

Review Article

The Role of Mindfulness Meditation for the Management of Hypertension in African American Adults in the US - A Scoping Review

Ermias Woldeamanuel^{1,2,*} , Lamar Johnson³ , Freda Patterson⁴ 

¹Epidemiology Department, University of Delaware, Newark, USA

²State Health Improvement Office, South Carolina Department of Public Health, Columbia, USA

³Internal Medicine Department, Christiana Care Health System, Wilmington, USA

⁴Behavioural Health and Nutrition Department, University of Delaware, Newark, USA

Abstract

The prevalence of hypertension is more significant among African American adults than among individuals in other ethnic groups. Mindfulness, an ancient technique used for thousands of years, is acknowledged as a valuable tool for improving health in various ways. However, despite its traditional wisdom, there remains a gap in understanding the standalone effects of MM on hypertension control. This review aimed to discuss the role of mindfulness in managing hypertension within the African American adult population in the U. S. PubMed and Scopus were the chosen databases for this exploration. The inclusion criteria comprised papers presenting primary data studies conducted on hypertensive African American patients, specifically reporting on the independent association between mindfulness and hypertension. The exclusion criteria included nonprimary data studies and studies not primarily focused on hypertension or mindfulness. Following our search strategy, we identified a total of 32 studies. Our review incorporated five randomized controlled trials, excluding manuscripts lacking primary data, nonrandomized clinical trials, and duplicates. Within these studies, mindfulness was administered to participants through either prerecorded MP3s or guidance from trained personnel. The observed reduction in blood pressure ranged from 7.2 mmHg to 21.92 mmHg for systolic blood pressure and from null to 7.2 mmHg for diastolic blood pressure across the five studies. Notably, one study showed no change in diastolic blood pressure. The outcomes of this review can contribute to clinical practice by offering an evidence-based approach for effective hypertension control through MM. The key findings highlight the positive impact of mindfulness on blood pressure regulation and emphasize using prerecorded MP3s or trained guidance as effective mindfulness delivery methods. These insights underscore the potential significance of MM as a cost-efficient and side-effect-free approach to hypertension management.

Keywords

Adults, African American, Hypertension, Meditation, Intervention

*Corresponding author: dtermial@udel.edu (Ermias Woldeamanuel)

Received: 26 July 2024; **Accepted:** 24 August 2024; **Published:** 11 September 2024



Copyright: © The Author(s), 2024. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

1. Introduction

Hypertension shows a much greater prevalence in African American adults than in other ethnic groups, accounting for 54% of African American adults, 46% of white adults, 39% of Asian adults, and 36% of Hispanics. [1] In the US, although 66.4% of African American hypertension patients are aware of their disease and are on various treatment options, only 28.9% have controlled hypertension, which is lower than that of white patients (35.4%). [1] In addition, this racial group has a greater incidence of complications related to hypertension [2]. Various psychosocial issues, such as discrimination, poor quality of care, and lack of access to health care, play a significant role in the high prevalence of uncontrolled hypertension in this population [3]. It is essential to focus on this 'silent killer' disease to attain the vision of the American Heart Association to have an equitable increase in life expectancy among societies from 66 years of age to 68 years by 2030. [4]

Mindfulness meditation is an ancient practice whose origin has been traced thousands of years back to Buddhist meditation techniques. It involves self-regulation of attention to the conscious mindset, openness, willingness for knowledge, and acceptance. [5, 7] Its primary focus is to empower the individual's capacity for self-reflection and consciousness of the outside world in a pure, content-free, and nonjudgmental way. [5] According to Loucks et al. (2015), experts define mindfulness in two ways. The initial aspect entails exercising self-control over one's focus and enabling heightened awareness of mental health processes. The second aspect involves cultivating a mindset of curiosity, receptiveness, and acceptance toward present experiences. [6] This traditional knowledge helps promote mental clarity, stress reduction, emotional balance, and a deeper connection to the present moment. [5] It is also crucial to note that this intervention not only addresses the temporary but also has a significant positive impact on the long-term health outcomes of the adult population by reducing morbidity and mortality rates. [5, 14] Despite the wealth of traditional knowledge and the application of mindfulness meditation, a gap persists in understanding how to integrate this conventional wisdom into modern medicine. Additionally, there is a need to explore the independent effects of mindfulness meditation, specifically for hypertension control. Bridging this gap could enhance our understanding and application of mindfulness within the context of contemporary medical practices.

Contemporary studies have shown that mindfulness can positively impact hypertension and various aspects of cardiovascular health in general. Loucks et al. (2015) reported that mindfulness can have a positive impact on greater physical activity levels, increased smoking cessation, healthy food consumption, reduced calorie consumption, and low rates of obesity. [6] However, the significance of the ability of mindfulness to lower blood pressure requires further investigation. This scoping review aimed to investigate the extent to which MM reduces blood pressure and its feasibility as a recognized nonpharmacologic tool for the management of hypertension in

adult African Americans.

There are numerous pharmacologic treatment classes and individual medications available for hypertension. Nevertheless, challenges persist in their use, including nonadherence, confusion about proper dosing and intervals, side effects, and the financial burden of prescription drug costs. Consequently, patients may face obstacles in adequately adhering to or maintaining their medication regimen, emphasizing the need for alternative and practical approaches to hypertension management. [8] Goldstein et al. (2012) stated that although medication use is necessary for the treatment of hypertension, pharmacotherapy must also be supported by nonpharmacologic treatment. [8] Mindfulness meditation can become one of these nonpharmacologic approaches. Nevertheless, we need more evidence on how to implement mindfulness meditation and what type, duration, and number of mindfulness meditation sessions can effectively improve blood pressure control. This scoping review will examine these factors, particularly in the adult population of African Americans.

This scoping review aims to study the independent effect of MM on hypertension control and identify commonalities in the type, duration, and number of sessions of MM interventions for the effective control of hypertension in the African American adult population. The findings from this review could help clinical practice by providing evidence for effective hypertension control strategies through MM in the US African American adult (aged >18 years) population.

2. Methods

The objective of this scoping review was to identify the role of mindfulness in the management of hypertension in the African American adult (aged >18 years) population in the US. This scoping review was mainly dedicated to answering the following questions.

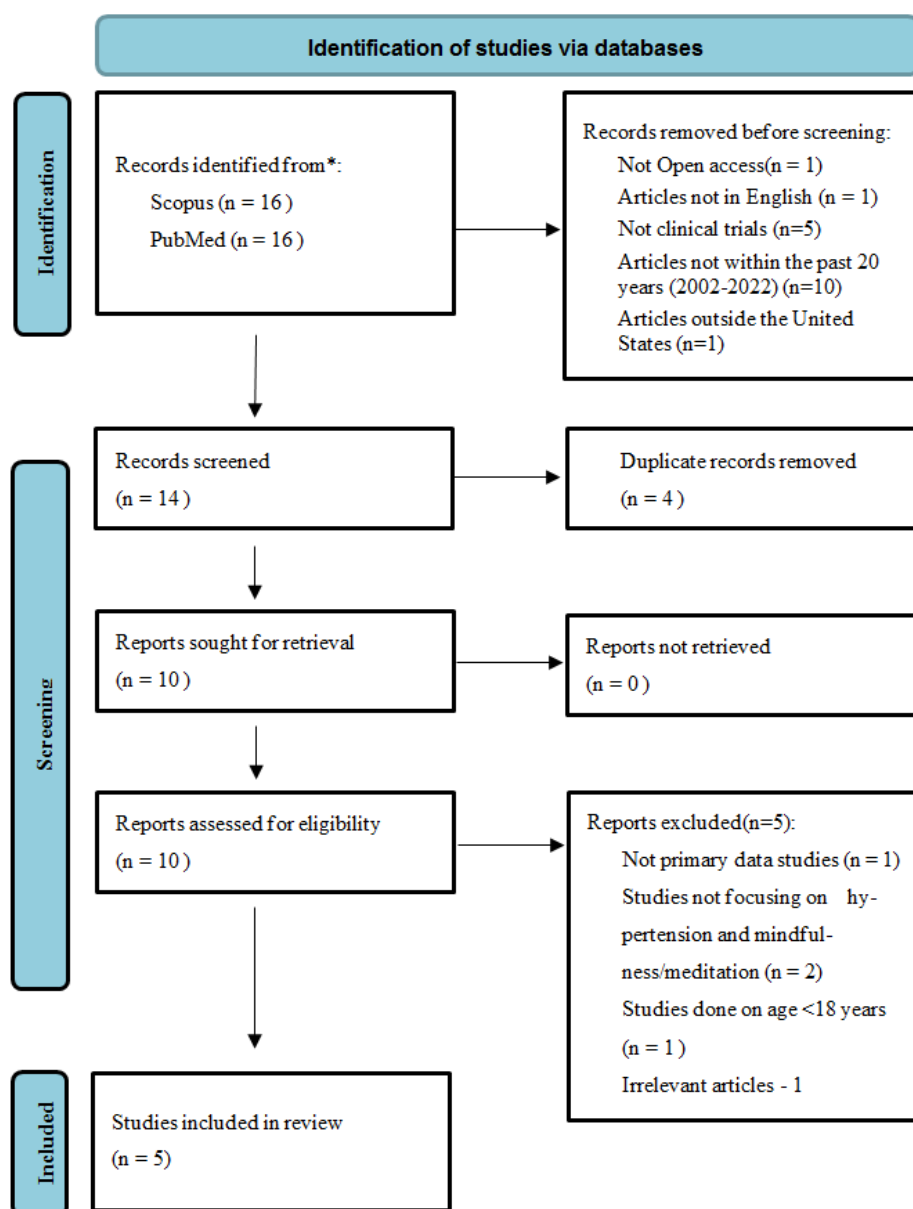
1. What types of mindfulness meditation were used in these studies?
2. What is the duration of the intervention for each of these manuscripts?
3. What is the effect of mindfulness on hypertension?
4. Which covariates were identified and adjusted to observe the distinct influence of MM on hypertension control?

2.1. Search Terms and Search Strategies

Our search strategy utilized the PICOC concept, which includes population, intervention/exposure, comparison, outcome, and context, to identify the main components of our research questions and keywords. [9] We searched for published studies up to April 14, 2022, using building blocks and incorporating key terms such as adults, African Americans, hypertension, meditation, and intervention. [10] We selected possible synonym terms for each keyword and combined them with their primary PICOC

term using 'OR'. To increase the number of search results, we used truncation (*) for some terms with prefixes or suffixes, and each block of terminology was conjugated by AND. [11] For the review process, we used two databases: PubMed and Scopus. The search terms used for Scopus were "African American" OR "Black American" AND "Hypertension" AND "Intervention" OR "treatment" OR "outcome" AND "adult*" OR "age>18" OR "age greater than 18" AND "meditation" OR "mindful-

ness." The same search strategy, separated by brackets, was applied to PubMed, with the query (Hypertension) AND ((Adult) OR (age greater than 18) OR (age>18)) AND ((African American) OR (Black American)) AND ((Intervention) OR (Treatment) OR (Outcome)) AND ((Mindfulness) OR (meditation)). The screening process and inclusion and exclusion criteria are summarized in the PRISMA flow diagram in Figure 1. [12]



Source: Page MJ, et al. BMJ 2021; 372: n71. doi: 10.1136/bmj.n71.

Figure 1. PRISMA flow diagram showing research papers identification process.

2.2. Search Outcome

Upon searching, we discovered 32 papers, with 16 results from each database: PubMed and Scopus. To refine our se-

lection, we implemented a filtering strategy focused on full text, open access, randomized controlled trials, recent articles from the past 20 years, and English language publications. This process left us with 14 papers, which we exported to the

Endnote reference manager for further screening. We then applied specific inclusion criteria, requiring the paper to feature a primary data study focused on hypertensive African American individuals and reporting on the independent association between mindfulness/meditation and blood pressure. Conversely, we excluded studies that did not include primary data or were unrelated to hypertension and mindfulness/meditation.

2.3. Quality Appraisal

A quality or strength assessment is not performed since this typical paper is a scoping review. [13]

2.4. Data Abstraction

Variables of interest were identified separately, and data were withdrawn from each paper based on the identified variables. Each paper was examined based on the study design, year of publication, type of intervention, duration of intervention, and the independent effect of mindfulness on hypertension. Appendix summarizes the characteristics of the selected studies and the sizes of their interventions.

3. Results

Five studies were ultimately included in the review. Unfortunately, the number of studies available on this topic was limited. Geographically, all the studies were from the US. The research papers primarily focused on the African American population. Additionally, one demographic study focused on African American chronic kidney disease patients. [17]

3.1. Study Design and Duration of Intervention

The studies were randomized controlled trials in which individuals from the eligible research population were randomly chosen for the intervention group. [19] One study was mainly a clustered randomized controlled trial. [15] In the examined studies, the intervention duration varied, ranging from eight weeks to one year. [15, 16, 18, 20] The intervention in one of the studies was conducted in a single-session format, lasting for just one day. [17]

3.2. Interventions Used in the Studies

In all the selected studies, the primary intervention used was MM. The participants were exposed to mindfulness meditation either through MP3 prerecorded players or with the guidance of trained personnel. [15-18, 20] The Wright et al. 2021 study included meditation, sharing of success, and experience among intervention groups regarding mindfulness skills for self-care and relationships with others. [15] In the Park et al. 2014 randomized controlled trial, participants practiced mindful meditation by listening to an MP3 listen,

which was recorded for 14 minutes. The components of these sessions were breathing awareness, a mini-body scan, and brief self-compassion. [17] Chandler et al.'s 2020 intervention was mainly dedicated to noncontrolled self and moment awareness, including breathing awareness meditation. This study used a mobile application called Tension Tamer (TT), which records the user's continuous real-time heart rate (HR) by placing their fingertip over a video camera lens during sessions. [16] After each session, users receive instant feedback graphs depicting their HR changes. Study participants also receive rewarding and inspirational text messages the next day, depending on their adherence. On the other hand, this study used two different control groups: the SPCTL (Lifestyle education program delivered via smartphone) attention group and the true control group. The SPCTL attention control group was engaged in twice-daily walking or running. At the same time, their level of daily physical activity (steps/day) was monitored by another mobile application called RunKeeper™. [16] In the study by Wright et al. 2021, the intervention was performed in a group format of 8 weekly sessions with meditation and life-related lectures on stress, mindfulness, and mind-body association; similar to previous studies, this study also used MP3 recorded music to deliver mindfulness recordings for participants by using disk players. [15] Schneider et al. (2005) used the transcendental meditation technique introduced in the US in 1959. Participants in the study were trained by a TM (Transcendental Meditation) yogi trainer for 20 minutes twice a day and given introductory and preparatory lectures to gain awareness about the benefits of the technique and personal instructions for a 1- to 1.5-hour session. Then, there was a three-month follow-up period for three days. [20]

3.3. The Effect of MM on Hypertension

According to the study by Wright et al. 2021, there was a significant difference between the intervention and attention groups, both statistically and clinically. [15] In the intervention group, Mindfulness In Motion DASH, systolic blood pressure decreased by -10.4 mmHg from baseline. In contrast, the blood pressure reduction for the attention group was only -3.2 mmHg, with a p value of 0.12. However, there was no significant reduction in diastolic blood pressure. [15]

The Chandler et al. 2020 study showed a significant difference in blood pressure change between the intervention group, the TT group, and the control SPCTL attention control group compared to their baselines. However, a significant decrease in systolic blood pressure was observed after the intervention. The study showed a significant change in systolic blood pressure in the third month for the intervention versus the control group as (-7.9 vs. -1.9 mmHg), sixth month (-10.0 vs. -0.9 mmHg), and twelfth (-11.6 vs. -0.4 mmHg, sixth and twelfth-month p values<0.04) by using the general linear mixed model. [16] Similar reductions were seen for diastolic blood pressure in the intervention group as compared

to the control group, with postintervention analysis showing on the third month (-7.9 vs. -1.9 mmHg), sixth month (-10.0 vs. -0.9 mmHg), and twelfth month (-11.6 vs. -0.4 mmHg; sixth and twelfth-month p values <0.04). Additionally, using General linear mixed model (GLMM) analyses of treatment over time (baseline, 1, 3, 6, 12 months) shows a significant difference with p values <0.01 . [8]

According to the findings of the Park et al. 2014 study, there was a noteworthy variance in the blood pressure changes between the intervention group, who practiced MM, and the control group after the 14-minute intervention. Specifically, the systolic blood pressure in the intervention group decreased by -8.66 , while that in the control group only slightly decreased by 0.37 . After accounting for other variables, this difference was statistically significant, with a P value of 0.004 . [17] The paper by Palta et al. 2012 also revealed a similar reduction in postintervention blood pressure compared to baseline for both systolic and diastolic blood pressure. Multivariate regression analysis was used to compare blood pressure measurements between the intervention and social support (control) groups. Compared with those in the social support group, the systolic blood pressure in the intervention group decreased by 21.92 mmHg ($p=0.02$). Despite having higher baseline blood pressure in the intervention group than in the control group at the beginning, postintervention analysis revealed a significant reduction in diastolic blood pressure of 16.7 mmHg in the intervention group ($p=0.003$). [10]

Finally, in the last study by Schneider et al. (2005), the systolic blood pressure was reduced by -3.12 ± 1.52 mmHg ($p=0.02$) in the intervention group and by 0.54 ± 1.52 mmHg ($p=NS$) in the control group. The mean reduction in diastolic blood pressure was -5.67 ± 0.89 mmHg for the intervention group (TM group) and -2.9 mmHg ± 0.89 mmHg for the control group, Progressive Muscle Relaxation (PMR) group. For both groups, the reduction in diastolic blood pressure was greater than zero ($p<0.01$). [20]

4. Discussion

This scoping review aimed to study the independent effect of MM on hypertension control and to identify the commonalities in the type and number of MM interventions performed to reduce blood pressure in the African American adult population. This scoping review contains two key findings. The first key finding is the independent effect of MM on the control of hypertension. Four studies showed a statistically significant reduction in blood pressure after completing a mindfulness meditation intervention compared to the control. [15-17, 20] The second key finding is that all studies provided mindfulness meditation as an intervention through prerecorded MP3 players or trained personal guidance. Three of the studies used mindfulness meditation guide recordings with an MP3 player or a mobile application. These data underscore the potential for MM to be considered an essential aspect of hypertension management, taking it as a cost-efficient and side

effect-free approach.

Mindfulness can positively impact hypertension and various aspects of cardiovascular health in general. Mindfulness can positively affect physical activity levels, smoking cessation, healthy food consumption, calorie reduction, and obesity rates. [6] This scoping review adds to the existing knowledge of the independent effect of MM on the control of hypertension. Four studies showed a statistically significant reduction in blood pressure after completing a mindfulness meditation intervention compared to a control condition. This blood pressure significantly decreased the systolic blood pressure compared to the diastolic blood pressure. [15-18, 20]

Mindfulness entails the self-regulation of attention, primarily emphasizing the enhancement of individuals' self-awareness and awareness of the external environment in a curious and nonjudgmental manner. [16] Despite the traditional knowledge of MM, there is still a gap in integrating this wisdom into modern medicine for intended clinical application. The findings in this review show that recorded MP3 or trained personal guided meditation can help improve mindfulness in the African American hypertensive adult population. The paper by Wright et al. 2021 used weekly group sessions, including a didactic presentation on stress, mindfulness, and the bodily mind/body connection, and a compact disk player with mindfulness recordings. Additionally, a weekly diary was used to document the study activities. [15]

4.1. Health Promotion Implications

The results of this review suggest that the adult hypertensive African American population (and likely other hypertensive populations) can benefit from MM as a component of the management of hypertension. These nonpharmacologic interventions help better control increased blood pressure without considering side effects and adherence. Physicians and other health service providers can use findings from the current review to help treat hypertensive patients as an adjunct to their pharmacologic regimen. In addition, their health service providers can also refer their patients to trained meditation facilitators as part of their management plan.

4.2. Strength and Limitations

The strengths of the current review include the focus on a single population of interest and the critical research questions that guided the review. This review primarily focused on the independent effect of mindfulness meditation for the management of hypertension targeted at adult African American people within the United States. It has long been known that MM can be effective for different aspects of cardiovascular health in the general population. However, very few articles have analyzed the effectiveness of this intervention for the control of hypertension, particularly in African Americans. This scoping review covers the intervention types, effectiveness, and number of sessions for managing hypertension in these populations.

This manuscript examines the association between MM and hypertension using randomized controlled trials (RCTs). RCTs are the cornerstone of rigorous scientific inquiry and play a pivotal role in establishing a robust association between the intervention, in this case, mindfulness meditation, and the desired outcome, hypertension management. By exclusively focusing on RCTs, this review ensures a high level of methodological rigor and minimizes biases, enhancing the internal validity of the findings. The randomized allocation of participants within the included studies helped eliminate confounding variables, enabling a more precise evaluation of the impact of MM on hypertension outcomes. This methodological approach strengthens the study's credibility and enhances its generalizability, as RCTs are widely recognized as the gold standard in clinical research.

Limitations of this review include the limited number of studies found and the absence of various meditation types. Three of the five studies used prerecorded MP3 play as a tool. The other two interventions used trained personal guided meditation. In the future, more studies should be conducted to examine the association between MM and hypertension control in the African American adult hypertensive population.

5. Conclusions

The findings of the current review suggest that mindfulness meditation, when applied independently, has the potential to reduce blood pressure in the adult African American population. Using prerecorded MP3 meditation or trained personal-guided meditation has emerged as two viable options for delivering mindfulness. This insight can be translated into clinical practice as an effective means of controlling hypertension in the African American adult population in the U.S. However, to further solidify these insights and enhance the impact of this research, it is suggested that more detailed recommendations for follow-up studies or future work on this topic should be made. Specifically, future research could explore the long-term effects of mindfulness on hypertension, investigate its applicability across diverse populations, and assess the feasibility of integrating MM into routine clinical practice.

Appendix

Table A1. Summary of Characteristics of the Selected Studies and Their Intervention Effect Size ($n = 5$).

No	Publication	Year of publication	Mode of intervention	Duration of Intervention	Change in SBP*	Change in DBP*	Study Sample Size	Adjusted Covariates
1	Wright et al.	2021	1) Guided meditation on stress management and mindfulness	2 hours sessions weekly for 8 weeks	-10.4 Vs -3.2 ($p=.12$)	-4.1 vs -3.4 ($p = .60$)	38	Age Sex Education

Abbreviations

MM	Mindfulness Meditation
PICOC	Population, Intervention/Exposure, Comparison, Outcome, and Context
TT	Tension Tamer
HR	Heart Rate
SPCTL	Lifestyle Education Program Delivered Via Smartphone
TM	Transcendental Meditation
DASH	Dietary Approach to Stop Hypertension
PMR	Progressive Muscle Relaxation
RCTs	Randomized Controlled Trials

Author Contributions

Ermias Woldeamanuel: Conceptualization, Resources, Methodology, Visualization, Writing-Original draft, Data Curation

Lamar Johnson: Resources, Writing-Original draft, Validation

Freda Patterson: Resources, Methodology, Writing-Original draft, Supervision

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data Availability Statement

All data used and analyzed during this scoping review are included in this published article.

Conflicts of Interest

The authors declare no conflicts of interest.

No	Publication	Year of publication	Mode of intervention	Duration of Intervention	Change in SBP*	Change in DBP*	Study Sample Size	Adjusted Covariates
			2) MP3 player-guided mindfulness meditation					Monthly income
2	Chandler et al	2020	Guided meditation using a smartphone application	1) 1 st - two 15-minute daily sessions 2) 2 nd and 3 rd month - two 10-minute daily sessions 3) 4 th to 12 th month - two 5 minutes daily sessions	-11.6 vs. -0.4 (p = 0.04)	-6.4 Vs +2.4 (p=0.01)	30	Age, Gender, Race, Marital status, Education, Income, Employment, Antihypertensive medication
3	Park et al	2013	1) Prerecorded guided Mindfulness. 2) Meditation using an MP3 player and headphones	15 minutes in a single session	-8.66 Vs 0.37 (p=0.004)	-3.86 (p=0.004)	15	Age, BMI, smoking Comorbid posttraumatic stress disorder,
4	Palta et al.	2012	Professional guided breath meditation	90 minutes sessions weekly for eight weeks	-11 vs -4.2 (p=0.02)	-3.7 vs +3 (p= 0.003)	20	Race, Number of years of education completed, Smoking history, Perceived stress
5	Schneider et al	2005	Transcendental Meditation	20 minutes twice a day for 1 year	-2.13 Vs -1.08 (p=0.17)	-6.24 Vs -4.44 (p<NS)	150	Age, gender, anti-hypertensive medication, income, marital status, weight, BMI, Smoking status, Alcohol intake, physical activity

p- p-value NS- Not Significant BMI - Body Mass Index mmHg - millimeter mercury SBP - Systolic Blood Pressure DBP - Diastolic Blood Pressure; *Change in DBP in the intervention group compared to control group (mmHg); *Change in SBP in the intervention group compared to control group (mmHg)

References

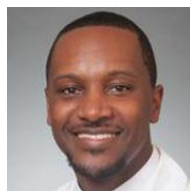
- [1] Butzner M, Oyekanmi C, McDuffie MJ, Nescott E, McCullers A, Woldeamanuel E, Lynn E, Cuffee Y. Impact of Health Literacy on Medication Adherence Among Black Medicaid Beneficiaries with Hypertension in Delaware: A Cross-Sectional Study. *Popul Health Manag.* 2023 Apr; 26(2): 93-99. <https://doi.org/10.1089/pop.2022.0270>
- [2] Albertus P, Morgenstern H, Robinson B, Saran R. Risk of ESRD in the United States. *Am J Kidney Dis.* 2016; 68: 862–72. <https://doi.org/10.1053/j.ajkd.2016.05.030>
- [3] Phillips E. The Silent Killer: A Review of Psychosocial Factors and Systems-Level Interventions that Address Hypertension in African American Men, *Graduate Annual: Vol. 2, Article 12.* <https://digitalcommons.lasalle.edu/graduateannual/vol2/iss1/12> (2014).
- [4] Sonia Y, Angell MV, McConnell, Cheryl AM, Anderson K, Bibbins-Domingo DS, Boyle S, Capewell M, Ezzati Sde, Ferranti DJ, Gaskin, Ron Z, Goetzel MD, Huffman YM, Khan S, Kim. Somava Saha and John J. Warner The American Heart Association 2030 Impact Goal: A Presidential Advisory From the American Heart Association Jan 2020; 141: e120–e138. <https://doi.org/10.1161/CIR.0000000000000758> *Circulation*
- [5] Alexander CN, Langer EJ, Newman RI, Chandler HM, Davies JL. Transcendental meditation, mindfulness, and longevity: an experimental study with elderly individuals. *J Pers Soc Psychol.* 1989; 57(6): 950 – 64. <https://doi.org/10.1037//0022-3514.57.6.950>
- [6] Loucks EB, Schuman-Olivier Z, Britton WB, et al. Mindfulness and Cardiovascular Disease Risk: State of the Evidence, Plausible Mechanisms, and Theoretical Framework. *Curr Cardiol Rep.* 2015; 17: 112. <https://doi.org/10.1007/s11886-015-0668-7>

- [7] Susan Chow PD, Benedetto Cuffari M. Sc., Meditation history, News Medical life sciences. March 18, 2021, <https://www.news-medical.net/health/Meditation-History.aspx>
- [8] Carly M, Goldstein R, Josephson S, Xie, Joel W. Hughes Current Perspectives on the Use of Meditation to Reduce Blood Pressure, *Int J Hypertens*. 2012; 2012: 578397. Published online. <https://doi.org/10.1155/2012/578397> 2012
- [9] Zachary Munn C, Stern E, Aromataris. Craig Lockwood, and Zoe Jordan What kind of systematic review should I conduct? A proposed typology and guidance for systematic reviewers in the medical and health sciences, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5761190/>
- [10] How to construct an effective search strategy. Rush University Medical Center library, <https://rushu.libguides.com/c.php?g=834766&p=5960431#s-l-g-box-wrapper-22226315> Jan 28, 2022.
- [11] Systematic reviews: finding the evidence - handout. University of South Australia Library. Rev. 21 February 2024. https://guides.library.unisa.edu.au/ld.php?content_id=49640953
- [12] Rethlefsen, M. L., Kirtley, S., Waffenschmidt, S. *et al*. PRISMA-S: an extension to the PRISMA Statement for Reporting Literature Searches in Systematic Reviews. *Syst Rev* 10, 39 (2021). <https://doi.org/10.1186/s13643-020-01542-z>
- [13] Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci*. 2010; 5: 69. <https://doi.org/10.1186/1748-5908-5-69>
- [14] Schneider RH, Alexander CN, Staggers F, Rainforth M, Salerno JW, Hartz A, Arndt S, Barnes VA, Nidich SI. Long-term effects of stress reduction on mortality in persons > or = 55 years of age with systemic hypertension. *Am J Cardiol*. 2005 May 1; 95(9): 1060-4. <https://doi.org/10.1016/j.amjcard.2004.12.058>
- [15] Wright KD, Klatt MD, Adams IR, Nguyen CM, Mion LC, Tan A, Monroe TB, Rose KM, Scharre DW. Mindfulness in Motion and Dietary Approaches to Stop Hypertension (DASH) in Hypertensive African Americans. *J Am Geriatr Soc*. 2021 Mar; 69(3): 773-778. <https://doi.org/10.1111/jgs.16947> Epub 2020 Nov 23.
- [16] Chandler J, Sox L, Diaz V, Kellam K, Neely A, Nemeth L, Treiber F. Impact of 12-Month Smartphone Breathing Meditation Program upon Systolic Blood Pressure among Non-Medicated Stage 1 Hypertensive Adults. *Int J Environ Res Public Health* 17 Issue. 2020; 17(6). <https://doi.org/10.3390/ijerph17061955>
- [17] Park J, Lyles RH, Bauer-Wu S. Mindfulness meditation lowers muscle sympathetic nerve activity and blood pressure in African-American males with chronic kidney disease. *Am J Physiol Regul Integr Comp Physiol*. 2014 Jul 1; 307(1): R93-R101. <https://doi.org/10.1152/ajpregu.00558.2013> Epub 2014 May 14.
- [18] Palta P, Page G, Piferi RL, Gill JM, Hayat MJ, Connolly AB, Szanton SL. Evaluation of a mindfulness-based intervention program to decrease blood pressure in low-income African-American older adults. *J Urban Health*. 2012 Apr; 89(2): 308-16. <https://doi.org/10.1007/s11524-011-9654-6>
- [19] White, H., Sabarwal S. & T. de Hoop, (2014). Randomized Controlled Trials (RCTs), Methodological Briefs: Impact Evaluation 7, UNICEF Office of Research, Florence.
- [20] Schneider RH, Alexander CN, Staggers F, Orme-Johnson DW, Rainforth M, Salerno JW, Sheppard W, Castillo-Richmond A, Barnes VA, Nidich SI. A randomized controlled trial of stress reduction in African Americans treated for hypertension for over one year. *Am J Hypertens*. 2005; 18(1): 88-98.

Biography



Ermiyas Woldeamanuel is an Epidemiologist working at the South Carolina Department of Public Health. He completed his Medical Doctorate from Arba Minch University in 2020 and his Master of Public Health Concentration in Epidemiology from the University of Delaware in 2023. He has a blend of medical and public health training. He contributed significantly to the South Carolina State Health Assessment and is working on a major state public health project titled State Health Improvement Plan of South Carolina as an Epidemiologist.



Lamar Johnson earned his medical degree from Meharry Medical College in Nashville, TN. He completed a combined residency in Internal Medicine and Pediatrics ("Med-Peds") at Wayne State University/Detroit Medical Center, where he also served as chief resident. He now works in primary care, where he sees children and adults, and pediatric hospital medicine. He strives to improve the health of his patients and those in his community by working towards a more just and patient-centered healthcare system. He is currently leading the development of a Health Advocacy and Equity Curriculum for the Internal Medicine Residency Program at Christiana.



Freda Patterson is the Associate Chair, Associate Professor, and Director of the PhD program in Health Behavior Science and Promotion within the Department of Behavioral Health and Nutrition at the University of Delaware. She also leads a Sleep and Health Research Program that receives external funding. As a public health scientist, her work focuses on using big-data analysis, community-based research, and controlled trials to explore the temporal and prospective relationships between sleep, circadian health, and various cardiometabolic behavioral risk factors, such as physical inactivity, sedentary behavior, poor diet, and tobacco use, particularly in high-risk populations.

Research Field

Ermiyas Woldeamanuel: Neurologic Diseases, Clinical Medicine, Health Equity, Epidemiology, Chronic Diseases

Lamar Johnson: Clinical Medicine, Chronic Diseases, Hypertension, Pediatric Disease, Diabetes Management

Freda Patterson: Cardiovascular health, behavioral health, Conversant in sleep, physical activity, and smoking cessation in relation to cardiovascular health