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Self-management program and Black women with hypertension: Randomized controlled trial substudy

Willie M. Abel[1] | Jimmy T. Efird[2,3] | Patricia B. Crane[1] | Keith C. Ferdinand[4]

[1]School of Nursing, The University of North Carolina, Charlotte, North Carolina, USA

[2]School of Medicine, Case Western Reserve University, Cleveland, Ohio, USA

[3]VA Cooperative Studies Program Coordinating Center, Boston, Massachusetts, USA

[4]Tulane University School of Medicine, New Orleans, Louisiana, USA

Correspondence

Willie M. Abel, School of Nursing, The University of North Carolina at Charlotte, 9201 University City Blvd., #444F CHHS Bldg., Charlotte, NC 28223, USA.
Email: wmabel@uncc.edu

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Abstract

The prevalence of hypertension (HTN) among Black women in the United States has increased over the past 10 years with a decline in levels of HTN awareness, treatment, and control. Higher death rates occur in Black women from HTN-related diseases when compared with women of other racial/ethnic groups. Although interventions aimed at self-care/self-management are vital to adults becoming the cornerstone of their own health and well-being, there is a paucity of research in Black women. This randomized controlled pilot trial substudy examined the influence of a Chronic Disease Self-Management Program (CDSMP) with tailored coaching versus the CDSMP alone on blood pressure (BP), weight, and scores on self-care questionnaires and medication adherence for Black women with HTN over 9 months. Eighty-three women who had completed the CDSMP were randomly assigned to coaching or no coaching. Median age was 54 years and the time since the HTN diagnosis was 9 years. Significant differences were noted in self-care maintenance and management over time with better self-care in the treatment group. Though not significant, both groups denoted a trend toward better medication adherence. Almost 60% of the participants in both groups showed improvements in their systolic and/or diastolic BP. However, there was no significant difference between the study groups' BP and weight variables. The CDSMP was effective in decreasing BP and improving medication adherence. Further research is needed to evaluate effective coaching strategies that motivate Black women with HTN toward self-care management.

KEYWORDS

Black women, chronic disease self-management program, hypertension

[Correction added on 27 February 2023, after first online publication: The words "Pilot Study" have been replaced by ": Randomized Controlled Trial Sub-study" in this version.]

1 | INTRODUCTION

Over the past decade, the prevalence of hypertension (HTN) among Black women in the United States increased from 46% (Roger et al., 2012) to 58% (Tsao et al., 2022). During this same time, levels of HTN awareness, treatment, and control declined among Black women (Tsao et al., 2022), and the reason for this decline is not fully understood. However, poor control of HTN and treatment nonadherence in Black women has been attributed to higher levels of biopsychosocial stress stemming from negative life events (Kang et al., 2018). Chronic stress exposure is associated with vascular structure changes such as inflammation, atherosclerosis, and arterial hypertension (Hinterdobler et al., 2021). While stress exposure is a part of everyday life for all individuals, Black people, regardless of their socioeconomic status (Carnethon et al., 2017), experience unique, multifactorial, chronic race-related stressors such as discrimination, structural/institutional racism, increased racial hostility powered by political polarization, and hate crimes with hostility and harassment. These stressors affect living and working conditions and create unsafe neighborhood environments, financial hardships, strained relationships, and lower life expectancy (Williams, 2018). Although stress exposure is not the focus of this study, it serves to explain coping behaviors, such as the adoption of unhealthy behaviors that may contribute to poor dietary habits, impaired physical activity (Kang et al., 2018), and medication nonadherence (Oates et al., 2020). Even more concerning is that Black women experience negative health outcomes including higher death rates from HTN-related diseases such as myocardial infarction, heart failure, stroke, and kidney failure when compared with women of other racial/ethical groups (Murphy et al., 2021). Thus, effective strategies to control HTN in Black women are imperative to reduce mortality and improve health outcomes.

Hypertension (a chronic disease) and chronic stress responses are usually not curable, but they can be managed with lifestyle changes and if needed, with prescribed antihypertensive medication (Whelton et al., 2018). For many Black women, overcoming multiple barriers to achieve blood pressure (BP) control, such as the high-fat southern diet, obesity, physical inactivity, medication nonadherence, and chronic stress exposure may be key to improving adherence to the HTN treatment regimen (Maraboto & Ferdinand, 2020). Thus, management of multiple lifestyle behaviors are important for effective BP control.

Interventions aimed at self-care and self-management are vital to adults with HTN, becoming the cornerstone of their own health and well-being. Self-care refers to an individual's responsibility for healthy lifestyle behaviors necessary for development, functioning, and coping required for physical and emotional stability (Omisakin & Ncama, 2011). Yet, historically, Black women have been socialized to embrace the "Strong Black Woman" schema where women care for others at the expense of self-care. Over time, this self-sacrifice contributes to stress responses associated with physical and mental health issues (Abrams et al., 2014). This was exemplified in a quote from a participant who attributed the increased need to educate Black women about self-care to their "lack of self-awareness and modeling from other Black women" (Adkins-Jackson et al., 2023; p, 11). Engagement in self-care requires an individual's actions or decisions to promote health and prevent chronic conditions such as HTN from progressing (Lorig et al., 2020). In contrast, self-management is the ability to use skills/tools from health care providers to manage the day-to-day work of physical and emotional effects of living with a chronic illness while continuing daily activities (Lorig et al., 2020). According to Lawless et al. (2021), self-care and self-management are not simple, individualistic processes but are dynamic in nature where behavioral adaptations occur in response to various psychological, social, economic, and environmental influences. Therefore, supports and resources are necessary to make self-care and self-management behaviors achievable (Lawless et al., 2021).

One established intervention for self-care/self/management is the Chronic Disease Self-Management Program (CDSMP), developed by researchers at Stanford University. This program is based on self-efficacy theory and uses skills mastery, modeling, reinterpretation, and social persuasion to build confidence in achieving desired health behavior changes using a standardized curriculum (Lorig, 2015). In contrast to the limited time spent on disease management with health care providers during office visits, the CDSMP fills this void with a supportive educational plan. Although education or knowledge alone is not sufficient for behavior change, when paired together with training and practice to increase understanding and confidence, skills are developed to execute change for becoming an active self-manager (Arlinghaus & Johnston, 2018; Lorig et al., 2020). Thus, being responsible for healthy behaviors requires the use of training or practicing skills learned from those with expertize in the topic area.

Working to motivate individuals with HTN to incorporate self-care strategies into their everyday physical and social environment where they can be performed independently requires active individual engagement in specific health care behaviors and self-care activities (Moore et al., 2014). Personalized coaching in addition to self-care education may be more effective for behavioral change than education alone, especially in high-risk groups such as Black women. However, few studies (Abel et al., 2017; Jones et al., 2018) have explored self-care/self-management of HTN in a sample of only Black women. Likewise, there is a paucity of clinical trials focused specifically on Black adults, with only 6.2% of HTN trials registered in ClinicalTrials.gov solely targeting Black participants (Zheutlin et al., 2020). Moreover, engaging Black women with HTN in interactive educational activities and coaching may increase confidence, skills, and motivation to better manage and control their HTN and health behaviors.

The use of mobile health technology applications has shown great potential for improving adherence to healthy lifestyle changes, especially in individuals with chronic diseases such as HTN (Debon et al., 2019). Digital technology can capture, store, process, and exchange information for disease monitoring, surveillance, and tracking (Moses et al., 2021). With technology, risk factors for

chronic diseases (including elevated BP, low physical activity, poor diet, and overweight) may be monitored in real-time (Moses et al., 2021). In addition, technology facilitates interactive communication with coaching via text messaging to encourage adherence to treatment (Debon et al., 2019). With technological advances, individuals may use smartphones and applications to assist with self-management of their chronic disease along with continuous monitoring and communication with health care providers to aid in improved health outcomes (Moses et al., 2021). Text messaging from a cellphone is a common form of communication used by individuals of all ages to engage in two-way interactive messages between the sender and receiver (Ødegård et al., 2022). In the United States, 99% of Black adults and 97% of Whites adults own a cell phone, while 83% of Black adults and 85% of White adults own smartphones (Mobile Fact Sheet, 2021, April 7). Thus, coaching with text messaging is a plausible intervention for Black adults.

This substudy stems from a parent study that used mobile health technology information and addresses data not included in the parent study. Thus, the aim of this substudy was to determine if the CDSMP with a personalized coaching intervention via text messaging was more effective than the CDSMP only intervention in improving participants (1) systolic and diastolic BP, (2) weight/body mass index (BMI), and (3) scores on the self-care of hypertension inventory subscales (maintenance, management, and confidence), self-efficacy, communication, and medication adherence among Black women with HTN over 9 months. The primary outcome was the change in systolic and diastolic BP measurements and the secondary outcome was the change in weight, self-care questionnaire responses, and medication adherence at 3, 6, and 9 months after the CDSMP and coaching.

2 | METHODS

2.1 | Study design

This substudy was part of a parent longitudinal randomized controlled trial pilot study that focused on the effects of a CDSMP with coaching and technology to improve BP control and adherence to medication and lifestyle changes (physical activity, healthy diet, and weight management) compared with CDSMP with technology alone in Black women with HTN. Abel and DeHaven (2021). Technology was used only in the parent study. In this substudy, longitudinal data collected from questionnaires and manual measurements of BP and weight are reported. This substudy used all study participants, existing data, and included a different specific aim than the parent study.

3 | STUDY SETTING AND PARTICIPANTS

The study was conducted with Black women who resided in the Piedmont region of North Carolina. Recruitment efforts involved flyers, social media, and/or face-to-face presentations at churches, sororities, and community organizations. Those eligible for the study were aged 18–70, English speaking, diagnosed with HTN and prescribed at least one antihypertensive medication, owned a smartphone with Wi-Fi connectivity, and had a systolic BP/diastolic BP greater than or equal to 130/80. Those who were excluded included women who reported an inability to function independently owing to mental illness or an uncontrolled/debilitating medical condition, unable to be physically active, currently pregnant, or with a systolic BP/diastolic BP greater than or equal to 160/100. Eligible participants were recruited from November 4, 2018 to April 13, 2019. The CDSMP classes were held from April 15, 2019 to May 25, 2019. Data were collected at 3-month intervals with each period consisting of 12 weeks beginning June 16, 2019, until February 22, 2020.

Individuals who volunteered to participant in the study were screened and those who met eligibility requirements provided informed consent. Approval for the study was obtained from the Institutional Review Board at The University of North Carolina at Charlotte.

4 | PROCEDURES AND INTERVENTION

In the privacy of the participant's home or a preferred private location, data were collected at baseline before beginning the CDSMP, and then at 3, 6, and 9 months and included BP, weight, demographics, and a series of study questionnaires. After collecting baseline data, all participants were enrolled in a 6-week CDSMP that focused on disease management skills. The CDSMP was taught by two trained leaders at a local church classroom. Participants met weekly in groups of 10–16 for $2^{1}/_{2}$-h class sessions. The CDSMP included topics for healthy living such as healthy eating/assessing nutritious foods, improving physical activity, managing excess weight, appropriate medication use/adhering to medications, reducing stress, dealing with depression, and communicating effectively with health care providers, along with educational activities such as discussions, problem-solving, and action-planning (Lorig et al., 2020). Those completing the CDSMP were randomized to the treatment or referent group. Participants in the treatment group received weekly coaching via text messaging from the PI for Months 1–3, bi-weekly for Months 4–6, and no coaching Months 7–9 (to assess for sustainability), while the referent group received no coaching. Coaching involved interactive communication and addressed the participant's action plans or goals that were consistent with the aims of the study. All data collected over the 9 months were entered into REDCap (Research Electronic Data Capture) Cloud using an iPad. If REDCap was not operational, data were collected by paper and pencil and later recorded in REDCap. Participants received gift cards for time expended for data collected at baseline ($20) and the amount was incrementally increased with data collection at 3 ($30), 6 ($40), and 9 months ($60) for a total of $150.

4.1 | Measures

4.1.1 | BMI

Weight in pounds was measured using a portable platform Seca 813 electronic scale and height was measured using a portable Seca 217 stadiometer with measurements to the nearest 0.1 cm. BMI was computed using the metric system formula, weight in kilograms divided by height in meters squared (Center for Disease Control and Prevention, 2022).

4.1.2 | BP

Using a home BP monitoring procedure (Muntner et al., 2019), participants were seated quietly for at least 5 minutes with their back supported and feet flat on the floor. A manual BP measurement was taken by a nurse team member with a Welch Allyn Tycos (DS58) hand aneroid sphygmomanometer in the bare left upper arm while supported at heart level. Three consecutive BP measurements were taken, 1 min apart and averaged (Pickering et al., 2005; Whelton et al., 2018). Manual BP measurements were taken at baseline and then at Months 3, 6, and 9 to verify readings from the digital Omron oscillometric BP monitor used in the parent study (Abel & DeHaven, 2021). To maintain consistency with the Omron BP recommendation, the left upper arm was used for BP measurements (Omron Healthcare, 2015).

4.2 | Questionnaires

4.2.1 | Demographic data

An investigator-developed Demographic Data Tool was used to collect descriptive data from the sample that included information such as age, education, income, and medical history.

4.2.2 | The self-care of hypertension inventory (SC-HI)

The SC-HI (v2.0) is a 23-item tool designed to measure self-care intervention effectiveness and self-efficacy in self-care (Dickson et al., 2017). The three subscales of the SC-HI are: (1) self-care maintenance, 11 items; (2) management, 6 items; and (3) confidence, 6 items. Each subscale has a differently worded 4-point Likert scale ranging from 0 to 4. Each subscale was scored separately and then transformed to a standardized score that ranges from 0 to 100. Scores of 70 or greater indicate self-care adequacy (Dickson et al., 2017). Cronbach's alpha for the SC-HI subscales were $\alpha = .71$ for maintenance; .60 for management; and .85 for confidence.

4.2.3 | Hill–Bone compliance to high BP therapy scale (Hill–Bone CHBPTS)

The Hill–Bone CHBPTS is a 14-item tool designed to assess medication compliance/adherence. Of the tool's three subscales, this study focused on medication taking, 8 items plus 1 item that addressed prescription refills totaling 9 items. Responses are scored on a 4-point Likert scale from 1 = *none of the time* to 4 = *all of the time*. Scores ranged from 9 to 36 with the minimal score indicating perfect adherence and higher scores indicating lower levels of adherence (M. T. Kim et al., 2003; E. Y. Kim et al., 2007). Cronbach's *alpha* for the medication compliance subscale was $\alpha = .74$.

4.2.4 | Self-efficacy for managing chronic disease (SEMCD)

The SEMCD is a six-item scale that differed from the SC-HI in that it is a measure of the perceived ability to manage salient aspects of life with chronic disease such as fatigue, pain, and emotional distress (Lorig et al., 2001) whereas SC-HI is specific to one chronic condition, HTN. Responses are scored on a 10-point Likert scale from 1 = *not at all confident* to 10 = *totally confident*, with higher scores indicating greater self-efficacy. (Ritter & Lorig, 2014). The Cronbach's alpha for the SEMCD was $\alpha = .85$.

4.2.5 | Communication with physicians

In the CDSMP, participants were taught to be active participants in their health care through effective communication with health care providers. The Communication with Physicians tool is a 3-item scale to assess communication behaviors with providers. The scale consists of a 5-point Likert scale where 0 = *never* and 5 = *always*. Higher scores indicate better communication with providers (Lorig et al., 1996). Cronbach's alpha for the Communication with Physicians scale was $\alpha = .65$.

4.3 | Statistical analyses

An a priori power analysis was conducted for the parent randomized control trial pilot study (Abel & DeHaven, 2021). Our sample size of 90 participants ($n = 45$ per arm), measured at baseline, and then after the CDSMP at 3, 6, and 9 months, has approximately 80% power (assuming five dropouts per arm) to detect an effect size of ~0.205 or greater at the $\alpha = 0.05$ level of statistical significance, given a realistic range of simulated unstructured covariance matrices.

Descriptive statistics were used to summarize sample characteristics. An independent (unpaired, between groups) samples *t* test was used to determine the difference between the means of the treatment and referent groups. The dependent (paired, within groups)

sample *t* test was used to determine the mean differences between variables (systolic and diastolic BP and weight/BMI) for treatment and referent group participants from baseline to Month 3, from Months 3 to 6, and from Months 6 to 9. Time frames were allotted to promote participant engagement in self-management.

The use of a two-sample *t* test versus nonparametric methods for nonnormally distributed data has been debated in the literature (le Cessie et al., 2020). In general, the *t* test is reasonably robust to departures from normality, providing that the sample sizes are sufficiently large, and the underlying variances are finite (with no extreme outliers) (Lumley et al., 2002).

All data collection tools (except the Hill–Bone CHBPTS medication subscale) were converted to a 100-point scale to enable comparison. Questionnaire scores were analyzed for changes across several time points using a mixed-effects repeated measures model for both groups. In comparison to a repeated measures analysis of variance test, the mixed model tends to yield valid estimates of treatment effects even when the missing values are not completely missing at random (Detry & Ma, 2016). Rounding was based upon two significant decimal places rather than the number of significant digits (i.e., Goldilocks method) (Efird, 2021). Data were analyzed using SAS—v 9.4.

5 | RESULTS

Of the 90 community-dwelling Black women enrolled, 83 completed the CDSMP and were randomized to the treatment ($n = 42$) or referent group ($n = 41$) with no significant difference in sample characteristics (see Table 1). The treatment group decreased from 42 participants at baseline to 37 (88% retention) and the referent group decreased from 41 to 32 over time (78% retention). A total of 69 participants completed the study. Those not completing the study ($n = 21$) were lost to follow-up, discontinued the intervention, or withdrew voluntarily.

Participants who completed the CDSMP had a median age of 54 years and the HTN diagnosis was 9 years. Most of the study participants (73%, $n = 61$) were educated at the community college level or higher and were classified as obese (80%, $n = 66$). Over half (53%, $n = 44$) had incomes ≥ $55,000 (see Table 1).

No significant differences were found in the treatment group ($n = 42–37$) compared with the referent group ($n = 41–32$) on repeated measures for BP and weight/BMI (see Table 2). Decreased participation was noted between baseline and the 3-month assessment for the treatment group and participation progressively decreased at each time point in the referent group.

Of the 69 study participants completing the study, only 9 (13%) had systolic BP < 130 and 16 (23%) had diastolic BP < 80 at baseline. By Month 9, 40 (58%) had systolic BP < 130 and 38 (55%) had diastolic BP < 80. Almost 60% of the participants completing the study showed improvements in their systolic and/or diastolic BP. During the first 3 months of the study systolic BP decreased by 13 mmHg in the treatment group and 11 mmHg in the referent group, while diastolic BP decreased 6 mmHg and 4 mmHg, respectively (see Table 3). Using the dependent (paired, within groups) sample *t* test, the mean systolic and diastolic BP measurements decreased significantly in both groups from baseline to 3 months. In both groups, there was no difference between the systolic and diastolic BP from 3 to 6 months and from 6 to 9 months. In addition, only the treatment group had a significant change in mean weight/BMI from baseline to 3 months. Otherwise, there was no change in weight/BMI for either group. At the end of Month 9, the weight in the treatment group decreased by 10 pounds, while the referent group decreased by 3 pounds. The largest recorded weight loss during the study was 50 pounds.

The mixed-effects repeated measures model (see Table 4) showed a significant difference between mean scores over time for SC-HI maintenance ($F(3, 81) = 3.77$; $p = 0.014$) and management ($F(3, 74) = 2.75$; $p = 0.049$), with higher scores indicating better self-care in the treatment group. Likewise, from baseline to Month 3 in the treatment group, SC-HI subscale scores, self-efficacy, and communication scores increased. This trend was also observed in the referent group with all scores except SC-HI management. In Months 6 and 9, scores for both groups fluctuated. The Hill–Bone CHBPTS medication adherence subscale score decreased or was unchanged in both groups across time denoting a trend towards adherence. Both groups at Month 9 had medication adherence means of 10, while a score of 9 indicated perfect medication adherence.

6 | DISCUSSION

This substudy used data from a parent longitudinal randomized controlled trial pilot study on an interactive technology-enhanced coaching intervention for Black women with HTN. The aim of this substudy was to examine the influence of a CDSMP with tailored coaching versus the CDSMP alone on BP, weight, and scores on self-care questionnaires and medication adherence over 9 months. Only those study participants who completed the 6-week CDSMP were randomized to the treatment and referent groups. Of the 90 participants recruited to the parent study, 92% ($n = 83$) completed the CDSMP, and 77% ($n = 69$) completed the study. The large percentage of women completing the 6-week CDSMP demonstrated the desire to self-manage health and is consistent with the Black Women's Health Study finding that Black women are inherently strong, resilient, and passionate about health and not merely defined by disease, obesity, or poverty (Jeffries & Stone, 2019). The fidelity of the CDSMP was maintained in that leaders closely followed the program as designed. Also, the CDSMP was feasible based on retention and effective BP management.

In the present study, Black women participants were highly educated (73%). Among Black adults with higher education, there is a wide gender gap where Black women earn a higher percentage of bachelor's (64.1%), master's (71.5%), and doctoral, medical, and dental degrees (65.9%) compared with Black men (American Association of University Women, n.d.). However, when compared

TABLE 1 Descriptive statistics.

Participant characteristics	*N* = 83 Median; IQR (Q3–Q1)	Treatment (*n* = 42) Mean	Referent (*n* = 41) Mean	*p* Value[b]
Age (years)	54.00; 12 (61–49)	55.57	52.66	0.096
Years dx with HTN	9.00; 11 (15–4)	11.00	9.79	0.441
Number of anti-HTN meds	1.00; 1 (2–1)	1.40	1.51	0.531
Blood pressure				
Systolic BP	138.00; 14 (146–132)	139.95	138.36	0.564
Diastolic BP	83.30; 8.7 (88–79)	83.78	83.29	0.764
	n (%)	*n* (%)	*n* (%)	
Marital status				0.897
Single (never married)	22 (27)	10 (24)	12 (29)	
Married	36 (43)	18 (43)	18 (44)	
Separated/divorced	21 (25)	12 (28)	9 (22)	
Widowed	4 (5)	2 (5)	2 (5)	
Education				0.388
Less than 12th grade	1 (1)	0 (0)	1 (2)	
High school graduate	2 (2)	0 (0)	2 (5)	
Some comm. college	11 (13)	7 (17)	4 (10)	
Graduated comm. college	7 (8)	3 (7)	4 (10)	
Some 4-year college	8 (10)	3 (7)	5 (12)	
Graduated 4-year college	28 (34)	18 (43)	10 (24)	
Some graduate school	2 (2)	1 (2)	1 (2)	
Graduated graduate school	24 (29)	10 (24)	14 (34)	
Income				0.408
<10,000–24,999	11 (13)	6 (14)	5 (12)	
25,000–54,999	26 (31)	14 (33)	12 (29)	
55,000 to >100,000	44 (53)	21 (50)	23 (56)	
Refused	2 (2)	1 (2)	1 (2)	
Occupational status				0.400
Work full-time	60 (72)	27 (64)	34 (83)	
Retired with pension	16 (19)[a]	8 (19)	5 (12)	
Work part-time/not employed	10 (12)[a]	9 (21)	3 (7)	
Body mass index				0.934
Normal weight (18.5–24.9 kg/m^2)	3 (4)	1 (2)	2 (5)	
Overweight (25–29.9 kg/m^2)	14 (17)	7 (17)	7 (17)	
Obesity (30 kg/m^2 or more)	66 (80)	34 (81)	32 (78)	

Abbreviations: BP, blood pressure; HTN, prevalence of hypertension; IQR, interquartile range.

[a]Retired with pension and work full-time, *n* = 1; retired with pension and work part-time, *n* = 2. Percentages may not add up to 100% due to rounding.

[b]Results of *t* test comparing treatment and referent group characteristics.

TABLE 2 Unpaired *t* test comparing group means at each time point.

Measure	Treatment group			Referent group					
	n	*M*	SD	*n*	*M*	SD	*df*	*T*	*p*
Systolic BP									
Baseline	42	139.95	10.90	41	138.36	8.81	81	0.73	0.470
Month 3	37	126.86	14.81	38	127.86	12.82	73	−0.31	0.757
Month 6	37	128.73	12.89	34	128.42	11.82	69	0.11	0.916
Month 9	37	128.03	14.67	32	128.59	10.63	67	−0.18	0.858
Diastolic BP									
Baseline	42	83.78	8.50	41	83.29	7.81	81	0.28	0.783
Month 3	37	78.27	9.64	38	79.12	8.08	73	−0.41	0.682
Month 6	37	77.42	8.46	34	79.39	7.22	69	−1.05	0.299
Month 9	37	78.09	8.98	32	78.30	8.96	67	−0.10	0.920
Weight (lbs.)									
Baseline	42	214.78	47.31	41	214.95	50.52	81	−0.02	0.987
Month 3	38	207.66	50.05	38	212.95	47.81	74	−0.47	0.639
Month 6	37	204.98	50.55	34	211.52	47.17	69	−0.56	0.575
Month 9	37	204.39	49.27	32	212.47	47.96	67	−0.69	0.494
BMI									
Baseline	42	36.93	7.48	41	36.74	7.76	81	0.11	0.914
Month 3	38	35.48	7.89	38	36.49	7.48	74	−0.57	0.569
Month 6	37	35.05	7.97	34	36.27	7.28	69	−0.67	0.503
Month 9	37	34.96	7.82	32	36.39	7.42	67	−0.77	0.442

Abbreviations: BMI, body mass index; BP, blood pressure.

to White women at the associate (11.3%), bachelor's (25.1%), and graduate (15%) level, degree attainment for Black women is lower (10.5%, 15.7%, and 9.9%, respectively) (Anthony et al., 2021). The demographics of Black women in this study are unique when compared to national data. Tens of millions of Black Americans continue to experience inequities affecting their socioeconomic status, health, and political influence. When comparing Black to White Americans; the unemployment rate is 50% higher, median wealth is $17,000 to $171,000, gaps in annual household income are about $29,000 less per year, college graduation gaps continue to lag behind, and life expectancy is 3.6 years lower (Beyer, 2020). With regard to the educational status and income of women in this study, it may be reflective of the study location that surrounds a large metropolitan area. These areas are known to attract a large percentage of educated Black adults due to employment opportunities (Black Demographics, 2022).

There was no significant difference in the BP measurements between the treatment and referent group. At baseline, participant mean BP measurements were at HTN Stage 1 (130–139/80–89 mmHg) or Stage 2 (≥140/≥90 mmHg) (Whelton et al., 2018). The largest decrease in the mean systolic and diastolic BP occurred at Month 3 and was significant. In addition, at Month 3, the mean BP decreased to <130/80 mmHg for both groups and this decrease in BP was sustained throughout the 9-month study period. The improved management and control of BP over 9 months may be credited to the skills learned during the 6-week CDSMP. Also, the completion of the CDSMP before randomization to the treatment and referent groups gave participants an opportunity to acquire the same knowledge base and this may account for the nonsignificant difference between the groups. This same trend was noted with the weight data. The effects of the CDSMP seem to overshadow the effectiveness of the coaching intervention for BP and weight/BMI variables because the results were similar for both the control and referent groups. To strengthen the coaching intervention in future studies, coaching frequencies could be offered at different time frames from weekly to monthly based on an assessment of individual participant's needs. In addition, a variety of coaching delivery mechanisms such as telephone, video calls, and text messaging could be offered to accommodate participant preference (Mao et al., 2017).

A majority of the sample had a BMI in the obesity category (80%, n = 66). Obesity in this study exceeded the obesity rates for Black women (55%) in the United States (Tsao et al., 2022). In a study conducted by Bell et al. (2018), Black adults with higher education and larger incomes had a greater odds of obesity when compared to

TABLE 3 Paired samples *t* test for difference in measures across time points.

Measure	Treatment group					Referent group				
	n	*Mean* (SD)	*df*	*t*	*p*	*n*	*Mean* (SD)	*df*	*t*	*p*
Systolic blood pressure (mmHg)										
Baseline to Month 3	38	140.13 (10.77)	37	6.14	<0.001	38	138.64 (8.88)	37	4.85	<0.001
		127.19 (14.75)					127.86 (12.82)			
Months 3–6	37	127.35 (14.92)	36	−0.77	0.449	34	128.41 (11.78)	33	−0.003	0.997
		128.73 (12.89)					128.42 (11.82)			
Months 6–9	37	128.73 (12.89)	36	0.35	0.728	32	129.38 (11.49)	31	0.40	0.695
		128.03 (14.67)					128.59 (10.63)			
Diastolic blood pressure (mmHg)										
Baseline to Month 3	38	84.11 (8.88)	37	3.65	<0.001	38	83.44 (7.96)	37	3.57	0.001
		78.39 (9.54)					79.12 (8.08)			
Months 3–6	37	78.34 (9.66)	36	0.63	0.532	34	79.95 (7.33)	33	0.463	0.646
		77.42 (8.46)					79.39 (7.22)			
Months 6–9	37	77.42 (8.46)	36	−0.47	0.642	32	80.02 (6.95)	31	1.33	0.192
		78.09 (8.98)					78.30 (8.96)			
Weight										
Baseline to Month 3	38	214.02 (48.03)	37	4.21	<0.001	38	215.06 (50.91)	37	1.93	0.061
		207.66 (50.05)					212.95 (47.81)			
Months 3–6	37	205.38 (48.71)	36	0.43	0.668	34	213.23 (49.89)	33	2.02	0.052
		204.98 (50.55)					211.52 (47.17)			
Months 6–9	37	204.98 (50.55)	36	0.64	0.528	32	212.99 (47.87)	31	0.41	0.688
		204.39 (49.27)					212.47 (47.96)			
Body mass index										
Baseline to Month 3	38	36.57 (7.44)	37	4.14	<0.001	38	36.84 (7.95)	37	1.85	0.072
		35.48 (7.89)					36.49 (7.48)			
Months 3–6	37	35.14 (7.72)	36	0.59	0.560	34	36.56 (7.73)	33	1.95	0.060
		35.05 (7.97)					36.27 (7.27)			
Months 6–9	37	35.05 (7.97)	36	0.58	0.568	32	36.48 (7.44)	31	0.41	0.682
		34.96 (7.82)					36.39 (7.42)			

Whites. Although a higher socioeconomic status would seem to be a predictor of better health, this is not true for Black adults. Other factors such as stress (specifically racial discrimination) have been implicated in the high rates of HTN and obesity in Black adults at every socioeconomic level (Bell et al., 2018). Because obesity is a risk factor for HTN that contributes to adverse cardiovascular and renal disease outcomes (Jiang et al., 2016), it is imperative to initiate effective weight loss programs for Black women. In this study, there was no difference in weight/BMI between the treatment and referent group. Only participants in the treatment group had a significant decrease in the mean weight/BMI from baseline to Month 3. By Month 9, the mean weight loss for the treatment group decreased by 10 pounds while the referent group decreased by 3 pounds. In addition, there were some individual successes with weight loss during the study period. One participant lost 50 pounds and several participants' weight loss resulted in a decrease or discontinuation of BP medication. To address obesity in Black women with HTN, future studies should include tailored interventions to specifically address factors and stressors that hinder weight loss, behavior change, and self-care management.

In the current study, the only significant differences between the groups occurred in the mean scores for SC-HI maintenance and management over time, with better self-care in the treatment group. In addition, all SC-HI subscales, self-efficacy, and communication scores except for communication in the referent group, increased in both groups from baseline to Month 3, suggesting

TABLE 4 Repeated measures with questionnaires over time.

	Mean ± SD				
	Baseline	Month 3 (*n*, 38,37)	Month 6 (*n*, 37,34)	Month 9 (*n*, 37,32)	
	n	*n*	*n*	*n*	
	45	38	37	37	
Treatment, referent, measure	45	37	34	32	*p* Value for interaction[a]
SC-HI maintenance					0.014
Treatment	45.33 ± 23.90	70.14 ± 16.40	58.20 ± 23.33	55.47 ± 23.12	
Referent	45.31 ± 20.12	56.13 ± 18.50	47.62 ± 24.73	47.02 ± 22.23	
SC-HI management					0.049
Treatment	60.86 ± 21.51	63.87 ± 23.98	61.36 ± 27.70	69.12 ± 23.97	
Referent	64.84 ± 17.44	53.85 ± 24.33	61.78 ± 20.23	56.48 ± 25.56	
SC-HI confidence					0.129
Treatment	55.61 ± 23.85	68.83 ± 25.91	67.75 ± 23.44	74.71 ± 22.18	
Referent	59.76 ± 22.40	63.20 ± 27.45	72.35 ± 18.36	72.10 ± 23.26	
Self-efficacy (SEMCD)					0.321
Treatment	65.15 ± 27.54	81.64 ± 20.06	75.26 ± 23.03	73.13 ± 20.34	
Referent	66.08 ± 25.04	73.74 ± 17.47	71.79 ± 25.75	70.09 ± 23.37	
Communication with physicians					0.995
Treatment	60.32 ± 23.92	67.61 ± 25.80	71.24 ± 24.48	65.11 ± 30.27	
Referent	70.41 ± 24.36	77.96 ± 21.39	83.19 ± 19.49	75.85 ± 22.34	
Hill–Bone medication subscale					0.846[b]
Treatment	11.98 ± 3.47	10.58 ± 1.84	10.51 ± 2.01	10.27 ± 1.45	
Referent	11.85 ± 2.73	10.41 ± 1.94	10.12 ± 1.77	10.06 ± 1.87	

Abbreviations: SC-HI, self-care of hypertension inventory; SD, standard deviation; SEMCD, self-efficacy for managing chronic disease.

[a]Mixed-effects repeated measures model.

[b]Log-transformed.

improved self-care. Our findings are similar to a previous study in which a nurse led m-Health intervention of older adults with HTN showed an increase in SC-HI self-care subscales over 3 months (Alsaqer & Bebis, 2022). However, no studies were found that tested interventions using SC-HI for periods greater than 3 months. For Months 4 through 9 in the present study, scores in both groups fluctuated. The decrease in coaching at Months 4–6, with no coaching at Months 7–9 could offer a possible explanation for the fluctuation of scores. Further examination of personalizing the frequency of the coaching intervention based on participant needs (Mao et al., 2017) could improve coaching interactions and participant outcomes. Although health coaches help individuals become active participants in managing their chronic condition by gaining knowledge, skills, tools, and confidence to achieve their self-identified goals, adopting healthy behaviors for lifestyle change requires a commitment that only participants can fulfill (Better Conversation, 2016). For future studies, it is vital to assess motivation and readiness to change in Black women with HTN. These data may help to identify barriers, minimize resistance, and decrease ambivalence toward the challenges of self-care/self-management (Ceccarini et al., 2015).

Antihypertensive medications have proven effectiveness when taken as prescribed to treat HTN. Women in this study became more adherent to medication taking as evidenced by their decreased systolic and diastolic BP that remained constant throughout the study period. Though not significant, the mean medication adherence scores as measured by the Hill–Bone CHBPTS for both groups showed a trend toward adherence. Typically, risk factors for medication nonadherence include low-income and low educational attainment (Oates et al., 2020). In this study, higher incomes and educational levels were evident. However, level of education alone is not indicative of health behavioral change (Arlinghaus & Johnston, 2018). According to a systematic review (Mongkhon & Kongkaew, 2017), medication nonadherence was associated with high-income countries such as the United States, and those most vulnerable to nonadherence and overlooked by the health care system were older adults and those at home with little supervision.

During one CDSMP session, participants asked the question, why have we not gotten this information from our health care providers.

In a systematic review of the literature, Black patients consistently reported poorer patient-physician communication quality, and less information-giving, patient participation, and participatory decision-making when compared with White patients (Shen et al., 2018). In addition, Black patients were rated as less intelligent and educated, regardless of their socioeconomic status. In the CDSMP, participants received training on how to communicate effectively with health care providers by taking PART (Prepare, Ask, Repeat, Take action) (Lorig et al., 2020). Empowering Black women with HTN to be active participants in their health care with their provider is vital to improving health outcomes. With the CDSMP, weekly educational activities focused on peer support, building skills, and enhancing confidence to manage HTN. Programs of this type may be key to promoting self-care management and adherence to the HTN treatment regimen.

6.1 | Strengths and limitations

The strength of this longitudinal study was the ability to assess self-management of BP, weight, and medication adherence in a sample of Black women with HTN over time using a randomized control design. Specifically designing and testing interventions for Black women who remain underrepresented in clinical trials may decrease mistrust and fear of exploitation (Zheutlin et al., 2020) and better inform HTN treatment modalities.

This study has several limitations. Potential participants were not assessed for motivation and readiness to change before beginning the study. These assessments could impact adherence to the HTN treatment regimen and health outcomes (Ceccarini et al., 2015). Questionnaires reflected self-reported data with Likert scales and may have been influenced by response bias. In addition, this study lacked qualitative data to provide insight into the barriers and facilitators of self-care management and lifestyle behavior change in this sample. Also, Black women in this study were highly educated, the sample size was small, all were required to own a smartphone with Wi-Fi connectivity, and participants were recruited from one geographical area. Therefore, findings can only be generalized to similar populations. Finally, the complex interaction of multiple social determinants of health may not have been completely accounted for in our analyses, given the limited number of participants randomized in this pilot study (Hu et al., 2022).

7 | CONCLUSION

This substudy emphasized self-care management of HTN in Black women and found that a CDSMP was effective in decreasing BP and improving medication adherence. Further research is needed to evaluate effective coaching strategies that motivate Black women with HTN toward self-care management with sustainable BP control, weight management, and positive health outcomes.

AUTHOR CONTRIBUTIONS

Willie M. Abel conceived the concept and all authors had input into the study design. Willie M. Abel collected the data. Jimmy Efird completed the statistical data analysis. All authors discussed the results and contributed to writing the manuscript. The final manuscript was read and approved by all authors.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

Approval for this study was obtained from The Institutional Review Board at The University of North Carolina at Charlotte. The approval process included informing all participants about study details before providing oral and written consent.

ORCID

Willie M. Abel http://orcid.org/0000-0002-4291-2580
Jimmy T. Efird http://orcid.org/0000-0002-4890-5111
Patricia B. Crane http://orcid.org/0000-0002-4710-3133
Keith C. Ferdinand http://orcid.org/0000-0003-3338-4410

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REFERENCES

Abel, W. M., & DeHaven, M. J. (2021). An interactive technology enhanced coaching intervention for Black women with hypertension: Randomized controlled trial study protocol. *Research in Nursing & Health*, *44*(1), 24–36. https://doi.org/10.1002/nur.22090

Abel, W. M., Joyner, J., Cornelius, J., & Greer, D. B. (2017). Self-care management strategies used by Black women who self-report consistent adherence to antihypertensive medication. *Patient Preference and Adherence*, *11*, 1401–1412. https://doi.org/10.2147/PPA.S138162

Abrams, J. A., Maxwell, M., Pope, M., & Belgrave, F. Z. (2014). Carrying the world with the grace of a lady and the grit of a warrior: Deepening our understanding of the "Strong Black Woman" schema. *Psychology of Women Quarterly*, *38*, 503–518. https://doi.org/10.1177/0361684314541418

Adkins-Jackson, P. B., Jackson Preston, P. A., & Hairston, T. (2023). 'The only way out': How self-care is conceptualized by Black women.

Ethnicity & Health, *28*, 29–45. https://doi.org/10.1080/13557858.2022.2027878

Alsaqer, K., & Bebis, H. (2022). Self-care of hypertension of older adults during COVID-19 lockdown period: A randomized controlled trial. *Clinical Hypertension*, *28*(1), 21. https://doi.org/10.1186/s40885-022-00204-7

American Association of University Women. (n.d.). Fast facts: Women of color in higher. Retrieved April 10, 2022. https://www.aauw.org/resources/article/fast-facts-woc-higher-ed/

Anthony, M., Jr., Nichols, A. H., & Del Pilar, W. (2021). Raising undergraduate degree attainment among Black women and men takes on new urgency amid the pandemic. The Education Trust. Retrieved April 10, 2022. https://edtrust.org/resource/national-and-state-degree-attainment-for-black-women-and-men/

Arlinghaus, K. R., & Johnston, C. A. (2018). Advocating for behavior change with education. *American Journal of Lifestyle Medicine*, *12*(2), 113–116. https://doi.org/10.1177/1559827617745479

Bell, C. N., Thorpe, R. J., Jr., Bowie, J. V., & LaVeist, T. A. (2018). Race disparities in cardiovascular disease risk factors within socio-economic status strata. *Annals of Epidemiology*, *28*(3), 147–152. https://doi.org/10.1016/j.annepidem.2017.12.007

Better Conversation. (2016). Better conversation: A guide to health coaching. Retrieved August 10, 2022. 2016). Better conversation: A guide to health coaching. Retrieved August 10, 2022. https://www.betterconversation.co.uk

Beyer, D. (2020). The economic state of Black America in 2020. United States Joint Economic Committee. Retrieved October 10, 2022. https://www.jec.senate.gov/public/_cache/files/ccf4dbe2-810a-44f8-b3e7-14f7e5143ba6/economic-state-of-black-america-2020.pdf

Black Demographics. (2022). Percent of African Americans with a bachelors degree or higher by city. Retrieved April 10, 2022. https://blackdemographics.com/rank-all-cities-big-small-ranked-by-black-educational-attainment/

Carnethon, M. R., Pu, J., Howard, G., Albert, M. A., Anderson, C. A. M., Bertoni, A. G., Mujahid, M. S., Palaniappan, L., Taylor, H. A., Jr., Willis, M., & Yancy, C. W. (2017). Cardiovascular health in African Americans: A scientific statement from the American Heart Association. *Circulation*, *136*(21), e393–e423. https://doi.org/10.1161/CIR.0000000000000534

Ceccarini, M., Borrello, M., Pietrabissa, G., Manzoni, G. M., & Castelnuovo, G. (2015). Assessing motivation and readiness to change for weight management and control: An in-depth evaluation of three sets of instruments. *Frontiers in Psychology*, *6*, 511. https://doi.org/10.3389/fpsyg.2015.00511

Center for Disease Control and Prevention. (2022). About BMI. Retrieved April 10, 2022. https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html

Debon, R., Coleone, J. D., Bellei, E. A., & De Marchi, A. (2019). Mobile health applications for chronic diseases: A systematic review of features for lifestyle improvement. *Diabetes & Metabolic Syndrome*, *13*(4), 2507–2512. https://doi.org/10.1016/j.dsx.2019.07.016

Detry, M. A., & Ma, Y. (2016). Analyzing repeated measurements using mixed models. *Journal of the American Medical Association*, *315*(4), 407–408. https://doi.org/10.1001/jama.2015.19394

Dickson, V. V., Lee, C., Yehle, K. S., Abel, W. M., & Riegel, B. (2017). Psychometric testing of the self-care of hypertension inventory. *Journal of Cardiovascular Nursing*, *32*(5), 431–438. https://doi.org/10.1097/JCN.0000000000000364

Efird, J. T. (2021). Goldilocks rounding: Achieving balance between accuracy and parsimony in the reporting of relative effect estimates. *Cancer Informatics*, *20*, 117693512098513. https://doi.org/10.1177/1176935120985132

Hinterdobler, J., Schunkert, H., Kessler, T., & Sager, H. B. (2021). Impact of acute and chronic psychosocial stress on vascular inflammation. *Antioxidants & Redox Signaling*, *35*(18), 1531–1550. https://doi.org/10.1089/ars.2021.0153

Hu, J., Kline, D. M., Tan, A., Zhao, S., Brock, G., Mion, L. C., Efird, J. T., Wang, D., Sims, M., Wu, B., Mongraw-Chaffin, M., & Joseph, J. J. (2022). Association between social determinants of health and glycemic control among African American people with type 2 diabetes: The Jackson Heart Study. *Annals of Behavioral Medicine*, *56*, 1300–1311. https://doi.org/10.1093/abm/kaac026

Jeffries, T., & Stone, R. D. (2019). *What healthy Black women can teach us about health* (3rd ed.). Black Women's Health Imperative. https://bwhi.org/wp-content/uploads/2020/01/BWHI_IndexUS_2019_Final-2.pdf

Jiang, S. Z., Lu, W., Zong, X. F., Ruan, H. Y., & Liu, Y. (2016). Obesity and hypertension. *Experimental and Therapeutic Medicine*, *12*(4), 2395–2399. https://doi.org/10.3892/etm.2016.3667

Jones, L. M., Veinot, T., Pressler, S. J., Coleman-Burns, P., & McCall, A. (2018). Exploring predictors of information use to self-manage blood pressure in midwestern African American women with hypertension. *Journal of Immigrant and Minority Health*, *20*(3), 569–576. https://doi.org/10.1007/s10903-017-0573-9

Kang, A. W., Dulin, A., Nadimpalli, S., & Risica, P. M. (2018). Stress, adherence, and blood pressure control: A baseline examination of Black women with hypertension participating in the SisterTalk II intervention. *Preventive Medicine Reports*, *12*, 25–32. https://doi.org/10.1016/j.pmedr.2018.08.002

Kim, E. Y., Han, H. R., Jeong, S., Kim, K. B., Park, H., Kang, E., Shin, H. S., & Kim, M. T. (2007). Does knowledge matter?: Intentional medication nonadherence among middle-aged Korean Americans with high blood pressure. *Journal of Cardiovascular Nursing*, *22*(5), 397–404. https://doi.org/10.1097/01.JCN.0000287038.23186.bd

Kim, M. T., Han, H. R., Hill, M. N., Rose, L., & Roary, M. (2003). Depression, substance use, adherence behaviors, and blood pressure in urban hypertensive Black men. *Annals of Behavioral Medicine*, *26*, 24–31.

Lawless, M. T., Tieu, M., Feo, R., & Kitson, A. L. (2021). Theories of self-care and self-management of long-term conditions by community-dwelling older adults: A systematic review and meta-ethnography. *Social Science & Medicine*, *287*, 114393. https://doi.org/10.1016/j.socscimed.2021.114393

le Cessie, S., Goeman, J. J., & Dekkers, O. M. (2020). Who is afraid of non-normal data? Choosing between parametric and non-parametric tests. *European Journal of Endocrinology*, *182*(2), E1–E3. https://doi.org/10.1530/EJE-19-0922

Lorig, K. (2015). Chronic disease self-management program: Insights from the eye of the storm. *Frontiers in Public Health*, *2*, 253. https://doi.org/10.3389/fpubh.2014.00253

Lorig, K., Laurent, D., Gonzalez, V., Sobel, D., Minor, M., & Gecht-Silver, M. (2020). *Living a healthy life with chronic conditions* (5th ed.). Bull Publishing Company.

Lorig, K., Stewart, A., Ritter, P., González, V., Laurent, D., & Lynch, J. (1996). *Outcome measures for health education and other health care interventions*. Sage Publications.

Lorig, K. R., Sobel, D. S., Ritter, P. L., Laurent, D., & Hobbs, M. (2001). Effect of a self-management program on patients with chronic disease. *Effective Clinical Practice*, *4*(6), 256–262.

Lumley, T., Diehr, P., Emerson, S., & Chen, L. (2002). The importance of the normality assumption in large public health data sets. *Annual Review of Public Health*, *23*, 151–169. https://doi.org/10.1146/annurev.publhealth.23.100901.140546

Mao, A. Y., Chen, C., Magana, C., Caballero Barajas, K., & Olayiwola, J. N. (2017). A mobile phone-based health coaching intervention for weight loss and blood pressure reduction in a national payer population: A retrospective study. *JMIR mHealth and uHealth*, *5*(6), e80. https://doi.org/10.2196/mhealth.7591

Maraboto, C., & Ferdinand, K. C. (2020). Update on hypertension in African-Americans. *Progress in Cardiovascular Diseases*, *63*(1), 33–39. https://doi.org/10.1016/j.pcad.2019.12.002

Mobile Fact Sheet. (2021, April 7). Pew Research Center. Retrieved August 12, 2022. https://www.pewresearch.org/internet/fact-sheet/mobile/

Mongkhon, P., & Kongkaew, C. (2017). Medication non-adherence identified at home: A systematic review and meta-analysis. *Quality in Primary Care*, *25*(2), 73–80.

Moore, J. O., Marshall, M. A., Judge, D. C., Moss, F. H., Gilroy, S. J., Crocker, J. B., & Zusman, R. M. (2014). Technology-supported apprenticeship in the management of hypertension: A randomized controlled trial. *Journal of Clinical Outcomes Management*, *21*(3), 110–122.

Moses, J. C., Adibi, S., Shariful Islam, S. M., Wickramasinghe, N., & Nguyen, L. (2021). Application of smartphone technologies in disease monitoring: A systematic review. *Healthcare*, *9*(7):889. https://doi.org/10.3390/healthcare9070889

Muntner, P., Shimbo, D., Carey, R. M., Charleston, J. B., Gaillard, T., Misra, S., Myers, M. G., Ogedegbe, G., Schwartz, J. E., Townsend, R. R., Urbina, E. M., Viera, A. J., White, W. B., & Wright, J. T., Jr. (2019). Measurement of blood pressure in humans: A scientific statement from the American Heart Association. *Hypertension*, *73*(5), e35–e66. https://doi.org/10.1161/HYP.0000000000000087

Murphy, S. L., Xu, J., Kochanek, K. D., Arias, E., & Tejada-Vera, B. (2021). Deaths: Final data for 2018. *National Vital Statistics Reports: From the Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System*, *69*(13), 1–83.

Oates, G. R., Juarez, L. D., Hansen, B., Kiefe, C. I., & Shikany, J. M. (2020). Social risk factors for medication nonadherence: Findings from the CARDIA study. *American Journal of Health Behavior*, *44*(2), 232–243. https://doi.org/10.5993/AJHB.44.2.10

Ødegård, E. S., Langbråten, L. S., Lundh, A., & Linde, D. S. (2022). Two-way text message interventions and healthcare outcomes in Africa: Systematic review of randomized trials with meta-analyses on appointment attendance and medicine adherence. *PLoS One*, *17*(4), e0266717. https://doi.org/10.1371/journal.pone.0266717

Omisakin, F. D., & Ncama, B. P. (2011). Self, self-care and self-management concepts: Implications for self-management education. *Educational Research*, *2*(12), 1733–1737.

Omron Healthcare. (2015). Omron Model BP786N Instruction Manual. Retrieved March 10, 2022. https://omronhealthcare.com/wp-content/uploads/BP786N-IM_EN.pdf

Pickering, T. G., Hall, J. E., Appel, L. J., Falkner, B. E., Graves, J., Hill, M. N., Jones, D. W., Kurtz, T., Sheps, S. G., & Roccella, E. J. (2005). Recommendations for blood pressure measurement in humans and experimental animals: Part 1: Blood pressure measurement in humans: A statement for professionals from the subcommittee of professional and public education of the American Heart Association Council on High Blood Pressure Research. *Hypertension*, *45*, 142–161. https://doi.org/10.1161/01.HYP.0000150859.47929.8e

Ritter, P. L., & Lorig, K. (2014). The English and spanish Self-Efficacy to manage chronic disease scale measures were validated using multiple studies. *Journal of Clinical Epidemiology*, *67*(11), 1265–1273. https://doi.org/10.1016/j.jclinepi.2014.06.009

Roger, V. L., Go, A. S., Lloyd-Jones, D. M., Benjamin, E. J., Berry, J. D., Borden, W. B., Bravata, D. M., Dai, S., Ford, E. S., & Turner, M. B. (2012). Heart disease and stroke statistics-2012 update: A report from the American Heart Association. *Circulation*, *125*, e2–e220. http://circ.ahajournals.org/content/125/1/e2

Shen, M. J., Peterson, E. B., Costas-Muñiz, R., Hernandez, M. H., Jewell, S. T., Matsoukas, K., & Bylund, C. L. (2018). The effects of race and racial concordance on patient-physician communication: A systematic review of the literature. *Journal of Racial and Ethnic Health Disparities*, *5*(1), 117–140. https://doi.org/10.1007/s40615-017-0350-4

Tsao, C. W., Aday, A. W., Almarzooq, Z. I., Alonso, A., Beaton, A. Z., Bittencourt, M. S., Boehme, A. K., Buxton, A. E., Carson, A. P., Commodore-Mensah, Y., Elkind, M. S. V., Evenson, K. R., Eze-Nliam, C., Ferguson, J. F., Generoso, G., Ho, J. E., Kalani, R., Khan, S. S., Kissela, B. M., Martin, S. S. (2022). Heart disease and stroke statistics-2022 update: A report from the American Heart Association. *Circulation*, *145*(8), e153–e639. https://doi.org/10.1161/CIR.0000000000001052

Whelton, P. K., Carey, R. M., Aronow, W. S., Casey DE, Jr., Collins, K. J., Dennison Himmelfarb, C., DePalma, S. M., Gidding, S., Jamerson, K. A., Jones, D. W., MacLaughlin, E. J., Muntner, P., Ovbiagele, B., Smith SC, Jr., Spencer, C. C., Stafford, R. S., Taler, S. J., Thomas, R. J., … Wright JT, Jr. (2018). 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: A report of the American College of Cardiology/American Heart Association Task Force on clinical practice guidelines. *Hypertension*, *71*(6), 13. https://doi.org/10.1161/HYP.0000000000000065

Williams, D. R. (2018). Stress and the mental health of populations of color: Advancing our understanding of race-related stressors. *Journal of Health and Social Behavior*, *59*(4), 466–485. https://doi.org/10.1177/0022146518814251

Zheutlin, A. R., Caldwell, D., Anstey, D. E., Conroy, M. B., Ogedegbe, O., & Bress, A. P. (2020). Trends in hypertension clinical trials focused on interventions specific for Black adults: An analysis of clinicaltrials.gov. *Journal of the American Heart Association*, *9*(24), e018512. https://doi.org/10.1161/JAHA.120.018512

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