 17% having a bachelor's degree or higher). Therefore, findings may not be generalizable to all urban-dwelling African American women.²¹

In summary, this study is among the first to identify the benefits of a lifestyle physical activity intervention in reducing blood pressure using the latest guidelines for awareness, prevention, and control of high blood pressure.¹⁹ Future studies should explore the link between intervention changes in lifestyle walking and changes in blood pressure.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical Approval

Institutional review boards from Rush University and the University of Illinois at Chicago approved the study.

Informed Consent

All participants provided informed written consent.

Trial Registration

Registered clinical trial: NCT01700894 [AJLM](#)

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