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The Development of a Clinical Predictive Tool to Increase Uptake of a Hypertension Prevention Treatment in at Risk Black Americans

Kiara De Simone
University of Windsor

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By

Kiara De Simone

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Kiara De Simone

APPROVED BY:

____
P. Levy, Special Member
Department of Emergency Medicine, Wayne State University

____
R. Brook, Special Member
Department of Emergency Medicine, Wayne State University

____
E. Tanlaka
Faculty of Nursing

____
C. Sutherland
Faculty of Human Kinetics

____
C. McGowan, Advisor
Faculty of Human Kinetics

January 25th, 2024

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Abstract

Cardiovascular disease (CVD) is the leading cause of death worldwide, and its most prominent risk factor, hypertension (HTN; elevated blood pressure; BP) affects 40% of the world's population. For numerous reasons, including racism and discrimination, limited access to care, low socioeconomic status (SES), lack of knowledge and social support, and low acceptance to traditional treatments, Black Americans in the United States (US) are disproportionately affected. Black Americans experience the highest rates of CVD- related mortality and HTN prevalence compared to any other racial group. Addressing this racial disparity is imperative. Endorsed nationally in HTN guidelines, isometric handgrip (IHG) training is a promising, little-known BP-lowering intervention, that has the potential to improve BP-control in this population. As such, the primary purpose of this study was to derive a preliminary prediction model to be used by clinicians to identify Black Americans with HTN who are most willing to adopt IHG training as a HTN treatment. Baseline retrospective data (2016) was analyzed from a subsample of Black American individuals (N=309) presenting to the Emergency Department at three urban medical centres who completed a questionnaire relating to IHG training acceptability. A forward-stepwise binary logistic regression was performed to determine patients' willingness to try a new, non-invasive, non-pharmacological, BP-lowering treatment such as IHG training according to demographic, clinical, and self-reported psychosocial factors. Older age (odds ratio [OR] 1.030, p = 0.01), having a higher perceived life experience with racism (OR 1.05, p = 0.045), and having a previous medical history of HTN (OR 2.207, p = 0.016) (n=299) were factors that predicted an individual's willingness. Future studies should assess the predictive performance of this model in a larger sample followed by robust, randomized control design implementation testing in a clinical setting.

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List of Abbreviations

ABPM	Ambulatory Blood Pressure Monitoring
ACC	American College of Cardiology
ACE	Angiotensin-Converting Enzyme
AHA	American Heart Association
ARB	Angiotensin Receptor Blockers
BP	Blood Pressure
CVD	Cardiovascular Disease
DBP	Diastolic Blood Pressure
HMIC	High-and-Middle Income Countries
HR	Heart Rate
HTN	Hypertension
IHG	Isometric Handgrip
IRT	Isometric Resistance Training
LMIC	Low-and-Middle Income Countries
MAP	Mean Arterial Pressure
MAPLE	Iso**M**etric-**A**ssociated Blood **P**ressure-**L**owering **E**xercise
MVC	Maximum Voluntary Contraction
PA	Physical Activity
Q	Cardiac Output
RAAS	Renin–Angiotensin–Aldosterone System
RaLES-B	Brief Racism and Life Experiences Scale
ROC	Receiver Operator Characteristic
SBP	Systolic Blood Pressure
SES	Socioeconomic Status
SSQ6	Social Support Questionaire-6
SV	Stroke Volume
TPR	Total Peripheral Resistance
US	United States
WHO	World Health Organization

Chapter 1: Literature Review

1.1 The Burden of Hypertension (HTN)

Cardiovascular disease (CVD) is the leading cause of death worldwide.[1] HTN or chronically elevated arterial blood pressure (BP; $\geq$130-139/80-89 mmHg) is the major primary risk factor for CVD development.[2,3]Affecting nearly 40% of the global population above the age of 25 years, HTN is the leading cause of disability and premature mortality worldwide.[3–5] HTN represents the most common clinical diagnosis seen in primary care, yet 70% of treated HTN patients are not achieving clinical control targets.[6,7] Ultimately, the World Health Organization (WHO) suggests HTN as "the most prevalent yet preventable chronic condition".[2,8]

The burden of HTN is highly skewed towards low-and middle-income countries (LMIC), such as those in the African continent.[9] However, in high-and-middle income countries (HMIC) such as the United States (US), individuals who identify as Black American experience greater rates of HTN and cardiovascular mortality than any other racial or ethnic group.[10–14] This disparity exists for several potential reasons, including but not limited to; discrimination and racism, limited access to care, low socioeconomic status (SES), lack of knowledge and social support, and poor adherence to traditional treatments (i.e., lifestyle modification and drug therapies).[11,15–28]

The wide-spread prevalence of HTN-related consequences has impacted the economy substantially, representing 10% of total global healthcare expenditures.[29] Similar health trends are noted within the US, with HTN being the most expensive risk factor of all total direct medical costs for CVD, attributing to $119 billion spent in 2020.[30] Black Americans occupy the greater proportion of spending compared to their

White counterparts, with mean annual expenditures for HTN treatments ranging from $887 USD per person compared to $661 USD per person, respectively.[13,31,32]

To expand upon the above-noted, Black Americans have one of the highest rates of HTN globally, and develop HTN at an earlier age compared with other racial/ethnic groups.[33,34] According to the American College of Cardiology (ACC)/American Heart Association (AHA) Task Force on Clinical Practice Guidelines for diagnosis of HTN, Black Americans experience a 40% greater HTN prevalence compared to their White (27%), Hispanic (27%), and Asian (25%) counterparts.[35,36] Moreover, Black Americans have higher rates of more severe HTN and, and develop HTN-related complications (e.g., target organ damage) at younger ages when compared to their White counterparts.[35,36] Furthermore, this population has less than 40% of their BP controlled to within target ranges, compared to over 50% of their White counterparts.[14,34,37]

Identifying factors that are attributed to these disparities is imperative to reduce HTN prevalence and ultimately, the burden of CVD.[35] This urgency for change is echoed in Surgeon General Dr. Jerome Adam's Call to Action for HTN control to be a national public health priority, stating: "We cannot wait, especially in communities of colour, to address the US epidemic of uncontrolled HTN."[38,39] Thus, exploring alternative interventions that promote effective prevention or management of HTN is essential for Black Americans and other marginalized populations.[38,40-42]

1.2 Pathophysiology of Primary HTN

Before describing the pathophysiology of HTN, it is important to understand the role of arterial BP regulation. Whether the body is at rest or under stress (e.g., exercise), arterial BP regulation works to maintain a high enough pressure to perfuse organs and tissues adequately, while not high enough to promote damage (e.g., endothelial injury) or low enough to elicit symptoms (e.g., light-headedness).[43–47]

BP is defined as the force exerted against the arterial walls to maintain adequate blood supply throughout the vascular system.[43] BP is represented dichotomously as systolic BP (SBP; the pressure measured in the arterial wall when the heart contracts, or the contraction phase) and diastolic BP (DBP; the pressure measured in the arterial wall when the heart relaxes between each heartbeat, or the relaxation phase).[45]

Mean arterial pressure (MAP) is the average BP measured within one cardiac cycle (systole and diastole).[45,47,48] MAP is the driving force for propelling blood to the tissues and relies on cardiac output (Q) and total peripheral resistance (TPR); expressed in the mathematical equation MAP = Q x TPR.[46–49] Q is the volume of blood ejected by each ventricle per minute, expressed as the mathematical equation Q = HR x SV (HR; heart rate, the contractile force of the heart and SV; stroke volume, total blood volume ejected from the left ventricle with each heartbeat).[45–47,49] TPR is determined by changes in blood viscosity (i.e., blood thickness) and arteriolar radius size, which is influenced by vasoconstriction (constriction of blood vessels that elevates BP) and vasodilation (relaxation of blood vessels that lowers BP).[45–47,49]

Alterations in MAP can occur throughout short-term (i.e., seconds to minutes) or long-term responses (i.e., hours, days, or longer). [44,47,50] Such responses are regulated through the integrated action of neural (increasing MAP via vasoconstriction from sympathetic innervation or a decreasing MAP via vasodilation from parasympathetic vagal stimulation), local (increasing MAP via release of endothelin and/or decreasing MAP via nitric oxide and histamine release), and hormonal mechanisms (such as increasing MAP via release of vasoconstricting hormones like vasopressin and angiotensin II).[44,47,50]

With respect to the latter, hormonal regulation plays a significant role in long-term BP maintenance, with its major regulatory mechanism consisting of the renin–angiotensin–aldosterone system (RAAS).[44,47,50] The RAAS is the most critical component of long-term BP regulation, as it is responsible for maintaining fluid balance through sodium excretion (via urination), sodium reabsorption (i.e., releasing aldosterone, a vasoconstricting hormone), and water reabsorption (i.e., releasing vasopressin, a vasoconstricting hormone).[43,47,49,51]

HTN is classified as elevated BP, which is a result of sustained increases in Q, TPR, or both. [46,47,49] Adequate BP control is therefore dependent on balance of Q and TPR.[46,47,49] HTN is a condition that typically presents asymptomatically, meaning that affected individuals may not experience any outward physical symptoms.[2,47] It's most common form is primary HTN, an idiopathic condition representing 90-95% of cases.[51] Secondary HTN develops from one or more known pathological cause(s) including: renovascular disease, primary aldosteronism, sleep apnea, or drug and alcohol-induced HTN, occupying the remaining 5-10% of cases.[4,47] The longer HTN remains ignored, undetected, or poorly managed, the greater the likelihood of developing life-threatening complications associated with the heart, blood vessels, and other major organs (e.g., brain and kidneys).[2,4,47]

Despite an unknown underlying cause, primary HTN is more likely to develop and progress at an earlier age among Black Americans when compared to their White counterparts.[10,14,49,52] Primary HTN is understood to be a multifactorial condition attributed to genetic, environmental, and behavioural characteristics that are classified into modifiable and non-modifiable risk factors.[2,52–54] Modifiable risk factors can include the presence of obesity or being overweight, an unhealthy diet, poor stress management, excessive alcohol and tobacco consumption, and a sedentary lifestyle; all of which can potentially be mitigated through lifestyle modification.[2,52–54]Alternatively, non-modifiable risk factors include genetic factors, aging (over 65 years), biological sex, race, and coexisting conditions (e.g., diabetes or kidney disease).[2,52–54]

The pathogenesis of HTN is complex; both modifiable and non-modifiable risk factors can cause disturbances within neural, local, and/or hormonal mechanisms, thus resulting in potentially fatal disruptions of BP homeostasis.[49,51,52]

1.2.1 Race-Based Pathophysiological Influences

The magnitude of the burden of HTN among Black Americans is not fully understood, although genetic factors are thought to explain 30–50% of cases, in addition to biological, environmental, and social factors.[55,56]

The greater HTN prevalence among Black Americans of African descent versus those individuals living in Africa could possibly be explained by environmental (e.g., obesity) and behavioral factors (e.g., poor diet) holding a greater weight of importance among Black Americans.[40,56–58] These factors could act directly or indirectly to trigger mechanisms of BP elevations that are dormant among residents of Africa.[58] Thus, addressing the development and progression of this disease through treatment therapies that target individual mechanisms, particularly in the Black American population, grants the opportunity to reduce HTN and its associated pathological consequences.[59]

Compared to other populations, Black Americans exhibit an accelerated progression from pre-HTN to HTN, greater rates of severe HTN, and elevated cardiovascular reactivity.[36,57] With respect to the latter, cardiovascular reactivity refers to acute cardiovascular responses, such as increased BP and HR elicited by the body in response to mental and physical stressors.[60] Current research suggests that high cardiovascular reactivity is associated with future HTN and CVD development.[60]

From a biological perspective, salt sensitivity may be implicated in the genetic predisposition of various components ranging from: overactivity of epithelial sodium channels, disturbances in the RAAS causing inflammation and fibrosis (e.g., reduced renin with high angiotensin II production and enhanced aldosterone sensitivity), and attenuated vasodilator responses (e.g., reduced nitric oxide bioavailability and impairment of endothelin receptors).[57,58] Ultimately, salt sensitivity can lead to irreversible damage to the circulatory system.

Finally, a framework to explain the impact of culturally and socially unique coping strategies and their effects on Black Americans; individuals experiencing low socioeconomic resources are more likely to exhibit higher BP levels than those with greater socioeconomic resources. Based on the folklore of John Henry, a steel-driving man (i.e., used sledgehammers to drive drills into the ground for railroad construction) who was well-renowned for his hard work ethic and exceptional physical strength. [7,61]

Henrys strength was tested in a competition in which he defeated a mechanical steam engine yet died shortly thereafter due to extreme physical stress and mental exhaustion.[17,61]

This theory alludes to a culturally specific psychological response to stress that has been associated with an increased risk of HTN development, greater cardiovascular reactivity, and poorer physical health.[17,61] Additionally, this hypothesis demonstrates the belief that Black Americans experiencing discrimination, socioeconomic marginalization, and other negative psychosocial factors respond with high-effort coping strategies to combat these stressors.[17,61] As a result, this group is more likely to experience HTN and rely on self-management strategies rather than seeking treatment within healthcare systems.[17,61]

1.3 Diagnosis of HTN

The updated 2020 Worldwide HTN Practice Guidelines (endorsed by the International Society of Hypertension) are designed to promote the accuracy and accessibility of HTN diagnosis on a global spectrum.[54] The guidelines are suitable for application among both LMICs and HMICs, since they are based on optimal standards that are simplified for various settings with different resource availabilities.[54] In accordance with most governing guidelines, HTN is diagnosed when office or clinical SBP is ≥140 mmHg and/or DBP is ≥90 mmHg (≥140/90 mmHg) across 2-3 office visits at 1-4-week intervals.[54]

Many countries, such as Canada, align with this practice, yet American guidelines have more conservative standards of care.[3,62,63] According to the recently updated HTN guidelines published by the AHA/ACC Task Force on Clinical Practice Guidelines lowered the definition of HTN to ≥130-139/80-89 mmHg, thereby increasing the US HTN prevalence from 31% to 46%.[3,63]

1.4 BP Measurement

Standardized measurement techniques for BP readings are office measurements, which include the non-automated method of auscultatory sphygmomanometry and automated oscillometric methods.[64] Both methods include the occlusion of the brachial artery and are recommended in several updated guidelines for BP measurement practices.[3,54,62,64] Auscultatory sphygmomanometery has been historically considered the gold standard BP measurement technique.[47,64] This technique is performed by placing an inflatable cuff around the bicep (brachial artery), and using Korotkoff sounds to detect SBP and DBP, respectively.[47,64] Comparatively, the oscillometric method has become popularized in recent years, and is now considered the preferred way for measuring and assessing BP.[47,64] Contrary to auscultatory sphygmomanometry, oscillometry uses a microprocessor that detects SBP and DBP via the magnitude of oscillometric impulses, rather than Korotkoff sounds.[47,64]

Additionally, ambulatory BP monitoring (ABPM; set interval recordings over a 24-hour period) is another popular method outlined in practicing BP guidelines.[4,54,62,64] ABPM also employs oscillometric methods to estimate BP, and involves the occlusion of the brachial artery.[47,64] ABPM is an ideal representation of true BP, providing broader ranges such as readings during an individual's daily routine and activities.[5,64] This method offers a better prediction of cardiovascular risk and target-organ damage due to its unique ability to record continuous BP readings over extended periods of time (i.e., 30-minute intervals at daytime and one-hour intervals at night-time).[5]

1.4.1 Optimal BP Measurement for Black Americans

Supporting evidence from the Jackson Heart Study, which examined an exclusively Black American cohort, demonstrated that ABPM is the preferred BP measurement method among Black Americans.[65] When compared to clinical measurements, daytime and night-time ABPM provide higher SBP and DBP values.[5,65] Additionally, ABPM minimizes the likelihood of mismatches between clinic and out-of-clinic BP-levels such as that which occurs with white-coat HTN, a condition where individuals demonstrate elevated BP readings only within clinical settings.[5,65] White-coat HTN is widely common, affecting upwards of 30% of Black American adults attending clinics due to high BP.[25] Thus, the use of ABPM can lower the risk of HTN misdiagnosis among Black Americans.[65]

Diagnosing HTN is an essential step for meeting treatment strategies and, subsequently, optimal BP targets.[66] With the goal of reversing these poor health trends, the effective use of diagnostic strategies are imperative for treating the cascade of health-related and economic consequences associated with HTN.[67]

1.5 Traditional HTN Treatments

Lifestyle modifications are recommended as the frontline method of antihypertensive treatment.[2,62] The most frequently recommended interventions for HTN management include weight management, adopting a healthy diet, smoking cessation, stress management, reducing alcohol consumption, and increasing physical activity (PA).[2,3,54,62]

Taking a deeper look at the latter, PA represents voluntary bodily movements produced by the contraction of skeletal muscles that requires energy expenditure.[68] Its subcategory, exercise, is widely recognized across governing HTN guidelines as a fundamental lifestyle modification for reducing BP.[3,54,62,68,69] Exercise involves planned, structured, and repetitive bodily movement to improve or maintain components of physical fitness.[68]

The ACC/AHA Task Force on Clinical Practice Guidelines recommend an accumulation of 90-150 minutes of combined aerobic and dynamic resistance exercise training, weekly. Aerobic exercise training is recommended to be performed at 65-75% of HR reserve (the difference between maximum HR and resting HR) weekly for both non-hypertensive and hypertensive populations.[3] Comparatively, dynamic resistance exercise is recommended to be performed at 50-80% of an individual's one-repetition maximum for a total of six exercises, with three sets per exercise, at ten repetitions per set for both non-hypertensive and hypertensive populations.[3]

The BP-lowering effects of aerobic exercise training have been widely supported across multiple robust meta-analyses.[70–73] More specifically, aerobic exercise training reflects an average reduction in SBP of 2-4 mmHg and DBP of 5-8 mmHg among both non-hypertensive and hypertensive populations.[73] Moreover, dynamic resistance exercise training has also been shown to elicit significant BP reductions in recent years, reflecting average reductions in SBP of 4 mmHg and DBP of 2 mmHg among both non-hypertensive and hypertensive populations.[73]

On account of the weight of the evidence for these antihypertensive effects, global governing guidelines highlight aerobic and dynamic resistance exercise training as cornerstone HTN treatments.[3,54,62,69] However, it is important to acknowledge that much of this research has involved populations of European descent.[37,66,74] To date, investigations regarding the BP-lowering effects of aerobic and dynamic resistance exercise training among the Black American population remain strikingly scarce.[74]

To the best of knowledge, only one existing meta-analysis has reported the antihypertensive effects of exercise on a solely Black American population.[74]Bersaoui and colleagues (2019) investigated the BP-lowering effects of aerobic and dynamic resistance exercise in healthy Black American adults ≥ 18 years of age with optimal BP, elevated BP, or HTN.[74] Only 4 randomized controlled trials were analyzed; the effect of aerobic exercise training reflected significant BP-lowering effects on SBP and DBP among all groups, with the largest reductions in SBP observed among the HTN group.[74] Lastly, dynamic resistance training among the HTN group could not be determined due to a lack of sufficient data.[74]

Pharmacotherapy should only be considered if lifestyle modifications are ineffective in lowering BP or when HTN is not controlled within clinical targets.[53] The mechanism of action for anti-hypertensive medication is to decrease Q, TPR, or both by targeting various physiological components.[47,53] Classes of anti-hypertensive drugs include thiazide-diuretics, beta blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARB), calcium channel blockers, alpha-adrenoceptor blockers, combined alpha- and beta-blockers, and direct vasodilators.[13,58,75]

Anti-hypertensive pharmacotherapy has been demonstrated to produce different effects in Black Americans compared to their White counterparts.[3] For example, ACE inhibitors and ARBs are less tolerated among hypertensive Black Americans, as it causes an increased risk of angioedema (skin swelling) and ACE-inhibitor-induced coughing.[3] Comparatively, calcium channel blockers and thiazide-diuretics taken in combination are considered superior to drugs that inhibit the RAAS for this population.[3,59]

Despite well-established governing HTN guidelines, the success rate of treating HTN is suboptimal.[76] In the US, nearly 56% of hypertensive adults did not have their BP controlled between the years of 2017 and 2018.[76] Black Americans occupy most of this population, reflecting the highest rates of inadequate BP control compared to their White counterparts, as previously noted.[14,31,40] While well-documented lifestyle modifications and pharmacotherapies are laudable, long-term adherence remains poor.[26]

1.6 HTN Disparity in Black Americans

Black Americans have a greater susceptibility to HTN-related complications, which is ultimately accompanied by greater CVD mortality rates.[31,33,37] For instance, Black Americans with uncontrolled BP have an 80% greater stroke mortality rate, 50% greater heart disease mortality rate, and a 320% greater rate of end-stage renal disease compared to their White counterparts.[33] These disparities are thought to be attributed to a myriad of factors, including but not limited to: discrimination and racism, limited access to care, low SES, lack of knowledge and social support, and poor adherence to traditional treatments.[11,15–28]

1.6.1 Discrimination and Racism

Discrimination is defined as unequal treatment of person(s) or groups on the basis of their race or ethnicity. [8,16] Racism is a form of racial prejudice, hatred, or discrimination which assumes that members of racial categories have distinctive characteristics and/or differences that result in some racial groups being inferior to others. [8,16] Racism generally includes negative emotional reactions to members of a particular group.[8,16] Systemic discrimination, which reinforces racism, is carried out through institutional policies and practices of society that shape the cultural beliefs and values supporting racist policies and practices.[8] Both discrimination and racism are considered a form of social ostracism; phenotypic and/or cultural characteristics are used to render individuals as outcasts.[8,16] As a result, this subjects individuals as targets of social exclusion, unfair treatment, and harassment which can directly or indirectly deprive individuals of social and economic opportunities, and may threaten personal safety.[8,16]

Discrimination has been theorized to serve as a psychosocial stressor contributing to the excess rates of HTN among Black Americans, attributing to its development and progression.[16,18] Dolezsar and colleagues (2014) compiled meta-analytic evidence supporting the association between perceived racial discrimination and hypertensive status.[15] Notably, perceived racial discrimination was strongly associated with night-time SBP and DBP measurements using ABPM.[15] Certain physiological mechanisms like sympathetic nervous system activation can be triggered by situational discrimination, such as emotional stress, and may contribute to HTN with chronic exposure.[15] Similar findings are noted in the association of racism and increased risk of HTN development.[8,16] Meta-analytic evidence from Brondolo and colleagues (2010) investigated the relationships of different aspects of racism (i.e., interpersonal, internalized, and institutionalized) and its association of HTN.[8,16] Findings suggest that all three aspects of racism are positively associated with the development of HTN, the strongest of which is interpersonal racism.[8] Additionally, psychosocial factors, like developing negative coping mechanisms (sedentary lifestyle, poor eating habits) may exacerbate HTN risk and its development.[16]

1.6.2 Limited Access to Care

Disparities in health service use and treatment outcomes reflect differences in access to care among Black Americans.[77] Black Americans are susceptible to lower incomes, lower rates of private health insurance coverage, less education, and have a higher probability of being uninsured with a greater dependency on publicly funded healthcare programming.[36,75,77] These factors combined can impede the opportunity to seek proper healthcare services to address HTN.[75,77]

Limited access to care is strongly related to poor treatment adherence and doctor-patient communication.[36] These disparities are highlighted in work from Young and colleagues (2015), whereby prevalent factors related to limited access to care were positively associated with being uninsured, the inability to afford antihypertensive medications, lesser access to a prescribing doctor, and transportation barriers (e.g., not able to get to a pharmacy).[19] Broader efforts to improve access to care may help address the racial disparities in HTN.

1.6.3 Low Socioeconomic Status (SES)

Low SES is associated with a greater risk of developing HTN among Black Americans.[16,21] For every US dollar of wealth that White Americans possess, Asian Americans have 83 cents, Hispanic Americans have 7 cents, and Black Americans have 6 cents.[22] The most prominent objective SES indicators measured are education, occupation, and unemployment.[24,78] Racial disparities are an important contributor across all measures of SES.[21] Black Americans receive less income at the same education levels, experience less wealth at equivalent income levels, and have less purchasing power due to higher costs of goods and services in residential environments where they are disproportionately located compared to their White counterparts.[21,22]

Glover and colleagues (2019) outlined the association between adulthood SES and HTN by analyzing the association of these objective SES indicators, and HTN incidence in a sample of Black American adults from the Jackson Heart Study.[21] Investigators noted that unstable income, education below a High School diploma, and occupation were significantly associated with a greater HTN prevalence.[21] Although the relationship between SES and HTN remains complex and multifactorial, low SES may limit access to high-quality care, high-cost medications, HTN awareness, knowledge, health beliefs about treatment, and doctor-patient communication[21,24]

1.6.4 Lack of Knowledge and Social Support

The overall lack of knowledge about HTN is associated with a greater likelihood of developing it.[20] More specifically, having a low health literacy is often associated with an individual's lack of knowledge about their existing chronic condition.[20] Health literacy pertains to the ability to access, understand, appraise, and apply information to make informed health decisions.[20] Work by Miranda and colleagues (2020) examined the association between health literacy and HTN outcomes in a multi-ethnic European population.[20] The study compared and assessed health literacy of HTN on groups of White-Dutch, Asian-Dutch, and African-Dutch participants residing in the Netherlands.[20] Results indicated that compared to their White and Asian counterparts, African-Dutch participants with low health literacy measures were the most likely population to have a HTN diagnosis.[20] Thus, targeting an individual's lack of HTN knowledge with improving health literacy strategies can impact HTN outcomes for this population.[20]

A lack of social support, defined as the product of interpersonal relationships that may directly affect health, is also associated with HTN development.[79,80] It has been suggested that social support is particularly important to Black Americans, as they tend to have strong social networks which often extend to family and faith-based groups, and that provide a first line of defense against adversity.[80] Regarding the treatment and management of HTN, similar findings have been documented. Hernandez and colleagues (2014) examined the buffering effects of social support on HTN in a sample of Black American adults, with results indicating that the absence of social support was significantly associated with greater odds of experiencing high BP.[47] Thus, social support represents an important factor for Black Americans dealing with HTN.[46]

1.6.5 Poor Acceptance to HTN Treatments in Black Americans

Black Americans are twice as likely to be physically inactive when compared to their White counterparts.[37] Such low adherence rates are largely attributable to patient-level barriers, which may include a lack of convenience, time commitment, physical health limitations, unattainable costs, safety, and other competing personal priorities. [81]

Unsafe exercise environments represents a barrier of particular importance for Black Americans, as expressing greater safety concerns, such as crime rates and unkept exercise environments has the largest negative influence on achieving recommended PA guidelines.[82,83] Urban areas of marginalized communities are often inadequately structured to encourage a safe environment for PA.[81] Work by Bopp and colleagues (2008) investigated the barriers of participating in regular PA uptake among Black Americans residing in urban areas with focus groups.[82] The most frequently reported barriers were related to personal aspects (e.g., lack of time, motivation, fatigue, health problems, and a lack of knowledge and awareness about exercise), social aspects (e.g., family, and a lack of social support), and environmental aspects (e.g., limited exercise facilities and cost, inadequate sidewalks, travel distance, and transportation). Participants reported suggestions such as improving social support, community connectedness, implementing structured community programming (e.g., Church groups that promote PA), and enforcing public policies to address safety concerns (e.g., reducing crime rates) to address these barriers.[82] Bridging this gap by implementing alternative exercise methods that can be easily accomplished in a safe environment (e.g., home-based) should be prioritized.[81, 82]

Despite over 60% of adults receiving pharmacotherapy for HTN, adherence to prescribed medications remain below 50%; with Black Americans having the lowest adherence rates.[75] Poor adherence rates to antihypertensive medication regimens may be influenced by low self-efficacy, adverse effects, competing priorities (e.g., caretaking), limited or no insurance coverage, illiteracy (e.g., inability to read prescription labels) and high medication costs.[75] Additionally, discrimination may also play a role, as discussed in section **1.6.1 Discrimination and Racism**.[19,84] Thus, complementary treatments that can reduce or manage HTN in populations that are highly susceptible to HTN disparities such as Black Americans is of high priority.

1.7 Adoption of Non-Pharmacological HTN Treatments

As a result of the above noted racial disparities, implementing new and effective BP-treatment strategies that can help attain clinical targets are urgently needed, particularly for individuals that have a high potential for uptake and long-term continuation. Novel exercise-based interventions that are amenable for use in clinical practice and have the potential to address the limitations associated with traditional HTN treatments for Black Americans should be highly prioritized in current healthcare systems.

1.7.1 Isometric Resistance Training (IRT)

IRT has been a recently endorsed exercise addition in governing HTN guidelines on account of accumulating evidence.[3,62,69] IRT is defined as sustained muscle recruitment with an increase in tension and no change in muscle length or joint angle (i.e., static muscle contraction).[73] Supported by robust meta-analyses, the use of IRT has demonstrated reductions in SBP and DBP by 5-10 mmHg and 4-6 mmHg, respectively, among hypertensive non-hypertensive cohorts.[85–88] Notably, IRT elicits reductions in resting SBP of 10-14 mmHg and resting DBP of 6-8 mmHg.[89] These reductions are comparable, if not greater, than reductions elicited by traditional aerobic (SBP: 2-4 mmHg and DBP: 5-8 mmHg) and dynamic resistance exercise training (SBP: 4 mmHg and DBP: 2 mmHg).[89]

1.7.2 Isometric Handgrip (IHG) Training

Most investigative IRT interventions use either lower limb modalities (i.e., leg extension torque) or upper limb modalities (i.e., hand dynamometry using a manual or computerized dynamometer).[85] With respect to the latter, the BP-lowering effects of upper limb IRT are frequently documented using IHG training protocols for non-hypertensive, pre-hypertensive, and hypertensive populations.[85]

IHG training consists of multiple sustained forearm contractions that are separated by short rest periods.[41] The most widely accredited IHG training protocol consists of performing four, two-minute bouts of hand contractions, with one-minute rest between contractions, at 30-40% of the maximum voluntary contraction (MVC), three times per week for eight-ten weeks.[41] This protocol is described in North American guidelines, such as the AHA/ACC Task Force on Clinical Practice Guidelines and the Hypertension Canada 2020 Comprehensive Guidelines for Hypertension.[3,62]

With respect to the AHA/ACC Task Force on Clinical Practice Guidelines, IHG training is listed as the 'Best Nonpharmacologic Intervention for Prevention and Treatment of Hypertension.'[3] With respect to Hypertension Canada 2020 Comprehensive Guidelines for Hypertension, it is recognized as a form of resistance exercise that "does not adversely influence BP."[62] Furthermore, IHG training has been endorsed in a recent position stand provided by Exercise and Sport Science Australia.[69]

Incorporating IHG training into a HTN treatment regimen may minimize or eliminate barriers to traditional exercise such as time commitment, poor adherence, cost, and unsuitability for individuals with HTN comorbidities and/or mobility issues.[41] As described, the IHG training protocol takes as little as 12-minutes to perform, acting as a time-efficient alternative for individuals with busy schedules who experience difficulties committing to traditional exercise programs.[41] With respect to individuals with mobility issues, the effort required to reap the antihypertensive benefits of aerobic and dynamic exercise training can inflict joint-related problems (including those associated with obesity, a highly prevalent comorbidity among Black Americans).[10,63]

IHG training can be particularly important for individuals with higher pre-training BP levels.[60,90] Recent work has suggested that IHG training elicits greater BP-lowering effects among hypertensive individuals who experience higher initial SBP values.[90] Similarly, IHG training also reduces cardiovascular reactivity to psychophysiological stressors among individuals with high initial BP values.[60] These findings are of particular importance to Black Americans, as this population experiences higher cardiovascular reactivity compared to other populations.[91]

IHG training is well-tolerated and has a low safety risk when performing at low to moderate-intensity levels.[41,92] Favourably, low to moderate-intensity IHG training does not evoke the same degree of cardiovascular stress (e.g., rate-pressure product) as moderate to vigorous-intensity aerobic exercise training.[41] To date, there have been no reported lasting physical impairments or detrimental health events during or resulting from IHG training across multiple trials.[41,89] The weight of the meta-analytic evidence supports high IHG training acceptance, thus, demonstrating greater adherence rates when compared to aerobic exercise training.[41,87]

IHG training exhibits clinically significant BP reductions in the primary prevention of HTN among normotensive individuals, reflecting mean differences of 3 mmHg for both SBP and DBP.[92] Governing clinical HTN guidelines outline that reductions in BP as little as 2 mmHg can lower both the risk of developing HTN by 17% and stroke by 6%.[3,62,89] Thus, IHG training may act as a strong primary prevention tool among Black Americans.

On average, IHG training elicits mean reductions in SBP by 5 mmHg, DBP by 4 mmHg, and overall MAP by 6 mmHg in hypertensive individuals.[85,87] Additionally, individual variables such as clinical, medication (i.e., antihypertensive medication), demographic characteristics (i.e., sex, Body Mass Index, and age), and exercise treatment programming (i.e., outpatient versus home) do not impose any adverse impacts on IHG treatment effects.[85] These findings confirm the convenience and practicality of employing IHG training as a treatment tool for HTN across multiple demographic variables; some of which were once speculated as barriers (i.e., sex and age) throughout previous work in achieving clinically significant effects.[85]

1.8 Role of Clinical Prediction Models in Healthcare

Clinical prediction models are designed to improve decision-making in clinical practice.[93–95] A series of predictor candidates are obtained from a patient's medical history, clinical examinations, and self-report measures to assist clinicians in diagnostic testing, starting, or stopping treatments, or recommending lifestyle changes.[96] For example, the Framingham Risk Score is one of the most widely recognized and frequently used models to predict cardiovascular risk.[97]

Despite its widespread use, this model was derived predominately from individuals of European descent and is not generalizable to other racial populations.[97] Clinical prediction models are structured to fit data from which they have been investigated; when used on other populations, they exhibit reduced performance efficacy.[97] Prescriptive clinical prediction models can assist in determining which specific patients will benefit the most from a particular treatment.[98] Notably, these models can identify and treat high-risk populations by communicating risk effectively through rapid identification.[98]

1.8.1 Development of Clinical Prediction Models

Developing a prediction model involves (1) carefully choosing a population of interest (e.g., Black Americans experiencing HTN disparities), (2) selecting an outcome of interest or dependent variable (e.g., willingness to use a BP treatment intervention), (3) the determination of predictor variables.[99] Moreover, retrospective data is a common source of information used for prediction model development. [94,95] Favourably, the use of retrospective data can limit selection bias and allow investigators collecting predictors to be blinded from the outcome of interest.[94,95,99,100]

Selecting appropriate predictor candidates (e.g., demographics and medical characteristics) are often predetermined by clinical experts in addition to eliminating redundant and/or irrelevant candidates.[100] It is encouraged to consider candidate predictors for inclusion based on clinical knowledge and previous literature.[100] The number of variables to initially include in a prediction model is dependent on its proposed use; there is no standard rule that stipulates how many parameters can be estimated from a dataset.[95] However, a commonly applied rule of thumb is that the number of chosen predictor variables should dictate the model's sample size; for example, using a large number of predictors require 10-15 cases per variable.[94]

According to the principle of parsimony, simple models with fewer variables are preferred over complex models.[100] If variables contain similar information (e.g., two highly correlated binary variables such as end-stage kidney disease and dialysis treatment), only one variable is needed to capture that information which will avoid redundancies and strengthen the final model.[100] Another common strategy to follow this principle is to reduce the number of candidate predictors by combining similar predictors.[100] For example, combining dyslipidemia, diabetes, and a BMI within the obesity range into a single category such as "HTN comorbidities".[99]

Lastly, predictors that include missing values of over 5% can be excluded from the dataset.[95,99,101] Nevertheless, it is imperative that all likely predictors are included in the derivation to minimize the risk of missing important predictors.[99] Ultimately, predictors that are strongly correlated to the outcome of interest, explain observed variation in the outcome of interest or interact with other predictors become candidates for inclusion in the model.[99] The final prediction model should have variable numbers to ensure a user experience that is simple, easy to interpret, and generalizable to the patient population of interest, all of which will increase the likelihood of its routine use in clinical practice.

1.9 Summary and Potential Impact

CVD is the number one cause of death worldwide, and its leading risk factor, HTN, affects 40% of the world's population above the age of 25 years.[3–5] The rapid rise in HTN prevalence has contributed to the WHO declaring it an epidemic.[2] Individuals in the US who identify as Black are disproportionately affected, experiencing the highest rates of uncontrolled HTN compared to any other racial or ethnic group.[3,9–14,40]

Lifestyle modifications are cornerstone recommendations of HTN treatment and management.[3,54,62] In particular, PA (e.g., aerobic and dynamic resistance exercise training) is widely endorsed by governing HTN guidelines.[3,54,62] Despite the widespread endorsement, exercise adherence remains remarkably low due to common barriers such as lack of convenience, its time commitment, competing priorities, health limitations, psychological stress, and expense.[41] These factors are amplified among racially diverse populations and extend include a lack of financial resources, little motivation to exercise, biological sex (e.g., being female), aging, fear of injury, and unsafe exercise environments among Black Americans.[12,27,82,83]

IHG training is a simple, novel exercise intervention in the form of IRT which involves sustained forearm contractions separated by short rest periods.[85,87,102] Implementing IHG training as a BP-lowering adjunct therapy has the potential to address the WHO global action call of enhanced feasibility, low maintenance, and economical ways to effectively prevent, treat, and manage HTN.[102] Current awareness of the prescription and widespread uptake of IHG training among a willing hypertensive Black American population remains virtually unexplored. Therefore, developing a clinical prediction model for Black Americans with HTN can enable clinicians to improve healthcare decisions, while promoting the routine prescription of non-traditional BP treatment alternatives which is imperative for bridging this gap in disparity.

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Chapter 2: The Development of a Clinical Predictive Tool to Increase Uptake of an Alternative Hypertension Treatment in At-Risk Black Americans

2.1 Introduction

Hypertension (HTN), or elevated blood pressure (BP), is the major underlying risk factor for cardiovascular disease (CVD) and the most common chronic condition seen in primary care.[1–3] HTN is the leading cause of death and premature disability worldwide, and its prevalence disproportionately affects marginalized populations.[3–5] In particular, Black Americans experience the greatest HTN prevalence than any other racial or ethnic group.[2,4,6–12] These disparities are thought to be attributed to a myriad of factors, including but not limited to racism and discrimination, limited access to care, low socioeconomic status (SES), lack of knowledge and social support, and low acceptance to traditional treatments.[9,12–23]

The development of HTN is influenced by modifiable and non-modifiable risk factors.[1,5,24] Notably, traditional treatment interventions have the potential to reverse the negative impact of modifiable risk factors.[1,24,25] Physical activity involving aerobic and dynamic resistance exercise training is a widely endorsed treatment intervention.[4,26,27] Despite its well-documented benefits, exercise adherence remains remarkably low due to common barriers such as lack of convenience, its time commitment, competing priorities, health limitations, psychological stress, and expense.[28] These barriers are amplified in racially diverse populations and extend to include lack of financial resources, little motivation to exercise, biological sex (e.g., being female), aging, fear of injury, and unsafe exercise environments among Black Americans.[9,29–31]

One such non-traditional treatment intervention that may address these potential barriers in Black Americans is isometric handgrip (IHG) training.[28,32–34] This urgency for change is echoed in Surgeon General Dr. Jerome Adam's Call to Action for HTN control to be a national public health priority, stating: “We cannot wait, especially in communities of colour, to address the US epidemic of uncontrolled HTN”.[2] In addition, implementing IHG training as a BP-lowering therapy addresses the World Health Organization's (WHO) global action call of needing interventions that have enhanced feasibility, are low maintenance, and represent an economical way to prevent, treat, and manage HTN effectively.[2,4]

To maximize the potential for successful IHG training prescription and acceptance in clinical practice, it is important to understand the patient population that is most likely to accept this tool as a HTN treatment option.

2.2 Purpose

2.2.1 Primary Objective

The primary objective of this retrospective study was to derive a preliminary prediction model for clinicians to use with their Black American patients to predict those who are more willing to try a new, non-invasive, non-pharmacological treatment such as IHG training to lower their BP. This prediction model was based on demographic, clinical, and self-reported psychosocial measures.

2.2.2 Hypothesis

It was expected those who would be the most willing to adopt a new, non-invasive, non-pharmacological treatment for HTN treatment would be patients who were male (i.e., biological sex),[38,39] $\leq$ 40 years of age,[38,39] and presenting with a high Body Mass Index (BMI; status of obesity $\geq$30). [38,39] It was also expected that this group would have the minimum of a high school education, be employed, and have health insurance coverage.[38,39]

Additionally, it was anticipated that these individuals would have a primary care physician, a previous medical history of HTN, have their BP controlled, and the presence of at least one CVD risk factor (i.e., a previous medical history of diabetes, dyslipidemia, and/or smoking status).[12,38,40] Furthermore, it was expected that this group would have higher resting SBP and DBP values, respectively, as well as on antihypertensive medication to control their BP.[12,38]

It was also thought that individuals most willing would experience low perceived racism,[13,14,16] have a greater knowledge of their condition (i.e., HTN awareness),[20] have strong social support, [21–23]and greater acceptance to traditional BP-lowering treatments.[9,17,17,30,37]

2.2.3 Secondary Objective

The secondary objective aimed to derive a preliminary prediction model for clinicians to use that would predict the willingness of Black American patients to cover additional costs to fund an alternative, non-pharmacological method for treating HTN (e.g., an isometric handgrip, cost ~$350 USD; gym membership).

2.2.4 Hypothesis

It was expected that similar predictors to the primary objective would be identified.

2.2.5 Exploratory Objective

As a foundation for future studies, patients with the highest overall acceptability for alternative, non-medication approaches to BP control were identified and characterized. This information is presented descriptively.

2.3 Methodology

In the current study, baseline retrospective data was analyzed from hundreds of patients who presented to the Emergency Department at three urban medical centres located in the United States in 2016.

This baseline data was collected as part of a biobank registry. In brief, to be included in the initial biobank registry, individuals had to be ≥ 18 years of age with an established history of HTN (controlled and uncontrolled) or presenting an elevated BP (defined as mean SBP ≥ 130 mmHg and DBP ≥ 80 mmHg) with no prior history of HTN. Patients were excluded from the biobank registry if they had known end-organ damage (e.g., known chronic kidney disease, IV or V, chronic heart failure, chronic heart disease, myocardial infarction, or cerebrovascular disease), were admitted to the hospital, or patients that were pregnant or prisoners.

The biobank registry patients were recruited by a clinician during clinical care and referred to a research team member (e.g., the Principal Investigator, Research Nurse, Research Coordinator/Assistant) who described the study, obtained written informed consent, and collected baseline data. Subsequently, the patient’s demographic information, medical history, home medications, concomitant medications, access to primary care, smoking history, and clinical signs from a physical examination were obtained. Additionally, a healthcare professional administered standard diagnostics and obtained a series of 5 successive BP measurements using the BPTru© automated BP monitor device. Lastly, participants were given self-report measures to complete electronically using Qualtrics© surveys. All data was input, de-identified, and stored in a password protected HIPPA compliant, management system (OnCore™) database.

For this study, a small sample of the biobank registry data was compiled. This sample was compiled of patients who identified as being Black American and completed the self-reported Iso**M**etric-**A**ssociated Blood **P**ressure-**L**owering **E**xercise (MAPLE) questionnaire via the Qualtrics© survey.

This study was cleared by the University of Windsor Research Ethics Board (REB; # 23-019) and a data sharing agreement was secured between institutions.

2.3.1 Dataset Acquisition

The retrospective, anonymized dataset was extracted from the biobank registry database (OnCore™) and imported into an Excel file by trained research personnel not associated with the study. Data was sent via secure file transfer to the University of Windsor (Physical Activity and Cardiovascular Research; [PACR] Laboratory, Department of Kinesiology, Faculty of Human Kinetics, Windsor, Ontario, Canada). Please refer to Table 1 for a list of the extracted variables.

Table 1: Extracted variables from the Biobank Registry.

Demographic Characteristics	Clinical Characteristics

• Age
• Sex at birth
• BMI
• Education
• Employment
• Insurance status
• The presence of a primary care primary care provider
	• Previous medical history of HTN
	• Number of CVD risk factor(s):
	    • Diabetes
	    • Dyslipidemia
	    • Smoking status
	• Antihypertensive medication status
	• BP status (BPTru© reading)
	• SBP values (BPTru© reading)
	• DBP values (BPTru© reading)

Psychosocial Self-Reported Measures	
• Brief Racism and Life Experiences Scale (RaLES-B; Experience with Racism) • Social Support Questionaire-6 (SSQ6; Perceived social support) • MacArthur Scale (Subjective SES) • American Heart Association Quiz (AHA Quiz; BP awareness) • Healthy Habits for Blood Pressure Control (Acceptability of non-medical approaches to manage BP)	

BMI = Body mass index, HTN = Hypertension, BP = Blood pressure, SBP = Systolic blood pressure, DBP = diastolic blood pressure, SES = Socioeconomic status.

2.3.2 Clinical Prediction Models

Primary Objective

A binary logistic regression model was used to predict patient factors (i.e., significant predictor variables) that were associated with their willingness to try a new, non-invasive, non-pharmacological treatment such as IHG training to lower their BP (i.e., binary outcome of interest; willing or not willing).

Secondary Objective

A binary logistic regression model was also used to predict patient factors (i.e., significant predictor variables) associated with their willingness (i.e., binary outcome of interest; willing or not willing) to cover additional costs to fund an alternative, non-pharmacological method for treating HTN (e.g., an isometric handgrip, cost ~$350 USD; gym membership).

2.3.3 Outcomes of Interest

Individual items from the MAPLE questionnaire were used to obtain the outcomes of interest for the primary and secondary objectives (detailed below).

The MAPLE is a 4-item questionnaire that was designed to assesses an individual's acceptability of alternative, non-medication approaches to BP control. Each item elicited binary responses (i.e., yes/no), such that items answered with "yes" represented a greater likelihood of acceptability (i.e., willingness) and "no" representing otherwise (i.e., not willing). Respondents were given a score of 2 if they answered "yes", and a score of 1 if they answered "No" (Figure 1). The scores were then summed, with the higher scores representing a greater acceptability of non-medication approaches for BP control.

We would like to assess the acceptability of alternative, non-medication approaches to BP control. Please answer the following questions.

1	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	Yes No
2	Do you know if exercise programs/memberships in your community are covered by your health insurance policy?	Yes No
3	Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	Yes No
4	Have you been prescribed aerobic exercise training by your health care provider as a treatment to lower your BP?	Yes No

Figure 1: The Iso**M**etric-**A**ssociated Blood **P**ressure-**L**owering **E**xercise (MAPLE) Questionnaire.

Primary Objective

The first outcome of interest was extracted from item 1 of the MAPLE questionnaire, which assessed a patient’s willingness to adopt a new, non-invasive, non-pharmacological treatment to lower their BP if prescribed by their healthcare provider.

Secondary Objective

The second outcome of interest was extracted from item 3 of the MAPLE questionnaire, which assessed a patient’s willingness to cover additional costs to fund an alternative, non-pharmacological method for treating HTN (e.g., an IHG, cost ~$350 USD; gym membership).

2.3.4 Predictor Candidates

A set of priori variables (listed in section **2.3.1 Dataset Acquisition**) were selected based on literature review and consultation with clinical experts. A rationale for inclusion in the prediction models are described below.

Demographic Characteristics

Age is an independent risk factor for HTN status among Black individuals, while the largest group of affected individuals are over the age of 60 years.[10,11,45] Only 5% of Black Americans over the age of 65 years meet the current American physical activity guidelines.[29]

Among Black Americans, women experience the highest HTN rates, and are less likely to engage in routine physical activity and meet the recommended physical activity guidelines than their male counterparts.[29]

A BMI $\geq$ 30 is a key risk factor for developing HTN.[10-12] Estimated to account for over 50% of HTN cases among Black Americans, the presence of obesity can pose major barriers to traditional treatment interventions.[10-12] With respect to exercise adherence, obesity can manifest physical limitations, mobility issues (e.g., joint problems), and other competing health priorities.[10-12]

Education, employment, and insurance status are major SES indicators and represent important predictors of HTN prevalence among Black Americans.[18,19] Individuals with a lower education (less than high school), that are unemployed, and live below the poverty line experience higher HTN rates.[18] Additionally, Black Americans that experience less access to care (i.e., those who are uninsured) are more likely to have uncontrolled HTN.[18] Low SES may impose on BP control among Black Americans in the following ways: causing low access to high-quality healthcare (high-cost medications), negatively influencing HTN awareness, limitations of knowledge (health literacy), a reliance on personal beliefs about its treatment, affects communication between primary care providers, reduces treatment adherence, and affects environmental living conditions that can hinder adopting lifestyle modifications (e.g., willingness to exercise).[18,19]

Lastly, access to a primary care provider represents a strong predictor of HTN treatment adherence.[17,18] More specifically, having limited or no access to a primary care provider is associated with poorer treatment and control of HTN.[17] Additionally, poor access to care such as difficulty paying for medications or affording a gym membership directly influences treatment acceptance to BP-lowering treatments.[19]

Clinical Characteristics

Clinical characteristics including diabetes, dyslipidemia and smoking status are major CVD risk factors.[2,4,46] Diabetes, which is often accompanied by dyslipidemia, are highly prevalent among Black Americans and can further exacerbate CVD risk.[47]

As approximately 50% of Black Americans do not routinely adhere to their prescribed antihypertensive pharmacotherapy, medication status is an important consideration.[48] Additionally, it has been reported that the major factors of poor acceptance of antihypertensive medications are low SES, low access to care, type of therapy, and patient characteristics.[48] Combined, these disparities may affect Black Americans willingness to implement new, non-invasive, non-pharmacological treatments as an adjunctive BP therapy.[9]

Self-Reported Measures

Internal consistency (e.g., reliability, measured with Cronbach's alpha for Likert-scale items) and validity coefficients (r) will be reported for each predictor candidate to support the psychometric strength of all self-reported measures.[49] A Cronbach's alpha represents how closely related a set of items are as a group (e.g., scale reliability), where a value of ≥ 0.70 is considered a minimum measure of internal consistency.[49] Criterion validity represents the degree to which scores from an instrument correlate with a manifestation of that construct in the real-world (e.g., criterion). To establish criterion validity, the scores of an instrument should be strongly correlated (i.e., $r \geq 0.70$) with the scores of their respective gold-standard instruments.[49]

RaLES-B

The RaLES-B scale was designed to measure an individual's experience with racism, which is directly associated with the increased development and progression of HTN among Black Americans.[14,50,51] Notably, racism has been theorized to serve as a psychosocial stressor contributing to the elevated rates of HTN among Black Americans.[51] Aspects of racism are thought to act by increasing the frequency, magnitude, duration, and psychophysiological effects of stress exposure, which can raise barriers when attempting to achieve a healthy lifestyle such as normal BP levels.[51]

The RaLES-B scale is a 9-item scale derived from a comprehensive set of RaLES scales (five primary scales).[50] The RaLES-B scale is a general overview measure of racism-related stress that includes questions assessing direct, vicarious, and collective experiences of racism.[50] Respondents are directed to rate their perceived experiences with racism based on a 5-point Likert scale (0 = not at all, 1 = a little, 2 = some, 3 = a lot, 4 =

extremely); individuals that report higher scores indicate more racism.[50,52] The total scores range from 0-36, with elevated scores indicating a greater impact of racism based on their life experiences (0-11 Mild; 12-24 Moderate; 25-36 High).[52]

The RaLES-B reflects strong internal consistency; multiple studies involving various samples of older Black adults have yielded Cronbach's Alpha scores ranging from 0.86 to 0.92.[50,52] Additionally, the RaLES-B supports strong construct validity in areas of urban life stress, collective self-esteem, racial discrimination, and cultural mistrust across various population samples (r = 0.83).[50,52] Ultimately, the strengths of using RaLES-B are its comprehensive approach to the measurement of racism experiences and stress, and its ease of administration.[52]

SSQ6

The SSQ6 was designed to measure an individual's perceived social support system.[41] Recent work has indicated that high perceived social support is related to a lower diastolic BP (a 1-point increase in support reflected a 2 mmHg decrease in diastolic BP).[21] The SSQ6 is a 6-item self-report measure derived from the 27-item SSQ; each item solicits a 2-part answer. [41]

Part 1 measures the SSQ-Number Score (SSQN): respondents are directed to report up to 9 individuals who they believe they can turn into different situation(s) across 6-items.[41,53] For each item, participants can list zero to nine people they feel can provide support based on a specific scenario, with a total score range from 0 to 54 (i.e., 9 potential individuals listed by 6-items).[41,53]

Part 2 calculates the SSQ-Satisfaction Score (SSQS): respondents then rate their levels of satisfaction with the support they received on a 6-point Likert scale (1 = very dissatisfied, 2 = fairly dissatisfied, 3 = a little dissatisfied, 4 = a little satisfied, 5 = fairly satisfied, and 6 = very satisfied) with scores ranging from 6 to 36.[53] The total SSQ6 score is calculated by dividing the summed SSQN and SSQS scores.[54]

The SSQ6 demonstrates high internal consistency, with meta-analytic evidence yielding Cronbach's Alpha scores ranging from 0.90 to 0.93 for both SSQN and SSSQS scores.[54] Criterion validity tests for the SSQ-6 indicate a coefficient reliability of 0.80 between the Inventory of Socially Supported Behaviour's and the Perceived Social Support Friend and Family subscales.[54] Additionally, the SSQ6 has been confirmed to be psychometrically sound and preferred over the original 27-item, condensed 12-item, and 3-item versions, especially when administration time is limited.[54]

MacArthur Scale

The MacArthur Scale is a single-item instrument designed to capture subjective SES based on an individual's perceived rank relative to others in their group.[55,56] As previously noted, an association exists between low SES and HTN.[18,19,35]

The MacArthur Scale is represented by an image of a stepladder with 10 rungs numbered in descending order to depict social hierarchy.[57] The respondents are directed to view the image and visualize it representing where people stand in society with the top of the ladder (e.g., 10) representing the people who are "the best off", and with the bottom (e.g., 1) representing people who are "the worst off".[57] The respondents are then directed to mark an "X" on which rung they think best represents where they should be on the ladder. The scores are ranked from 1-10 according to where the “X” was placed on the ladder.[57]

Despite the significance of objective SES indicators (described above), they can often fall short on providing evidence of which socioeconomic disadvantages contribute to increased morbidity and mortality among Black Americans.[57] The MacArthur scale can measure subjective aspects of social position, which has reflected to represent a better predictor of health outcomes when compared to objective SES indicators.[58] Recent work has suggested a low correlation between the MacArthur scale and objective SES indicators (r=0.32), which may indicate that they measure distinct SES constructs.[58]

AHA Quiz

The AHA quiz was designed to measure health literacy of HTN knowledge.[59] The lack of knowledge about the condition of HTN overall is associated with a greater likelihood of developing HTN among Black Americans.[20] Assessing the level of knowledge concerning high BP is a useful outcome measure of patient awareness.[60] Notably, it has been found that similar HTN knowledge instruments are sensitive to detecting differences in BP control status (e.g., individuals without adequate BP control were found to have lower scores).[60]

The AHA quiz is a 5-item questionnaire that was previously posted on the official AHA website, which was accessible to the general public to use.[59] Respondents are directed to select the correct answer according to general BP-related questions such as “*Which of the following is the most desirable blood pressure reading?*” anchored to these possible answers “*(1) 130/90, (2) 180/110, (3) 140/80, (4) lower than 120/80*”.[59]

This measure has not been previously tested for internal consistency or criterion validity; however, it has been noted that similar HTN knowledge instruments on a nominal scale have demonstrated a Cronbach's alpha range of 0.70-0.85.[60]

Healthy Habits for BP Control

Healthy Habits for BP Control is a 14-item self-report measure that was derived from the Self-Report Habit Index, a questionnaire designed to assess a wide range of particular behaviour(s).[61] In relation to HTN, it has been indicated that Black Americans exhibit poor acceptance to pharmacological (e.g., antihypertensives) and non-pharmacological (e.g., exercise) treatments.[17,62]

This study adapted the Self-Report Habit Index for following the habits of traditional treatments for BP control.[63] More specifically, the Self-Report Habit Index measures behaviour's on the basis of habit strength such as a history of repetition, automaticity (lack of control and awareness), and expressing identity.[63] The items consist of statements (e.g., '*Behaviour "X": is something*…') that can be adapted to any given behaviour that is being measured (e.g., '*Looking for ways to improve my blood pressure is something*…').[63] The Habit Context for BP control includes four habit response options: (1) "*this is something I do automatically*", (2) "*I do without having to consciously remember*", (3) "*I do without thinking*", or (4) "*I start doing before I realize it*".[63] This instrument is anchored by a 7-point Likert scale involving "agree or disagree" responses (e.g., 1 = strongly disagree to 7 = strongly agree).[63] Items are summed and averaged to get an overall Self-Report Habit Index score that ranges between 1 and 7.[63]

The weight of the meta-analytic evidence supports the use of self-report Habit Context scales, particularly for the use of measuring physical activity and eating behaviours.[44,61] Internal consistency reliability related to the self-reported measures reflect a Cronbach's alpha score range from 0.90 to 0.97 across over 20 studies.[44] Criterion validity cannot be analyzed for this scale since it is adapted towards a specific research question**.**

2.3.5 Exploratory Objective

As noted above, the last objective was to identify and characterize patients who selected "yes" to all four items on the MAPLE questionnaire, which indicated a high overall acceptability of alternative interventions.

2.4 Statistical Analysis

Data Cleaning

The biobank registry dataset was first condensed to include only Black American participants that completed the MAPLE questionnaire.

Data cleaning procedures were then administered to eliminate irrelevant data (i.e., removing variables outside the scope of the research objectives), confirm a lack of outliers and anomaly cases, identify data entry errors, and remove duplicate data.

For the primary objective, the sample was further condensed to include only patients that responded to item 1 of the MAPLE questionnaire: "*If your healthcare provider prescribed a new, non-invasive, non-pharmacological treatment that has been proved to lower your blood pressure, do you think you would try it*?".

For the secondary objective, the sample only included patients that responded to item 2 of the MAPLE questionnaire: "*Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your blood pressure (*e.g., *an isometric handgrip cost ~ $350 USD)?*".

For the exploratory objective, the sample only included patients that responded "yes" to all 4 items on the MAPLE questionnaire (i.e., patients with a total summed score of 8). More specifically, this group represents individuals that have the greatest acceptability to non-medication approaches for BP control.

2.4.1 Primary Objective

Descriptive Statistics

First, descriptive statistics were conducted to characterize the population. Patient demographic characteristics (age, sex at birth, BMI, education, employment, and insurance status), clinical characteristics (previous medical history of HTN, controlled or uncontrolled BP, CVD risk factors such as a previous medical history of diabetes, dyslipidemia, and a smoking status, SBP and DBP values, and antihypertensive medication status), and psychosocial self-reported measures (RaLES-B, SSQ6, MacArthur Scale, AHA Quiz, and Healthy Habits for BP Control) were assessed according to "willingness to try non-pharmacological approaches to lower BP".

Binary Logistic Regression Analysis

The dataset was then tested for assumptions to select predictor variables and satisfy the criteria for binomial logistic regression modelling (see Appendix A).

The following steps included identifying (a) missing data, (b) multicollinearity, and (c) significant univariate associations to determine the predictor variables eligible for inclusion in the logistic regression model for the primary and secondary objectives.

In brief, descriptive statistics were conducted to identify variables with missing data that was greater than 5%, which were omitted from the regression analyses. All predictor variables with less than 5% missingness were then assessed for multicollinearity via pairwise bivariate correlation analyses (i.e., Pearson's correlation for continuous variables and Spearman's Rho for categorical variables). Highly correlated variables (i.e., $r = \geq 0.8$) were addressed by omitting the variable that was less relevant to the outcome of interest based on the weight of clinical evidence.

Univariate analyses were administered for hypothesis testing, and to determine the predictor variables eligible for entry into the logistic regression model according to the outcome of interest for the primary and secondary objectives. The variables (i.e., demographic, clinical, and psychosocial self-reported measures) were tested for a significant univariate association with patient willingness (i.e., willingness to try IHG training for the primary objective and willingness to cover additional costs to fund IHG training for the secondary objective) by using independent sample t-tests for continuous variables, and chi-square tests for categorical variables.

Variables revealing a significant univariate association with willingness (p = ≤ 0.20) were retained and entered into the regression model. A more liberal significance level of p = ≤ 0.20 was used because the traditional p-value (i.e., p = ≤ 0.05) is suggested to be too restrictive when investigating exploratory data, and it helps to minimize the risk of excluding any potentially useful predictor variables.[64] Although a significance value of p = ≤ 0.20 was required to enter, a significance level of p = ≤ 0.05 was used to retain a variable in the final regression model.

Subsequently, a forward-stepwise binary logistic regression with willingness to try non-pharmacological approaches to lower BP (willing or not willing) as the outcome of interest and patient characteristics as the predictor variables was conducted to identify factors that predicted willingness to try non-pharmacological BP-lowering methods.

Factor Analysis

A principal components analysis (PCA; used interchangeably with factor analysis) was administered on psychosocial self-reported measures that were statistically significant predictors (i.e., self-reported psychosocial measures) in the final logistic regression model. More specifically, this analysis was administered to understand the psychometric properties of the potential self-reported measure(s) as a prediction model to identify patients' willingness to try a new, non-invasive, non-pharmacological treatment that to lower their BP.

Receiver Operator Characteristic (ROC) Curve

Any predictor variable found to have a significant univariate association with the outcome of interest (i.e., willingness to try a new, non-invasive, non-pharmacological treatment to lower BP) in the final regression model was further explored by constructing a receiver operator characteristic (ROC) curve (i.e., equivalent of concordance (c)-statistic). The ROC curve was used to determine a cut-off point defining a positive test. The point closest to the upper left-hand corner of a ROC curve represents the cut-off score with the best diagnostic accuracy (i.e., discrimination).

2.4.2 Secondary Objective

Descriptive Statistics

Descriptive statistics were conducted to characterize the population, which was identical to the primary objective (see Table 1 for more details). The sample is identical because the same patients who answered item 1 also answered item 3 of the MAPLE questionnaire.

Binary Logistic Regression Analysis

The dataset was then tested for assumptions to select predictor variables and satisfy the criteria for binomial logistic regression modelling (see Appendix A for details regarding assumption testing). In regard to selecting predictor variables, identical procedures were followed as per the primary objective, however, the outcome of interest was "willingness to cover additional costs to fund non-pharmacological approaches to lower BP".

Subsequently, an enter-method binary logistic regression with a patient's willingness to cover additional costs to fund an alternative, non-pharmacological method to lower their blood pressure (e.g., an isometric handgrip cost ~ $350 USD) as the outcome (willing or not willing) and patient characteristics as the predictor variables was conducted to identify factors that predicted willingness to cover additional costs.

ROC Curve

Any predictor variable found to have a significant univariate association with the outcome of interest (i.e., willingness to cover additional costs to fund an alternative, non-pharmacological method for lowering BP) in the final regression model was further explored by constructing a ROC curve. The ROC curve was used to determine a cut-off point defining a positive test. The point nearest the upper left-hand corner of a ROC curve represents the cut-off score with the best diagnostic accuracy.

2.4.3 Exploratory Objective

Descriptive statistics were conducted to characterize the population according to patients who selected "yes" to all four items on the MAPLE questionnaire. This population reflected a group that indicates a high overall acceptability of alternative interventions for BP control.

First, descriptive statistics were conducted to characterize the population. Patient demographic characteristics (age, sex at birth, BMI, education, employment, and insurance status), clinical characteristics (previous medical history of HTN, controlled or uncontrolled BP, CVD risk factors such as a previous medical history of diabetes, dyslipidemia, and a smoking status, SBP and DBP values, and antihypertensive medication status), and psychosocial self-reported measures (RaLES-B, SSQ6, MacArthur Scale, AHA Quiz, and Healthy Habits for BP Control) were assessed in patients that had a total MAPLE score of eight.

All statistical analyses were performed with IBM SPSS Statistics 26.0 (IBM Corp, Armonk, New York).

2.5 Results

2.5.1 Descriptive Statistics

Individuals in the population sample (n = 309) were predominantly female, high school educated, and were employed. Most individuals had a primary care provider and a previous medical history of HTN with no additional CVD risk factors, yet did not have their BP controlled despite taking antihypertensive medications. Results are presented as means and standard deviations (SD) for continuous data, and n (%) for categorical data. Please refer to Table 2 for details.

Table 2: Patient Characteristics of MAPLE Responders

	(n = 309)
Age (years; mean ± SD)	45 ± 13
Sex at Birth (#; % of total sample)	
Men	127 (41)
Women	182 (59)
BMI† (kilograms/meters squared; mean ± SD)	33 ± 10
Education† (#; % of total sample)	
< High School Diploma	63 (21)
High School Diploma	98 (33)
Some College	89 (30)
Associate's/Technical Degree	29 (10)
Bachelor's Degree	12 (4)
Master's Degree	9 (3)
Post-Graduate	2 (0.7)
Employment† (#; % of total sample)	
Employed	173 (57)
Retired	23 (8%)
Unemployed	72 (24)
Disability	32 (11)
Home Manager	2 (<1)
Full-Time Student	2 (<1)
Insurance Status† (#; % of total sample)	
Private	80 (28)
Self	25 (9)
Medicare	28 (10)

Medicaid	144 (50)
Federal	14 (5)
Presence of a Primary Care Provider† (#; % of total sample)	
Yes	218 (71)
No	89 (29)
Previous Medical History of HTN† (#; % of total sample)	
Yes	243 (79)
No	64 (21)
CVD Risk Factors (#; % of total sample)	
0 Risk Factors	126 (41)
1 Risk Factor	146 (47)
2 Risk Factors	34 (11)
3 Risk Factors	3 (1)
Antihypertensive Medication Status (#; % of total sample)	
Yes	114 (37)
No	195 (63)
BP Control Status† (#; % of total sample)	
Yes	85 (28)
No	224 (73)
SBP (mmHg; mean ± SD)	150 ± 25
DBP (mmHg; mean ± SD)	96 ± 15
RaLES-B Score (score; mean ± SD)	123 ± 6
SSQ6 Score† (score; mean ± SD)	2 ± 2
MacArthur Score† (score; mean ± SD)	5 ± 2
AHA Score† (score; mean ± SD)	3 ± 0.9
Healthy Habits Score† (score; mean ± SD)	190 ± 73

†BMI had 9 system missing cases

†Education had 7 system missing cases

†Employment Status had 2 system missing cases

†Insurance Status had 18 system missing cases

†The presence of a primary care provider had 2 system missing cases

† Hypertension Status had 2 system missing cases

† SSQ6 Score Status had 46 system missing cases

† McArthur Score had 22 system missing cases

† Healthy Habits Score had 1 system missing cases

SD, standard deviation; BMI, body mass index; HTN, hypertension; CVD, cardiovascular disease; BP, blood pressure; SBP, systolic blood pressure; DBP, diastolic blood pressure; RaLES-B, brief racism and life experiences scale; SSQ6, social support questionnaire; AHA, American Heart Association

2.5.2 Variable Selection: Primary and Secondary Objective

Insurance status, the MacArthur Scale, and the SSQ6 were omitted from the analysis because missing data values were over 5%.

After screening for multicollinearity, it was found that SBP and DBP values were highly correlated ($r = \geq 0.8$) among continuous variables, indicating the higher the SBP, the higher the DBP. Since SBP represents a greater indicator of HTN, DBP was eliminated from the analysis.[4,66] Table 3 provides an overview of bivariate correlations (Pearson's) between the continuous variables of patient demographic characteristics, clinical characteristics, and self-reported psychosocial measures.

Table 3: Correlation Between Continuous Variables

	Age	BMI	SBP Value	DBP Value	RaLES-B Score	Healthy Habits Score	AHA Quiz Score
Age	1						
BMI	-0.48	1					
SBP Value	-0.07	-0.33	1				
DBP Value	-0.25	-0.31	**0.95**	1			
RaLES-B Score	-0.14	-0.26	-0.17	-0.07	1		
Healthy Habits Score	0.17	-0.14	-0.27	-0.29	-0.21	1	
AHA Quiz Score	-0.10	-0.03	-0.44	-0.42	-0.18	-0.04	1

Note. This heatmap provides a graphical representation of the correlation matrix among selected demographic, clinical, and psychosocial measures. Strong correlation is represented by green; medium correlation is represented by dark orange; and low correlation is represented by yellow.
BMI, body mass index; SBP, systolic blood pressure; RaLES-B, brief racism and life experiences scale; AHA, American Heart Association

No present variables reflected multicollinearity among categorical variables, and as such, all were retained for univariate analysis. Table 4 provides an overview of bivariate correlations (Spearman's Rho) between the categorical variables of patient demographic characteristics, clinical characteristics, and self-reported psychosocial measures.

Table 4: Correlation Between Categorical Variables

	Gender at Birth	Education	Employment Status	Presence of primary care provider	Hypertension History	Antihypertensive Status	BP Control Status	CVD Risk Factors
Gender at Birth	1							
Education	0.33	1						
Employment Status	-0.17	-0.52	1					
Presence Primary Care Provider	-0.65	-0.19	-0.24	1				
HTN History	-0.45	-0.10	-0.11	0.27	1			
Antihypertensive Status	-0.36	-0.16	-0.09	0.26	0.60	1		
BP Control Status	-0.12	-0.11	-0.19	0.11	-0.34	-0.20	1	
CVD Risk Factors	-0.28	-0.43	0.22	-0.15	-0.15	-0.18	-0.07	1

Note. This heatmap provides a graphical representation of the correlation matrix among selected demographic, clinical, and psychosocial measures. Strong correlation is represented by green; moderate correlation is represented by dark orange; and weak correlation is represented by yellow.

HTN, hypertension; BP, blood pressure; CVD, cardiovascular disease

2.5.3 Primary Objective

From the total sample (N = 309), there were 244 patients that responded with "yes" (i.e., willing) and 65 patients that responded with "no" (i.e., not willing) to item 1 of the MAPLE questionnaire: "*If your healthcare provider prescribed a new, non-invasive, non-pharmacological treatment that has been proved to lower your blood pressure, do you think you would try it*?".

Included Predictors

Comparison of Willingness and Age

An independent-samples t-test revealed a significant difference in age between patients that were and were not willing to try a new, non-invasive, non-pharmacological treatment to lower their BP if prescribed by a health care provider. Willing patients (46 years ± 12) were significantly older than non-willing patients (41 years ± 12) [difference = 5.02 years (95% confidence interval [CI], 1.52 to 8.51-); t(307) = 2.824, p = <0.01].

Comparison of Willingness and SBP Values

An independent-samples t-test revealed a significant difference in SBP values between patients' that were and were not willing to try a new, non-invasive, non-pharmacological treatment to lower their BP if prescribed by a health care provider. Willing patients had a significantly higher SBP value (151 mmHg ± 25) than non-willing than patients' (145 mmHg ± 26) [difference = 5.16 mmHg (95% CI, -.071 to .47); t(307) = t, p = 0.14].

Comparison of Willingness and RaLES-B Scores

An independent-samples t-test revealed a significant difference in RaLES-B scores between patients that were and were not willing to try a new, non-invasive, non-pharmacological treatment to lower their BP if prescribed by a health care provider. Willing patients had a significantly higher RaLES-B score (13 ± 6) than non-willing patients (11± 5) [difference = 1.75 (95% CI, 0.03 to 0.58); t(307) = 2.15, p = 0.03].

Comparison of Willingness and Healthy Habits for BP Control Scores

An independent-samples t-test revealed a significant difference in Healthy Habits for BP Control scores between patients' that were and were not willing to try a new, non-invasive, non-pharmacological treatment to lower their BP if prescribed by a health care provider. Willing patients had a significantly higher Healthy Habits score (193 ± 69) than non-willing patients (180 ± 84) [difference = 13.28 (95% CI, -6.86 to 33.43); t(306) = 1.298, p = 0.19].

Comparison of Willingness and Education

A chi-square test revealed a significant association between a patient's willingness to try a new, non-invasive, non-pharmacological treatment to lower their BP if prescribed by a health care provider and education (i.e., less than a High School Diploma, equivalent of a High School diploma, College degree, Associate/Technical degree, Bachelor's degree, Master's degree, and Postgraduate degree) $\chi2(6) = 13.092$, p = 0.03. The proportion of willing patients with a College (31%) or Associates/Technical degree (10%), Master's (3%) or Postgraduate degree (1%) was significantly more than non-willing patients (23%, 6%, 0%, and 0% respectively). Alternatively, the proportion of willing patients with less than a High school diploma (20%), the equivalent of a High school diploma (31%), and a Bachelor's degree (2%) was significantly less than non-willing patients (23%, 37%, and 10%, respectively).

Comparison of Willingness and Previous Medical History of HTN

A chi-square test revealed a significant difference in the existence of a previous medical history of HTN and patients that were and were not willing to try a new, non-invasive, non-pharmacological treatment to lower their BP if prescribed by a health care provider, $\chi2(1) = 10.561$, $p = 0.02$. The proportion of willing patients with a previous medical history of HTN (83%) were significantly more than non-willing patients (65%). Additionally, the proportion of willing patients with no previous medical history of HTN (17%) was significantly less than non-willing patients (35%).

Comparison of Willingness and BP Control Status

A chi-square test revealed a significant difference in BP status (i.e., controlled, or uncontrolled) and patients that were and were not willing to try a new, non-invasive, non-pharmacological treatment to lower their BP if prescribed by a health care provider and, $\chi2(1) = 3.659$, $p = 0.06$. The proportion of willing patients with uncontrolled BP (75%) were significantly more than non-willing patients (63%). Additionally, the proportion of willing patients with controlled BP (25%) were significantly less than non-willing patients (37%).

Comparison of Willingness and Antihypertensive Medication Status

A chi-square test revealed a significant association between antihypertensive medication status and a patient's willingness to try a new, non-invasive, non-pharmacological treatment to lower their BP if prescribed by a health care provider and, $\chi2(1) = 6.749$, $p = 0.01$. The proportion of willing patients on antihypertensives (41%)

were significantly more than non-willing patients (23%). Additionally, the proportion of willing patients not on antihypertensives (60%) were significantly less than non-willing patients (80%).

Excluded Predictors

The remaining predictors that did not demonstrate a statistically significant association with a patient's willingness are reported in Table 5 below and were not entered in the regression model.

Table 5: Primary Objective Predictors with a p-value ≥ 0.20.

	(n = 309)		
	Willing	**Not Willing**	**P Value**
BMI (mean ± SD)	33 ± 10	34 ± 9	p = 0.86
AHA Quiz (mean ± SD)	3 ± 0.9	3 ± 0.9	p = 0.29
Sex at Birth (#; % within willingness)			p = 0.67
Men	102 (42)	25 (20)	
Women	142 (59)	40 (62)	
Employment† (#; % within willingness)			p = 0.48
Employed	130 (54)	43 (66)	
Retired	21 (9)	2 (3%)	
Unemployed	59 (25)	13 (20)	
Disability	25 (10)	7 (11)	
Home Manager	2 (1)	0 (0)	
Full-Time Student	2 (1)	0 (0)	
Presence of a Primary Care Provider† (#; % within willingness)			p = 0.50
Yes	174 (72)	44 (68)	
No	68 (28)	21 (32)	
CVD Risk Factors (#; % within willingness)			p = 0.63
0 Risk Factors	96 (39)	30 (46)	
1 Risk Factor	116 (48)	30 (46)	
2 Risk Factors	29 (12)	5 (8)	
3 Risk Factors	3 (1)	0 (0)	

†BMI had 9 missing system missing cases

†Employment Status had 2 system missing cases

†The presence of a primary care provider had 2 system missing cases

SD, standard deviation; BMI, body mass index; AHA, American Heart Association; HS, high school; CVD, cardiovascular disease

Binary Logistic Regression Model

There were 10 identified system missing cases among all included variables, therefore, N = 299. A forward-stepwise logistic regression was performed to determine the likelihood of patients' willingness to try a new, non-invasive, non-pharmacological treatment to lower their BP if prescribed by a health care provider according to age, SBP values, RaLES-B score, Healthy Habits for BP Control score, education, previous medical history of HTN, BP status (i.e., controlled/uncontrolled), and antihypertensive medication status as predictors in the model. A test of the final model, including three of the eight predictors (i.e., age, RaLES-B score, previous medical history of HTN) compared to the constant only model was statistically significant $\chi2(3) = 19.069$, $p = < 0.01$, Nagelkerke R2 = 0.096. The model correctly classified 78.9% of cases.

Age was significantly associated with a willingness to try a new, non-invasive, non-pharmacological treatment, where every year increase in age was associated with a 3% increase in the likelihood of answering "yes" (odds ratio [OR] 1.030, $p = 0.01$).

The RaLES-B score was significantly associated with willingness, where every unit increase on the RaLES-B score was associated with a 5% increase in the likelihood of saying "yes" (OR 1.05, $p = 0.04$).

The presence of a previous medical history of HTN status was significantly associated with willingness to try a new, non-invasive, non-pharmacological treatment, where a having a documented previous history of HTN was associated with an increased likelihood of answering "yes" by 78% (OR 2.207, $p = 0.01$).

Binary Logistic Regression ROC Curve

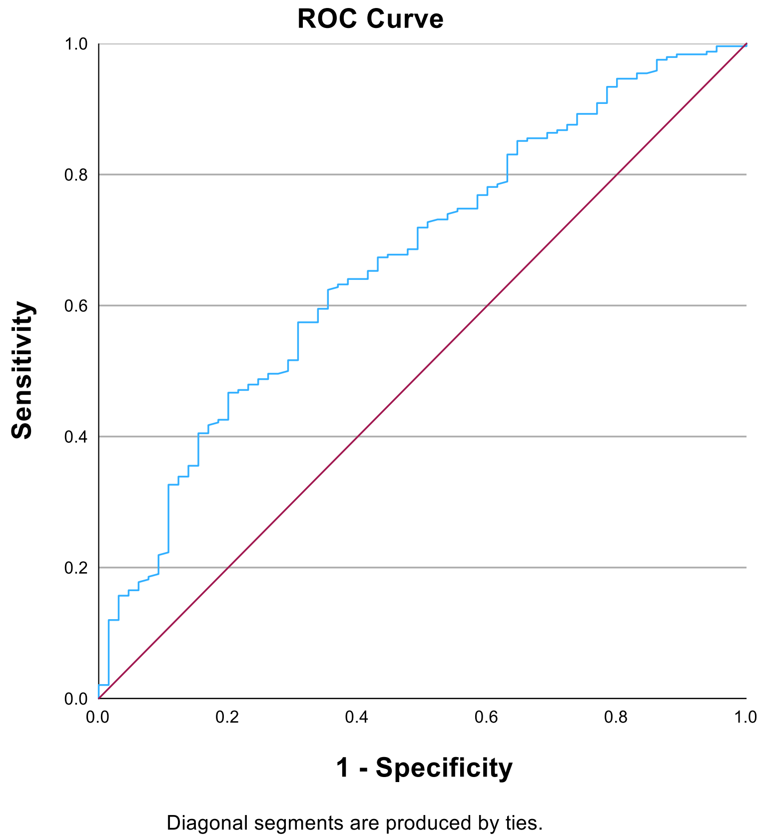

Figure 2: ROC Curve for the Primary Objective, ROC = 0.669. Test results variable(s) included patients age, RaLES-B score, Healthy Habits for BP Control score, previous medical history of HTN, education, SBP value, and antihypertensive medication status. The test result variable(s): Predicted probability has at least one tie between the positive actual state group and the negative actual state group.

Model discrimination was assessed with the area under the ROC curve for the final regression model. The area under the ROC curve was 0.669 (95% CI, .718 to .891), which was based on the original eight predictors entered in the regression equation. This is suggestive of the model “fairly” correctly predicting a patient’s willingness (see Figure 2).

To test for other possibilities, 10 other ROC curves were analyzed using multiple combinations of predictors. The strongest ROC curve was 0.671, which included the following predictors: patients age, and RaLES-B score, and previous medical history of HTN (see Figure 3). This combination reflects the final 3 predictors in the logistic regression model.

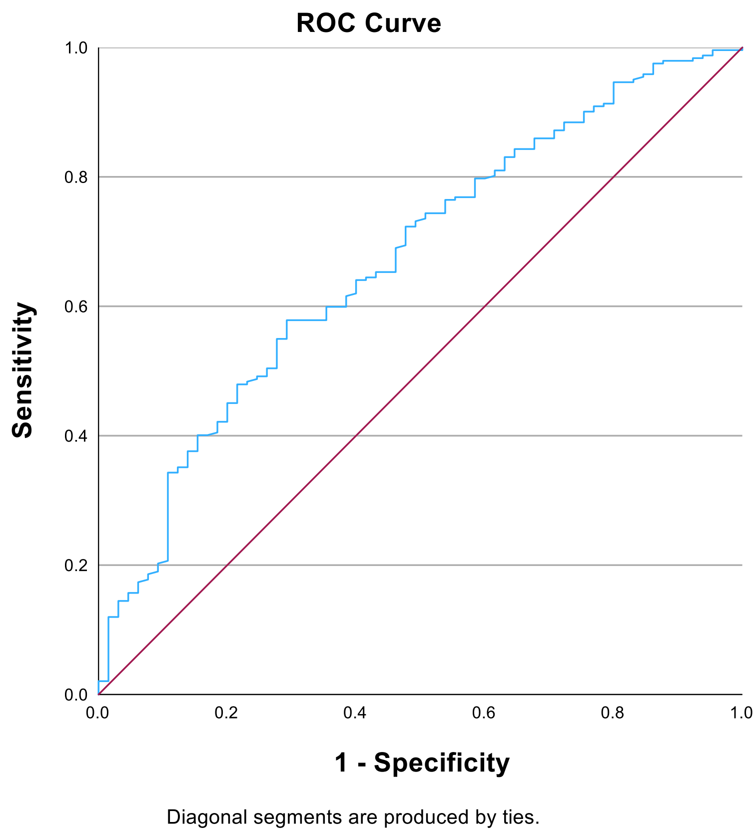

Figure 3: ROC Curve for the Primary Objective, ROC = 0.671. Test results variable(s) included patients age, RaLES-B score, and previous medical history of HTN. The test result variable(s): Predicted probability has at least one tie between the positive actual state group and the negative actual state group.

Factor Analysis

A PCA was run on the RaLES, a 9-item questionnaire that measures a general overview of one's life experience with racism (n = 299). Inspection of the correlation matrix showed that all variables had at least one correlation coefficient greater than 0.3 (see Table 6).

Table 6: Correlation matrix demonstrating bivariate correlations among the 9-item RaLES-B questionnaire.

		Item 1	**Item 2**	**Item 3**	**Item 4**	**Item 5**	**Item 6**	**Item 7**	**Item 8**	**Item 9**
Correlation	**Item 1**	1.0	.68	.48	.49	-.17	-.19	.35	.53	.51
	Item 2	.68	1.0	.37	.56	-.19	-.20	.41	.54	.63
	Item 3	.48	.37	1.0	.47	-.18	-.18	.32	.33	.27
	Item 4	.49	.56	.47	1.0	-.11	-.25	.44	.48	.52
	Item 5	-.17	-.19	-.18	-.11	1.0	.22	-.25	-.16	-.13
	Item 6	-.19	-.20	-.18	-.25	.22	1.0	-.18	-.20	-.21
	Item 7	.35	.41	.32	.44	-.25	-.18	1.0	.51	.52
	Item 8	.53	.54	.33	.48	-.16	-.20	.51	1.0	.75
	Item 9	.51	.63	.27	.52	-.13	-.21	.52	.75	1.0

The overall Kaiser-Meyer-Olkin (KMO) measure was 0.840, with individual KMO measures all greater than 0.7, representing classifications of 'middling' to 'meritorious'. Bartlett's test of sphericity was statistically significant ($p = < .01$), indicating that the data was likely factorizable.

The PCA revealed two components that had eigenvalues greater than one: Component one explained about 46% of the variance, while component two explained about 12% of the variance.

Visual inspection of the scree plot indicated that two components should be retained (see Figure 4). In addition, a two-component solution met the interpretability criterion. As such, two components were retained. The two-component solution explained 58% of the total variance. A Varimax orthogonal rotation was employed to aid interpretability. The rotated solution exhibited 'simple structure'.

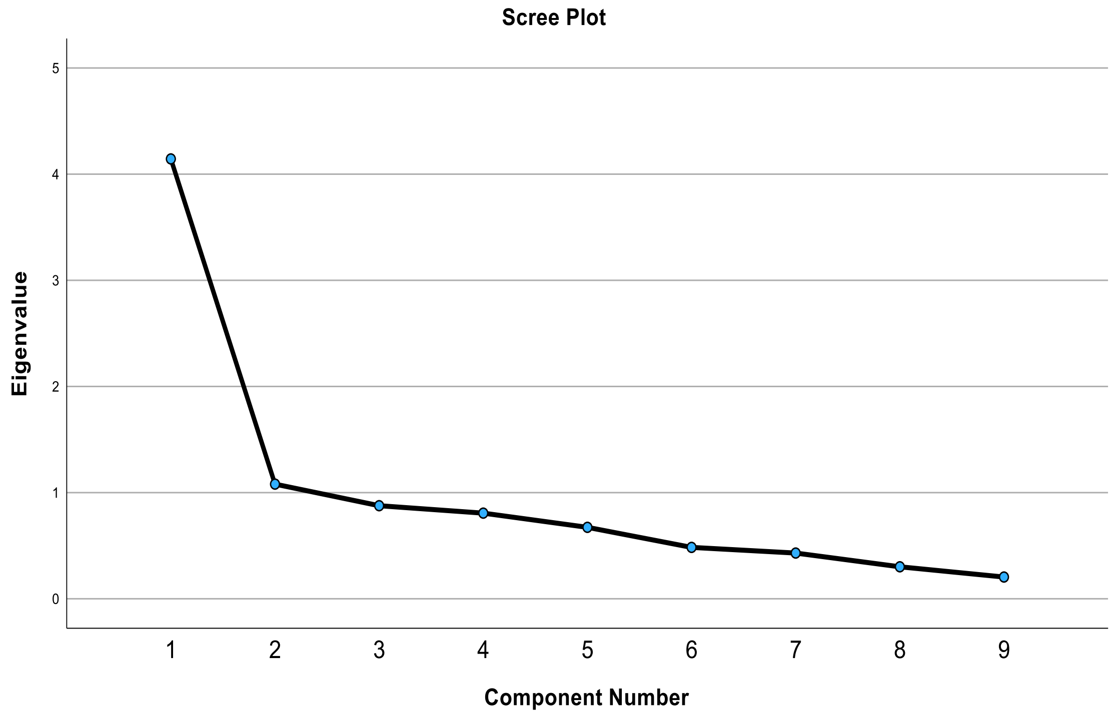

Figure 4: Scree plot displaying the eigenvalues of principal components in the RaLES-B 9-item questionnaire.

2.5.4 Secondary Objective

From the total sample (N= 309), there were 128 patients that responded with "yes" (i.e., willing) and 181 patients that responded with "no" (i.e., not willing) to item 3 of the MAPLE questionnaire: "*Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~%350; gym membership)*?".

In brief, an independent samples t-test did not reveal statistical associations among any of the continuous variables (i.e., age, BMI, SBP values, RaLES-B score, AHA Quiz score, Health Habits for Blood Pressure Control score) between patients that responded with "yes" (i.e., willing) and "no" (i.e., not willing) to cover additional costs to fund an alternative, non-pharmacological method to lower their BP (e.g., an isometric handgrip cost ~ $350 USD). However, gender and education were found to have significant associations with willingness according to chi-square tests, and as such, these variables were included as predictors in the binomial logistic regression model.

Included Predictors

Comparison of Willingness and Sex at Birth

A chi-square test revealed a significant association between gender and a patient's willingness to cover any additional costs to fund an alternative, non-pharmacological method for lowering their BP, $\chi2(1) = 3.010$, $p = 0.08$. The proportion of willing patients that were male (46%) were significantly more than non-willing male patients (37%). Additionally, the proportion of willing patients that were female (53%) were significantly less than non-willing female patients (53%).

Comparison of Willingness and Education

An additional chi-square test revealed a significant difference in a patient's willingness to cover any additional costs to fund an alternative, non-pharmacological method for lowering their BP and education (i.e., less than a High School Diploma, equivalent of a High School diploma, College degree, Associate/Technical degree, Bachelor's degree, Master's degree, and Postgraduate degree), $\chi2(6) = 10.47$ $p = 0.08$. The proportion of willing patients with a college (39%), bachelor's (4%), master's (3%), or postgraduate (0.8%) degree was significantly more than non-willing patients (22%, 3%, 2%, and 0%, respectively). Alternatively, the proportion of willing patients with less than High School diploma (18%), the equivalent of a High School diploma (35%), or an associate degree (8%) was significantly less than non-willing patients (22%, 37% and 10%, respectively).

Excluded Predictors

The remaining predictors that did not demonstrate a statistically significant association with the outcome variable (i.e., willingness) are reported in Table 7 below, and were not entered in the regression model.

Table 7: Secondary Objective Predictors with a p-value ≥ 0.20.

	(n=302)		
	Willing	**Not Willing**	**P Value**
Age (mean ± SD)	45 ± 12	45 ±13	p = 0.80
BMI† (mean ± SD)	33 ± 9	33 ± 10	p = 0.99
SBP Values (mean ± SD)	151 ± 25	149 ± 25	p = 0.50
RaLES-B Score	13 ± 6	12 ± 5	p = 0.65
AHA Quiz Score (mean ± SD)	3 ± 1	3 ± 1	p = 0.67
Healthy Habits for BP Control Score (mean ± SD)	185 ± 69	193 ± 74	p = 0.34
Employment† (#; % within willingness)			p = 0.92
Employed	68 (54)	105 (59)	
Retired	11 (9)	12 (7)	
Unemployed	29 (23)	43 (24)	
Disability	15 (12)	17 (9)	
Home Manager	1 (1)	1 (1)	
Full-Time Student	1(1)	1 (1)	
Presence of a Primary Care Provider† (#; % within willingness)			p = 0.90
Yes	89 (70)	129 (71)	
No	37 (29)	52 (28)	
Previous Medical History of HTN† (#; % within willingness)			p = 0.31
Yes	97 (76)	146 (81)	
No	30 (23)	34 (53)	
BP Control Status (#; % within willingness)			p = 0.95
Controlled	35 (27)	50 (28)	
Uncontrolled	93 (73)	131 (72)	
Antihypertensive			p = 0.77

Medication Status (#; % within willingness)			
Yes	46 (36)	68 (38)	
No	82 (64)	113 (62)	
CVD Risk Factors (#; % within willingness)			p = 0.36
0 Risk Factors	59 (46)	67 (37)	
1 Risk Factor	59 (46)	87 (48)	
2 Risk Factors	9 (7)	25 (14)	
3 Risk Factors	1 (1)	2 (1)	

†BMI had 9 system missing cases

†Employment had 5 system missing cases

†Healthy Habits for BP Control had 1 system missing case

†The presence of a primary care provider had 2 system missing cases

† Previous medical history of HTN had 2 system missing cases

SD, standard deviation; BMI, body mass index; SBP, systolic blood pressure; RaLES-B, Racism and Life Experience Scale; AHA, American Heart Association; HTN, hypertension; BP, blood pressure; CVD, cardiovascular disease

Binary Logistic Regression Results

There were 7 identified system missing cases among all included variables; therefore, N = 302. An enter-method logistic regression was performed to determine the likelihood of patients' willingness to cover any additional costs to fund an alternative, non-pharmacological method for lowering their BP according to sex at birth and education as predictors in the model. A test of the final model, including the two predictors compared to the constant only model was not statistically significant $\chi2(2) = 5.712$, $p = 0.057$, Nagelkerke R2 = 0.025. The model correctly classified 60.3% of cases.

Binary Logistic Regression ROC Curve

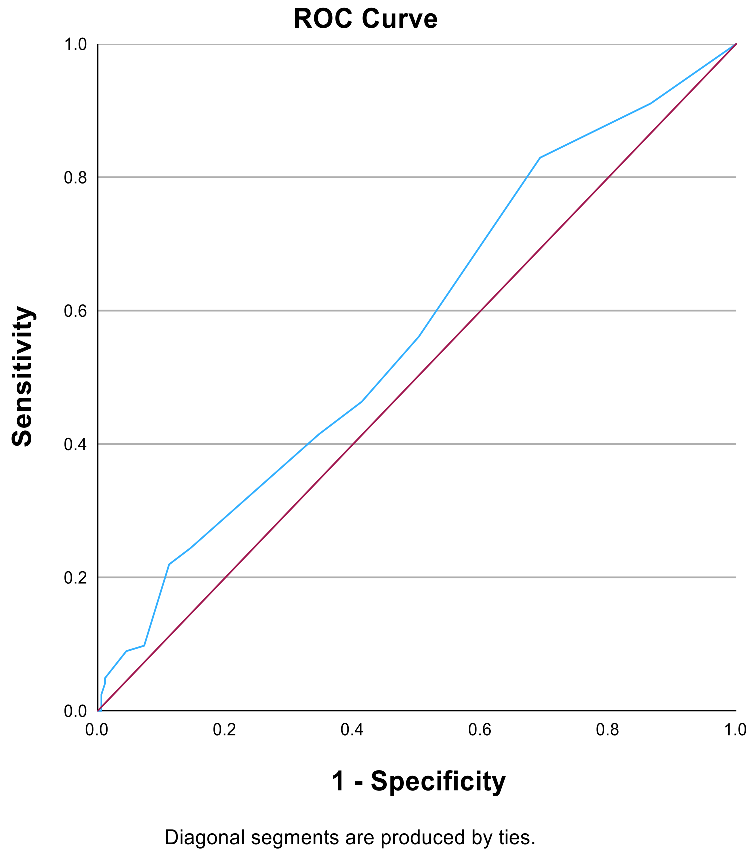

Figure 5: ROC Curve for the Secondary Objective, ROC = 0.571. Test results variable(s) included sex at birth and education. The test result variable(s): Predicted probability has at least one tie between the positive actual state group and the negative actual state group.

Model discrimination was assessed with the area under the ROC curve for the final regression model. The area under the ROC curve was 0.571 (95% CI, .506 to .637) based on the two original predictors entered in the regression equation. This is suggestive that the model presents no discrimination of correctly classifying a patient's willingness to cover additional costs (see Figure 5).

2.5.5 Exploratory Objective

Individuals in this sample were those who selected "yes" to all four items on the MAPLE questionnaire (n= 39). This population reflected a group that had a high overall acceptability of alternative interventions for BP control.

Most patients were predominately female, high school educated, employed, and insured (i.e., Medicaid). The majority of individuals had a primary care provider, a previous medical history of HTN with at least one other additional CVD risk factor, did not have their BP controlled, and were not taking antihypertensive medications.

Lastly, this group had predominately mild-moderate RaLES-B scores, an average MacArthur Scale score, higher AHA Quiz scores, and higher Healthy Habits for BP Control score.

Please refer to Table 8 for details. Results are presented as means and standard deviations (SD) for continuous data, and n (%) for categorical data.

Table 8: Patient Characteristics of MAPLE Responders with a score of 8

	(n = 39)
Age (years; mean ± SD)	40 ± 13
Sex at Birth (#; % of total sample)	
Men	17 (44)
Women	22 (56)
BMI† (kilograms/meters squared; mean ± SD)	31 ± 8
Education† (#; % of total sample)	
< HS Diploma	9 (23)
HS Diploma	16 (41)
Some College	8 (20)
Associate/Technical Degree/	3 (8)
Bachelor's Degree	3 (8)
Master's Degree	0 (0)
Post-Graduate	0 (0)

Employment[†] (#; % of total sample)	
Employed	25 (64)
Retired	1 (3)
Unemployed	9 (24)
Disability	4 (11)
Home Manager	0 (<1%)
Full-Time Student	0 (<1%)
Insurance Status[†] (#; % of total sample)	
Private	7 (18)
Self	1 (3)
Medicare	3 (8)
Medicaid	25 (66)
Federal	2 (5)
Presence of a Primary Care Provider[†] (#; % of total sample)	
Yes	24 (61)
No	15 (39)
Previous Medical History of HTN (#; % of total sample)	
Yes	24 (61)
No	15 (39)
CVD Risk Factors[†](#; % of total sample)	
0 Risk Factors	17 (44)
1 Risk Factor	18 (46)
2 Risk Factors	4 (10)
3 Risk Factors	0 (0)
Antihypertensive Medication Status (#; % of total sample)	
Yes	114 (37)
No	195 (63)
BP Control Status[†] (#; % of total sample)	
Yes	8 (21)
No	31 (80)
SBP (mmHg; mean ± SD)	144 ± 28
DBP (mmHg; mean ± SD)	93 ± 17
RaLES-B Score (score; mean ± SD)	26 ± 11
SSQ6 Score[†] (score; mean ± SD)	2 ± 2
MacArthur Score[†] (score; mean ± SD)	6 ± 2
AHA Score[†] (score; mean ± SD)	3 ± 3

Healthy Habits Score† (score; mean ± SD)	173 ± 82

† SSQ6 Score Status had 11 system missing cases

† McArthur Score had 4 system missing cases

SD, standard deviation; BMI, body mass index; HTN, hypertension; CVD, cardiovascular disease; BP, blood pressure; SBP, systolic blood pressure; DBP, diastolic blood pressure; RaLES-B, brief racism and life experiences scale; SSQ6, social support questionnaire; AHA, American Heart Association

2.6 Discussion

Given the burden of HTN in the US and its disparaging effects on Black Americans, there is an urgent need to translate effective BP-lowering therapies into clinical practice. This investigation took an important first step by identifying (a) older age, (b) a higher perceived life experience with racism, and (c) having a previous medical history of HTN as factors that predict whether a patient would be willing to use a new, non-invasive, non-pharmacological treatment such as IHG training as a tool for BP management. Ultimately, understanding these factors may lead to the much-needed widespread uptake and routine prescription of tools like IHG training among this underrepresented group. The findings are discussed in more detail below.

2.6.1 Sample Characteristics

Black American patients who completed the MAPLE questionnaire were, on average, 45 years old, predominately female, with a BMI classification in the "obesity" range. In alignment with previous studies, Black American women experience the highest HTN rates globally yet are least likely to engage in routine physical activity and meet the recommended physical activity guidelines compared to their male counterparts.[29]

More specifically, Black American women at a higher weight range (i.e., obesity classification) are at the highest risk.[47-48] It is important to acknowledge these worrisome trends and promote long-term HTN management strategies beyond traditional treatments that can effectively lower BP to target levels.[38-40]

Approximately two-thirds of the same sample had post-secondary education (i.e., College, Associates/Technical degree, Bachelor's degree, Master's degree, or Post-Graduate degree). More than half of the sample was employed and insured under Medicaid.

Nearly half of the population had a primary care provider, had at least one existing CVD risk factor other than HTN (i.e., dyslipidemia, diabetes, or smoking), and over 70% did not have their BP controlled. With respect to the latter, this rate is reflective of evidence suggesting Black residents of Detroit with HTN.[67]

The highest psychosocial self-reported measure in this sample was the RALES-B score, indicating that this group had a high perceived experience with racism and racism-related stress. Assessing the relationship between exercise for BP management and the role of perceived racism should be considered.

2.6.2 Primary Objective

As previously mentioned, the primary objective was to derive a preliminary prediction model for clinicians to use with their Black American patients to predict those who are more willing to try a new, non-invasive, non-pharmacological treatment such as IHG training to lower their BP. The following predictors were revealed: older age, having a higher RaLES-B score, and having a previous medical history of HTN.

In partial support of the hypothesis, having a previous medical history of HTN did predict a patient's willingness to try a new, non-invasive, non-pharmacological treatment (e.g., IHG training) to lower their BP. In contrast, a younger age, a lower RaLES-B score, and other clinical and demographic characteristics that were expected to have an influence based on the literature did not have predictive properties. With respect to the latter, these factors included: being male, having a high BMI (i.e., obesity classification), having the minimum of a High School education, being employed, having health insurance coverage, the presence of a primary care provider, well controlled BP, having at least one CVD risk factor, and taking antihypertensives. Furthermore, having greater knowledge of HTN awareness (i.e., higher AHA Quiz scores), having a strong perceived social support system (i.e., higher SSQ6 score), and adopting better BP-lowering habits (i.e., higher Healthy Habits for BP Control score) according to the self-reported psychosocial measures were not significant predictors of willingness. Explanations for these findings are discussed below.

Age

Each yearly increase in age was associated with a 3% greater likelihood of being more willing to try non-medical approaches such as IHG training for BP management. The prevalence of older participants experiencing a higher willingness to try new, non-invasive, non-pharmacological treatments (e.g., IHG training) may be explained by the greater time availability they experience as they approach and/or enter retirement, which may lead individuals to be more open to trying different treatment modalities.[68] This idea aligns with previous findings which have reported that older adults are increasingly seeking non-pharmacological therapies for aging-related conditions, with the most common being HTN.[68-69]

Additionally, health-related problems due to aging might make individuals more open to trying additional treatment options.[68-69] For example, meta-analytic evidence suggests that health concerns were the most prominent factor influencing exercise engagement.[69]

Given the willingness of older Black Americans to try new, non-invasive, non-pharmacological treatments to lower BP, further specific types should be explored, such as IHG training. Previous research has demonstrated the effectiveness of lowering BP in older Caucasian individuals with HTN, including those currently receiving pharmacotherapy to treat their HTN, and in those with high BP reactivity.[8, 82-84]

However, further research is warranted to investigate the impact on Black Americans. Given this preliminary evidence suggesting this cohort is willing to try a new, non-invasive, non-pharmacological treatment to lower BP further supports the uptake and BP-lowering effectiveness in this population.

Since older Black American adults have greater rates of HTN, implementing the use of IHG training can be particularly efficacious for this group. Moreover, IHG training is safe, easily adoptable (i.e., home-based), addresses health-related mobility issues, and can be performed in a shorter amount of time when compared to traditional exercise regimes (e.g., aerobic and dynamic exercise) to lower BP.[41,43]

RaLES-B

The RaLES-B score represented a statistically significant predictor, whereby every unit increase on the RaLES-B score was associated with a 5% increase in the likelihood of a patient being willing to try a non-pharmacological treatment to lower their BP. These findings imply that individuals who expressed a greater experience with racism and racism-related stress have a higher chance of willingness. Very few studies have examined the relationship of racism and/or discrimination to lifestyle factors specifically associated with BP management, such as physical activity.[11] As such, there is insufficient evidence to support the current findings.[13,70]

However, results from the Jackson Heart Study demonstrated that younger Black American participants used physical exercise as a coping mechanism to counteract the negative effects of discrimination on cardiovascular outcomes.[70] Based on these outcomes, it has been theorized that among low-income, urban populations, the impact of chronic experiences of discrimination on intentional physical activity engaged as a health-promoting behaviour could be obscured by greater exposure to activities of daily living (e.g., increased use of walking as the primary means of transportation and/or laborious jobs).[71]

The impact racism and/or discrimination has on adopting healthy lifestyle behaviours for BP control among individuals with HTN warrants further examination. Nonetheless, primary care providers should be encouraged to measure patient-perceived racism by utilizing the RaLES-B to help identify the specific mechanisms underlying this relationship.

Previous Medical History of HTN

Having a previous medical history of HTN was associated with a 78% greater likelihood of willingness. Increased willingness in this sample may be reflective of the broader desire to look beyond traditional BP-lowering strategies, including pharmacotherapy and increased physical activity, as these strategies are often met with poor compliance and/or effectiveness in Black American patients. [30-31] These poor rates may drive patients to become more curious about alternative BP-lowering approaches.[35] This idea aligns with previous work highlighting patient-centered barriers to antihypertensive medication adherence, reporting that patients were dissatisfied with treatment, had inadequate knowledge of their condition, especially drug type and dosage level, fear of reliance on medication, and adverse effects.[30-31,35,37-38]

Among adults living with HTN, there is little existing evidence regarding the attitudes (e.g., willingness) toward physical activity engagement for BP management.[37] To the best of knowledge, one other study investigated the perceptions, knowledge, and attitudes towards the behaviours of physical activity among a sample of individuals with HTN.[72] These findings align with the current results, such that participants reported a positive attitude regarding the benefits and importance of physical activity for BP management.[72]

2.6.3 Secondary Objective

As previously mentioned, the secondary objective was to derive a preliminary prediction model for clinicians to use with their Black American patients to predict those who are most willing to cover additional costs to fund an alternative, non-pharmacological method for treating HTN (e.g., an isometric handgrip, cost ~$350 USD; gym membership).

No predictors revealed a significant association with willingness to cover additional costs. Although sex at birth (i.e., being female) and having a higher education were significant in univariate testing when entered into the predictive model, no significant findings were observed.

A potential reason for females being more willing to cover additional costs than males may be explained by the disparity in antihypertensive prescriptions among females within primary care.[74] Meta-analytic evidence suggests that women were 15% less likely to be prescribed ACE inhibitors and almost 30% less likely to be prescribed diuretics despite demonstrating comparable BP to their male counterparts.[75] This delay in receiving proper medical treatment might urge women to rely on alternative methods, causing them to be more open to using their own funds to provide self-management.[75]

The findings regarding education align with previous research suggesting that participants with higher education are more likely to have enhanced health literacy, such that they may be more open to investing in different methods to manage their BP.[76] Another possible explanation for these findings is that with advanced education, individuals are more likely to secure higher-paying jobs, leading to improved financial stability.[76] Furthermore, patients with a greater than a high school education have fewer financial barriers compared to patients that are less educated.[76] Lastly, the critical thinking, problem-solving, and perseverance skills achieved via higher education may guide healthy behaviors such that these individuals have a greater ability to react to new health information and have higher levels of learned understanding and effectiveness.[76]

Other clinical and demographic characteristics that were expected to have an influence based on the literature did not have predictive properties. With respect to the latter, these factors included: being male, having a high BMI (i.e., obesity classification), having the minimum of a High School education, being employed, having health insurance coverage, the presence of a primary care provider, well controlled BP, having at least one CVD risk factor, and taking antihypertensives. Furthermore, having a lower perceived life experience with racism (i.e., low RaLES-B scores), a greater knowledge of HTN awareness (i.e., higher AHA Quiz scores), having a strong perceived social support system (i.e., higher SSQ6 score), and adopting better BP-lowering habits (i.e., higher Healthy Habits for BP Control score) according to the self-reported psychosocial measures were not significant predictors of willingness.

Although these factors were not statistically significant in the final regression model, it is important to consider the continuation of collecting this demographic, clinical, and psychosocial information in clinical settings for future studies with larger sample sizes, which may contribute to an association.

2.6.4 Exploratory Objective

Black American patients who demonstrated the highest overall acceptability of non-medical approaches to lower BP who completed the MAPLE questionnaire were, on average middle-aged, predominately female, with a BMI classification in the "obesity" range. These findings are in alignment with the patient characteristics outlined in both the primary and secondary objectives. As previously mentioned, the demographic characteristics in this particular sample put patients at a higher risk for long-term HTN-related complications.[35]

These findings are encouraging because this same high-risk sample is also reflective of the group that is most willing to manage their condition using alternative BP-lowering methods. With respect to sex at birth, aspects of the current findings are similar to previous work evaluating gender differences in utilizing healthcare services in the US, suggesting that women were more likely to utilize cost-effective healthcare strategies than men.[74] This may be a result of women acquiring reproductive healthcare needs as well as having an increased prevalence of chronic illness when compared to their male counterparts.[75]

Moreover, the lower utilization of health-care services among men reinforces the commonly held view that they are less likely to visit a doctor and thereby, be less exposed to healthcare services.[75] An unfortunate consequence of this may be the reduced likelihood in men seeking alternative care services, which was reflected in this sample as well.[77]

Lastly, this group had predominately higher average RaLES-B scores (i.e., racism experience measurement), MacArthur Scale scores (i.e., subjective SES measurement), AHA Quiz scores (i.e., HTN awareness and health literacy measurement), and Healthy Habits for BP Control scores (i.e., acceptability of non-medical BP-lowering approaches). Lower than normal psychosocial averages were reflected in the SSQ6 score (i.e., perceived social support measurement).

These findings speak to the unique interplay between different psychosocial factors and their effect on HTN development. Previous work has demonstrated that racial disparities (e.g., racism and discrimination) in HTN remain constant or increase with decreasing SES.[17-19,67,] Other factors associated with low SES and increased health risk can be attributed to a myriad of factors, including increased abdominal adiposity (i.e., high BMI), increased CVD risk factors (i.e., smoking and/or tobacco use), and reduced psychosocial resources, aligning with the current sample.[7,9-10]

One promising psychosocial observation noted in this sample is the higher AHA quiz scores and Healthy Habits score averages. Both of these measures assess health literacy and behaviours towards adopting healthy strategies (i.e., diet and exercise) to better manage BP.[79] Previous work has found that adequate education of HTN represents a strong predictor of compliance to exercise programs for BP management.[79] These observations emphasize the need to ensure that patients are properly informed about their condition to optimize uptake from a patient-perspective.[79]

Stressors associated with low SES (i.e., financial problems), have been linked to experiencing more negative social interactions.[78] The lower SSQ6 scores found in the current sample speak to existing research implicating that older adults are more susceptible to chronic exposure to social and family networks, which can offer extensive support but also act as major sources of interpersonal conflict.[78] In turn, this may lead to negative social interactions, which has been linked to increased CVD risk and incident HTN.[78]

2.7 Strengths and Limitations

Notable strengths of this work include: (1) the use of readily available parameters to assess patient acceptance of novel BP-lowering therapy in a high-risk HTN population, (2) the sample size, which was adequate to test a wide range of meaningful predictors for both the primary and secondary study objectives, and (3) the retrospective nature of the study, which limited the risk of selection bias due to confounders (i.e., selection bias among investigators).

There are a number of present limitations, however, that are important to acknowledge. First, although adequate, the sample size was small. Increasing the sample size would widen case-to-predictor ratio and optimize overall model performance and minimize the amount of missingness.

Internal validation approaches (i.e., bootstrapping) could not be performed, as the recommended sample sizes for this procedure are larger.[80] It is also important to note that the current study is representative of the 'developmental phase' of generating a prediction model, and the absence of external validation approaches represents a major limitation in this study. Future studies should further undergo an external validation phase, which assesses the predictive performance of this model in a different, larger sample that is generalizable to the current sample before implementation on a large scale.

Outside of model building, other limitations span across the original study design, regarding data collection. First, this baseline data was collected in emergency care settings, which may have presented difficulties for both patients and researchers in this type of environment. Beginning with patient-centered challenges, the original inclusion criteria involved patients presenting to the emergency department with (a) a previous reported medical history of HTN or (b) an elevated BP.

With respect to the latter, BP was collected in office by a clinical researcher, which may have subjected the risk of white coat HTN.[81-82] Particularly in emergency care settings, patients are often already in a heightened state of anxiety and under stress, which can provoke increased bouts of elevated BP and further potentiate their stress response.[81] It is recognized that this factor may have affected the findings.

Moreover, potential challenges among researchers may have included the use of complicated or time-consuming electronic health record systems, narrow participant eligibility criteria, high noise levels (i.e., communication barriers), and competing work demands.[82]

It is also important to recognize that this baseline data involved the administration of psychosocial self-reported measures, some of which concerned private or sensitive topics (e.g., dietary and exercise intake, social status, and violence), which can oftentimes be threatened by self-reporting biases.[82] One such self-reporting bias that could have occurred is the social desirability bias, which is when participants underreport socially undesirable attitudes/behaviour's, and overreport more desirable attributes.[82]

2.8 Clinical Relevance and Future Directions

HTN is the leading cause of CVD and related mortality globally.[1–3] Nearly 35% of American adults have HTN, and Black Americans experience the highest rates compared to other racial groups. This disparity is intensified in large urban areas where Black Americans are over-represented, have a lower SES, and have little access to care.[1–3, 5,7.]

Despite the well-established existence of clinical practice guidelines for BP management, low adherence rates to traditional treatments remain a major public health problem. One such widely endorsed yet underutilized recommendation is physical activity. Over 40% of American Adults are inactive, with even greater rates reported among Black Americans. From a clinician perspective, tools of truly low time burden and human cost are needed.[28] Deriving a clinical prediction model for non-traditional BP-lowering therapies, such as IHG training acceptance fits this well.

This work lay the foundation for a powerful tool that clinicians can use that may help improve standard of HTN care in their Black American patients. Although prediction models can sometimes consist of complicated mathematical equations, which can be difficult to apply in clinical practices, the current model is simple and may be easily applied to a web-based application.[83] Web-based tools integrating clinical prediction models into more user-friendly "calculators" may help increase their use routine use in clinical practice.[83] Thus, early stages in developing and piloting a web-based application for this prediction model should be investigated in future studies.

The offered convenience of 3 simple and ‘easy to remember’ patient factors can encourage clinician application and prescription confidence. From a healthcare provider perspective, knowing a Black American patient’s age, RaLES-B score, and their HTN status, is crucial when prescribing HTN management treatments. Thus, the receiving of information and counselling about the benefit of IHG training and its use from primary care providers can encourage translating patients attitudes to action. Future studies should also aim to promote physician education and the benefit of prescribing IHG training, implement and assess patient education/health literacy programming regarding the uptake and use of IHG training for HTN management, and understand clinicians’ beliefs, behaviors, and attitudes towards the use of this prediction model as a prescription tool in primary care. Studies should extend to include the evaluation of whether implementing this clinician tool results in an increased uptake among patients of alternative treatments to lower their BP (i.e., IHG), and whether this uptake results in better BP management.

To reiterate, there is an urgent need to translate effective BP-lowering therapies into clinical practice, especially for Black Americans. Having an easy-to-use tool for clinicians that helps to optimize BP control in this population has the potential to impact thousands of Black Americans living with HTN.

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Appendices

Appendix A: Assumption Testing

Primary Objective

Univariate Analysis: Continuous Variables

For the independent-samples t-test, outliers were assessed by inspection of boxplots and z-scores, and normal distribution was assessed by histograms, and normal Q-Q plots. Homogeneity of variance was assessed by Levene's test for equality of variance.

Univariate Analysis: Categorical Variables

For the chi-square tests, all expected cell frequencies were inspected to be greater than five for 2 by 2 contingency tables. For larger tables (i.e., r x c contingency tables), Fisher's Exact test was reported if one or more expected cell frequencies had an expected cell count less than five.

Binary Logistic Regression Output

Outliers, high leverage points, or high influential points (i.e., any unusual observations) were assessed with standardized residuals. There was a total of eight standardized residuals with standard deviations greater ± 2 among cases. These cases were further investigated to determine if they were true outliers. Upon inspection, it was determined that these cases had low RaLES-B scores, however, they were not low enough (e.g., ≤ 0) to be omitted from the analysis (i.e., scores were still in eligible range of RaLES-B scoring, 0-36). Therefore, no cases were classified as significant outliers, high leverage points, or high influential points, and as such, were kept in the analysis.

Confirming the linearity of the continuous variables (e.g., age) with respect to the logit of the dependent variable (i.e., willingness) was assessed via the Box-Tidwell procedure. A Bonferroni correction was applied using all four terms (i.e., age, SBP values, RaLES-B scores, and Healthy Habits for BP Control scores) in the model resulting in statistical significance being accepted when $p = < .0083$. Based on this assessment, all continuous independent variables were found to be linearly related to the logit of the dependent variable.

Secondary Objective

Univariate Analysis: Continuous Variables

For the independent-samples t-test, outliers were assessed by inspection of boxplots and z-scores, and normal distribution was assessed by histograms, and normal Q-Q plots. Homogeneity of variance was assessed by Levene's test for equality of variance.

Univariate Analysis: Categorical Variables

For the chi-square tests, all expected cell frequencies were inspected to be greater than five for 2 by 2 contingency tables. For larger tables, all expected cell frequencies were inspected to be greater than one and no more than 20% were less than five. However, if these assumptions were not met (i.e., one or more expected cell frequencies had an expected cell count less than five) the Fisher-Freeman-Halton Exact Test test was reported as an alternative to the Pearson Chi-Square.

Binary Logistic Regression Output

Since no continuous variables were entered in this regression model (i.e., no significant associations), testing for the linearity of independent variables with respect to the logit of the dependent variable (i.e., willingness to cover additional costs) was not required.

Since all variables entered in the equation were categorical, no cases were classified as significant outliers, high leverage points, or high influential points, confirming the absence of significant outliers, high leverage points, or high influential points (i.e., any unusual observations) was not required.

Appendix B: Primary Objective Univariate Testing for Continuous Variables

Comparison of Willingness and Age

Group Statistics

	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	N	Mean	Std. Deviation	Std. Error Mean
Participant Age	Yes	236	**46.2828**	**12.72008**	.81432
	No	65	**41.2615**	**8.85247**	1.58740

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Participant Age	Equal variances assumed	.110	.741	**2.824**	**307**	.003	**.005**	5.02125	1.77776	**1.52311**	**8.51939**
	Equal variances not assumed			2.814	100.287	.003	.006	5.02125	1.78409	1.48180	8.56070

Comparison of Willingness and BMI

Group Statistics					
	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	N	Mean	Std. Deviation	Std. Error Mean
BMI	Yes	236	33.2694	9.98844	.65019
	No	64	33.5124	8.85247	1.10656

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
BMI	Equal variances assumed	.008	.927	**-.177**	**298**	.430	**.860**	-.24294	1.37542	**-2.94970**	**2.46381**
	Equal variances not assumed			-.189	110.481	.425	.850	-.24294	1.28344	-2.78630	2.30041

Comparison of Willingness and SBP Values

Group Statistics

	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	N	Mean	Std. Deviation	Std. Error Mean
BP True SBP Value	Yes	244	**151.0697**	**25.30878**	1.62023
	No	65	**145.9077**	**25.60501**	3.17591

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
BP True SBP Value	Equal variances assumed	.010	.919	**1.458**	**307**	.073	**.146**	5.16198	3.54130	**-1.80630**	**12.13026**
	Equal variances not assumed			1.448	99.867	.075	.151	5.16198	3.56533	-1.91164	12.23560

Comparison of Willingness and RaLES-B Scores

Group Statistics					
	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	N	Mean	Std. Deviation	Std. Error Mean
RaLES-B score	Yes	244	**12.9385**	**5.89834**	.37760
	No	65	**11.1846**	**5.58428**	.69264

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
RaLES-B score	Equal variances assumed	.003	.954	**2.154**	**307**	.016	**.032**	1.75391	.81435	**.15149**	**3.35633**
	Equal variances not assumed			2.223	105.246	.014	.028	1.75391	.78889	.18974	3.31808

Comparison of Willingness and AHA Scores

Group Statistics

	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	N	Mean	Std. Deviation	Std. Error Mean
AHA score	Yes	244	3.1270	.86320	.05526
	No	65	3.0000	.86603	.10742

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
AHA score	Equal variances assumed	.103	.744	1.054	307	.146	.293	.12705	.12057	.11020	.36429
	Equal variances not assumed			1.052	100.505	.148	.295	1.75391	.12705	.11260	.36699

Comparison of Willingness and Healthy Habits for BP Control Scores

Group Statistics

	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	N	Mean	Std. Deviation	Std. Error Mean
Healthy Habits Total Score	Yes	244	**193.1926**	**69.59607**	4.45543
	No	64	**179.9063**	**84.47273**	10.55909

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Healthy Habits Total Score	Equal variances assumed	2.363	.125	**1.298**	**306**	.098	**.195**	13.28637	10.23912	**-6.86162**	**33.43437**
	Equal variances not assumed			1.159	86.718	.125	.250	13.28637	11.46060	-9.49385	36.06659

Appendix C: Primary Objective Univariate Testing for Categorical Variables

Comparison of Willingness and Sex at Birth

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Sex at Birth * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**309**	100.0%	0	0.0%	309	100.0%

Sex at birth * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? Crosstabulation					
			If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?		Total
			Yes	No	
Sex at birth	Male	Count	**102**	**25**	127
		Expected Count	100.3	26.7	127.0
		% within Gender at birth	80.3%	19.7%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**41.8%**	**38.5%**	41.1%
		% of Total	33.0%	8.1%	41.1%
	Female	Count	**142**	**40**	182
		Expected Count	143.7	38.3	182.0
		% within Gender at birth	78.0%	22.0%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**58.2%**	**61.5%**	58.9%
		% of Total	46.0%	12.9%	58.9%
Total		Count	244	65	309
		Expected Count	244.0	65.0	309.0
		% within Gender at birth	79.0%	21.0%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	100.0%	100.0%	100.0%
		% of Total	79.0%	21.0%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	**.237**[a]	**1**	.627	**.672**	.367	
Continuity Correction[b]	.119	1	.730			
Likelihood Ratio	.238	1	.626	.672	.367	
Fisher's Exact Test				.672	.367	
Linear-by-Linear Association	.236[c]	1	.627	.672	.367	.101
N of Valid Cases	309					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 26.72.

b. Computed only for a 2x2 table

c. The standardized statistic is .486.

Comparison of Willingness and Education

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Education * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**302**	97.7%	7	2.3%	309	100.0%

Education * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? Crosstabulation					
			If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?		Total
			Yes	No	
Education	< HS Diploma	Count	48	15	63
		Expected Count	49.4	13.6	63.0
		% within Education	76.2%	23.8%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	20.3%	23.1%	20.9%
		% of Total	15.9%	5.0%	20.9%
	HS Diploma	Count	74	24	98
		Expected Count	76.9	21.1	98.0
		% within Education	75.5%	24.5%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	31.2%	36.9%	32.5%
		% of Total	24.5%	7.9%	32.5%
	Some College	Count	74	15	89
		Expected Count	69.8	19.2	89.0
		% within Education	83.1%	16.9%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	31.2%	23.1%	29.5%
		% of Total	24.5%	5.0%	29.5%
	Associates Degree/ Technical	Count	25	4	29
		Expected Count	22.8	6.2	29.0
		% within Education	86.2%	13.8%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been	10.5%	6.2%	9.6%

		proven to lower blood pressure (BP), do you think you would try it to lower your own BP?			
		% of Total	8.3%	1.3%	9.6%
	Bachelors Degree	Count	5	7	12
		Expected Count	9.4	2.6	12.0
		% within Education	41.7%	58.3%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**2.1%**	**10.8%**	4.0%
		% of Total	1.7%	2.3%	4.0%
	Masters Degree	Count	9	0	9
		Expected Count	7.1	1.9	9.0
		% within Education	100.0%	0.0%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	3.8%	0.0%	3.0%
		% of Total	3.0%	0.0%	3.0%
	Post Graduate	Count	2	0	2
		Expected Count	1.6	.4	2.0
		% within Education	100.0%	0.0%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**0.8%**	**0.0%**	0.7%
		% of Total	0.7%	0.0%	0.7%
Total		Count	237	65	302
		Expected Count	237.0	65.0	302.0
		% within Education	78.5%	21.5%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	100.0%	100.0%	100.0%
		% of Total	78.5%	21.5%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	15.524[a]	6	.017	.017		
Likelihood Ratio	16.000	6	.014	.017		
Fisher-Freeman-Halton Exact Test	**13.092**	**6**		**.030**		
Linear-by-Linear Association	.558[b]	1	.455	.472	.247	.034
N of Valid Cases	302					

a. 4 cells (28.6%) have expected count less than 5. The minimum expected count is .43.

b. The standardized statistic is -.747.

Comparison of Willingness and Employment

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Employment Status * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	304	98.4%	5	1.6%	309	100.0%

Employment Status * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? Crosstabulation					
			If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?		
			Yes	No	Total
Employment Status	Employed	Count	130	43	173
		Expected Count	136.0	37.0	173.0
		% within Employment Status	75.1%	24.9%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	54.4%	66.2%	56.9%
		% of Total	42.8%	14.1%	56.9%
	Retired	Count	21	2	23
		Expected Count	18.1	4.9	23.0
		% within Employment Status	91.3%	8.7%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	8.8%	3.1%	7.6%
		% of Total	6.9%	0.7%	7.6%
	Unemployed	Count	59	13	72

		Expected Count	56.6	15.4	72.0
		% within Employment Status	81.9%	18.1%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**24.7%**	**20.0%**	23.7%
		% of Total	19.4%	4.3%	23.7%
	Disability	Count	**25**	**7**	32
		Expected Count	25.2	6.8	32.0
		% within Employment Status	78.1%	21.9%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**10.5%**	**10.8%**	10.5%
		% of Total	8.2%	2.3%	10.5%
	Home Manager	Count	**2**	**0**	2
		Expected Count	1.6	.4	2.0
		% within Employment Status	100.0%	0.0%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**0.8%**	**0.0%**	0.7%
		% of Total	0.7%	0.0%	0.7%
	Full-time Student	Count	**2**	**0**	2
		Expected Count	1.6	.4	2.0
		% within Employment Status	100.0%	0.0%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**0.8%**	**0.0%**	0.7%
		% of Total	0.7%	0.0%	0.7%
Total		Count	239	65	304
		Expected Count	239.0	65.0	304.0
		% within Employment	78.6%	21.4%	100.0%

	Status			
	% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	100.0%	100.0%	100.0%
	% of Total	78.6%	21.4%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	5.010[a]	5	.415	.369		
Likelihood Ratio	6.304	5	.278	.290		
Fisher-Freeman-Halton Exact Test	**4.176**	**5**		**.480**		
Linear-by-Linear Association	1.729[b]	1	.189	.193	.104	.020
N of Valid Cases	304					

a. 5 cells (41.7%) have expected count less than 5. The minimum expected count is .43.

b. The standardized statistic is -1.315.

Comparison of Willingness and Presence of a Primary Care Provider

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Does patient have a primary care physician or clinic? * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	307	99.4%	2	0.6%	309	100.0%

Does patient have a primary care physician or clinic? * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? Crosstabulation					
			If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?		
			Yes	No	Total
Does patient have a primary care physician or clinic?	Yes	Count	174	44	218
		Expected Count	171.8	46.2	218.0
		% within Does patient have a primary care physician or clinic?	79.8%	20.2%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	71.9%	67.7%	71.0%
		% of Total	56.7%	14.3%	71.0%
	No	Count	68	21	89
		Expected Count	70.2	18.8	89.0
		% within Does patient have a primary care physician or clinic?	76.4%	23.6%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your	28.1%	32.3%	29.0%

		own BP?			
		% of Total	22.1%	6.8%	29.0%
Total		Count	242	65	307
		Expected Count	242.0	65.0	307.0
		% within Does patient have a primary care physician or clinic?	78.8%	21.2%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	100.0%	100.0%	100.0%
		% of Total	78.8%	21.2%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	**.441**[a]	**1**	.507	**.539**	.302	
Continuity Correction[b]	.260	1	.610			
Likelihood Ratio	.434	1	.510	.539	.302	
Fisher's Exact Test				.539	.302	
Linear-by-Linear Association	.439[c]	1	.507	.539	.302	.096
N of Valid Cases	307					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.84.

b. Computed only for a 2x2 table

c. The standardized statistic is .663.

Comparison of Willingness and Previous Medical History of Hypertension

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Hypertension * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**307**	99.4%	2	0.6%	309	100.0%

Hypertension * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? Crosstabulation

			If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?		Total
			Yes	No	
Hypertension	Yes	Count	**201**	**42**	243
		Expected Count	191.6	51.4	243.0
		% within Hypertension	82.7%	17.3%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**83.1%**	**64.6%**	79.2%
		% of Total	65.5%	13.7%	79.2%
	No	Count	**41**	**23**	64
		Expected Count	50.4	13.6	64.0
		% within Hypertension	64.1%	35.9%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**16.9%**	**35.4%**	20.8%
		% of Total	13.4%	7.5%	20.8%
Total		Count	242	65	307
		Expected Count	242.0	65.0	307.0
		% within Hypertension	78.8%	21.2%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-	100.0%	100.0%	100.0%

	pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?			
	% of Total	78.8%	21.2%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	**10.561**[a]	**1**	.001	**.002**	.002	
Continuity Correction[b]	9.473	1	.002			
Likelihood Ratio	9.642	1	.002	.003	.002	
Fisher's Exact Test				.002	.002	
Linear-by-Linear Association	10.527[c]	1	.001	.002	.002	.001
N of Valid Cases	307					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.55.

b. Computed only for a 2x2 table

c. The standardized statistic is 3.245.

Comparison of Willingness and Antihypertensive Medication Status

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Is patient taking any anti-hypertensive medications? * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	309	100.0%	0	0.0%	309	100.0%

Is patient taking any anti-hypertensive medications? * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? Crosstabulation

			If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?		
			Yes	No	Total
Is patient taking any anti-hypertensive medications?	No	Count	**145**	**50**	195
		Expected Count	154.0	41.0	195.0
		% within Is patient taking any anti-hypertensive medications?	74.4%	25.6%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	59.4%	76.9%	63.1%
		% of Total	46.9%	16.2%	63.1%
	Yes	Count	**99**	**15**	114
		Expected Count	90.0	24.0	114.0
		% within Is patient taking any anti-hypertensive medications?	86.8%	13.2%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you	**40.6%**	**23.1%**	36.9%

		would try it to lower your own BP?			
		% of Total	32.0%	4.9%	36.9%
Total		Count	244	65	309
		Expected Count	244.0	65.0	309.0
		% within Is patient taking any anti-hypertensive medications?	79.0%	21.0%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	100.0%	100.0%	100.0%
		% of Total	79.0%	21.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	**6.749**[a]	**1**	.009	**.013**	.006	
Continuity Correction[b]	6.018	1	.014			
Likelihood Ratio	7.124	1	.008	.009	.006	
Fisher's Exact Test				.009	.006	
Linear-by-Linear Association	6.727[c]	1	.009	.013	.006	.004
N of Valid Cases	309					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 23.98.

b. Computed only for a 2x2 table

c. The standardized statistic is -2.594.

Comparison of Willingness and Blood Pressure Control Status

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
BP True HTN Controlled * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	309	100.0%	0	0.0%	309	100.0%

BP True HTN Controlled * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? Crosstabulation

			If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?		
			Yes	No	Total
BP True HTN Controlled	Controlled (BP True)	Count	61	24	85
		Expected Count	67.1	17.9	85.0
		% within BP True HTN Controlled	71.8%	28.2%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	25.0%	36.9%	27.5%
		% of Total	19.7%	7.8%	27.5%
	Uncontrolled (BP True)	Count	183	41	224
		Expected Count	176.9	47.1	224.0
		% within BP True HTN Controlled	81.7%	18.3%	100.0%
		% within If your health care provider	75.0%	63.1%	72.5%

		prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?			
		% of Total	59.2%	13.3%	72.5%
Total		Count	244	65	309
		Expected Count	244.0	65.0	309.0
		% within BP True HTN Controlled	79.0%	21.0%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	100.0%	100.0%	100.0%
		% of Total	79.0%	21.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	**3.659[a]**	**1**	.056	**.062**	.041	
Continuity Correction[b]	3.086	1	.079			
Likelihood Ratio	3.506	1	.061	.085	.041	
Fisher's Exact Test				.062	.041	
Linear-by-Linear Association	3.647[c]	1	.056	.062	.041	.021
N of Valid Cases	309					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 17.88.

b. Computed only for a 2x2 table

c. The standardized statistic is -1.910.

Comparison of Willingness and Number of CVD Risk Factors

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
CVD Risk Factors (diabetes, dyslipidemia, smoking history) * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**309**	100.0%	0	0.0%	309	100.0%

CVD Risk Factors (diabetes, dyslipidemia, smoking history) * If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? Crosstabulation					
			If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?		
			Yes	No	Total
CVD Risk Factors (diabetes. dyslipidemia, smoking history)	No risk factors	Count	**96**	**30**	126
		% within CVD Risk Factors (diabetes. dyslipidemia, smoking history)	76.2%	23.8%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**39.3%**	**46.2%**	40.8%
		% of Total	31.1%	9.7%	40.8%
	1 risk factor	Count	**116**	**30**	146
		% within CVD Risk Factors (diabetes. dyslipidemia, smoking history)	79.5%	20.5%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	47.5%	46.2%	47.2%
		% of Total	**37.5%**	**9.7%**	47.2%
	2 risk factors	Count	**29**	**5**	34
		% within CVD Risk Factors (diabetes. dyslipidemia, smoking history)	85.3%	14.7%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	**11.9%**	**7.7%**	11.0%
		% of Total	9.4%	1.6%	11.0%
	3 risk factors	Count	**3**	**0**	3
		% within CVD Risk	100.0%	0.0%	100.0%

		Factors (diabetes. dyslipidemia, smoking history)			
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	1.2%	0.0%	1.0%
		% of Total	1.0%	0.0%	1.0%
Total		Count	244	65	309
		% within CVD Risk Factors (diabetes. dyslipidemia, smoking history)	79.0%	21.0%	100.0%
		% within If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	100.0%	100.0%	100.0%
		% of Total	79.0%	21.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.224[a]	3	.527	.507		
Likelihood Ratio	2.897	3	.408	.448		
Fisher-Freeman-Halton Exact Test	1.589			.636		
Linear-by-Linear Association	1.935[b]	1	.164	.191	.097	.031
N of Valid Cases	309					

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .63.

b. The standardized statistic is -1.391.

Appendix D: Primary Objective Binary Logistic Regression Results

Case Processing Summary			
Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	299	96.8
	Missing Cases	10	3.2
	Total	309	100.0
Unselected Cases		0	.0
Total		309	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding	
Original Value	Internal Value
No	0
Yes	1

Categorical Variables Codings			
			Parameter coding
		Frequency	(1)
Is patient taking any anti-hypertensive medications?	Yes	109	1.000
	No	190	.000
BP True HTN Controlled	Controlled (BP True)	83	1.000
	Uncontrolled (BP True)	216	.000
Hypertension	Yes	237	1.000
	No	62	.000

Block 0: Beginning Block

Classification Table[a,b]

	Observed		Predicted: If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?		
			No	Yes	Percentage Correct
Step 0	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	No	0	64	.0
		Yes	0	235	100.0
	Overall Percentage				78.6

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	1.301	.141	85.101	1	<.001	3.672

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Participant Age	9.115	1	.003
		RaLES-B score	4.292	1	.038
		Education	.956	1	.328
		Healthy Habits Total Score	1.778	1	.182
		Hypertension(1)	9.216	1	.002
		BP True SBP Measurement	2.405	1	.121
		BP True HTN Controlled(1)	3.853	1	.050
		Is patient taking any anti-hypertensive medications?(1)	5.956	1	.015
	Overall Statistics		23.868	8	.002

Block 1: Method = Forward Stepwise (Likelihood Ratio)

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	8.448	1	.004
	Block	8.448	1	.004
	Model	8.448	1	.004

Step 2	Step	6.451	1	.011
	Block	14.899	2	<.001
	Model	14.899	2	<.001
Step 3	Step	4.169	1	.041
	Block	19.069	3	<.001
	Model	19.069	3	<.001

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	302.075[a]	.028	.043
2	295.624[a]	.049	.075
3	291.454[b]	.062	.096

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

b. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.000	0	.
2	7.315	8	.503
3	5.942	8	.654

Contingency Table for Hosmer and Lemeshow Test

		If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? = No		If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	22	22.000	40	40.000	62
	2	42	42.000	195	195.000	237
Step 2	1	14	13.295	17	17.705	31
	2	6	9.135	24	20.865	30
	3	8	7.834	23	23.166	31
	4	8	6.619	22	23.381	30
	5	7	5.556	21	22.444	28
	6	7	4.873	20	22.127	27
	7	2	5.650	32	28.350	34
	8	4	4.477	26	25.523	30
	9	5	3.422	22	23.578	27
	10	3	3.140	28	27.860	31
Step 3	1	14	13.765	16	16.235	30
	2	9	9.480	21	20.520	30
	3	6	7.643	24	22.357	30
	4	9	6.761	21	23.239	30
	5	7	6.106	23	23.894	30
	6	6	5.584	25	25.416	31
	7	4	4.767	26	25.233	30

	8	2	4.070	28	25.930	30
	9	6	3.482	24	26.518	30
	10	1	2.342	27	25.658	28

Classification Table[a]

	Observed		Predicted: If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP? No	Yes	Percentage Correct
Step 1	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	No	0	64	.0
		Yes	0	235	100.0
	Overall Percentage				78.6
Step 2	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	No	2	62	3.1
		Yes	1	234	99.6
	Overall Percentage				78.9
Step 3	If your health care provider prescribed a new, non-invasive, non-pharmacological treatment that has been proven to lower blood pressure (BP), do you think you would try it to lower your own BP?	No	3	61	4.7
		Yes	2	233	99.1
	Overall Percentage				**78.9**

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Hypertension(1)	.937	.315	8.843	1	.003	2.554
	Constant	.598	.265	5.073	1	.024	1.818
Step 2[b]	Participant Age	.030	.012	6.167	1	.013	1.030
	Hypertension(1)	.778	.325	5.741	1	.017	2.178
	Constant	-.585	.539	1.177	1	.278	.557
Step 3[c]	Participant Age	**.029**	.012	5.806	1	**.016**	**1.030**
	RaLES-B score	**.051**	.026	4.002	1	**.045**	**1.053**

	Hypertension(1)	**.782**	.329	5.782	1	**.016**	**2.207**
	Constant	-1.188	.622	3.650	1	.056	.305

a. Variable(s) entered on step 1: Hypertension.

b. Variable(s) entered on step 2: Participant Age.

c. Variable(s) entered on step 3: RaLES-B score.

Model if Term Removed

Variable		Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1	Hypertension	-155.262	8.448	1	.004
Step 2	Participant Age	-151.037	6.451	1	.011
	Hypertension	-150.572	5.521	1	.019
Step 3	Participant Age	-148.761	6.067	1	.014
	RaLES-B score	-147.812	4.169	1	.041
	Hypertension	-148.511	5.568	1	.018

Variables not in the Equation

			Score	df	Sig.
Step 1	Variables	Participant Age	6.298	1	.012
		RaLES-B score	4.425	1	.035
		Education	.947	1	.330
		Healthy Habits Total Score	1.557	1	.212
		BP True SBP Measurement	1.349	1	.245
		BP True HTN Controlled(1)	2.572	1	.109
		Is patient taking any anti-hypertensive medications?(1)	2.296	1	.130
	Overall Statistics		14.900	7	.037
Step 2	Variables	RaLES-B score	4.062	1	.044
		Education	.502	1	.478
		Healthy Habits Total Score	.728	1	.393
		BP True SBP Measurement	.686	1	.408
		BP True HTN Controlled(1)	1.828	1	.176
		Is patient taking any anti-hypertensive medications?(1)	1.781	1	.182
	Overall Statistics		8.723	6	.190
Step 3	Variables	Education	.443	1	.506
		Healthy Habits Total Score	.556	1	.456
		BP True SBP Measurement	.464	1	.496
		BP True HTN Controlled(1)	1.600	1	.206
		Is patient taking any anti-hypertensive medications?(1)	2.464	1	.116
	Overall Statistics		4.691	5	.455

Appendix E: Secondary Objective Univariate Testing for Continuous Variables

Comparison of Willingness and Age

	Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	N	Mean	Std. Deviation	Std. Error Mean
Participant Age	Yes	128	45.0156	12.55099	1.10936
	No	181	45.3757	13.13994	.97668

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Participant Age	Equal variances assumed	.848	.358	-.242	307	.405	.809	-.36007	1.48974	-3.29146	2.57132
	Equal variances not assumed			-.244	281.045	.404	.808	-.36007	1.47804	-3.26949	2.54936

Comparison of Willingness and BMI

Group Statistics

	Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	N	Mean	Std. Deviation	Std. Error Mean
BMI	Yes	123	**33.3238**	**9.01745**	.81308
	No	177	**33.3194**	**10.24291**	.76990

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
BMI	Equal variances assumed	.476	.491	**.004**	**298**	.498	**.997**	.00442	1.14568	**-2.25023**	**2.25907**
	Equal variances not assumed			.004	281.811	.498	.997	.00442	1.11975	-2.19972	2.20856

Comparison of Willingness and SBP Values

Group Statistics

	Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	N	Mean	Std. Deviation	Std. Error Mean
BP True SBP Measurement	Yes	128	**151.1250**	**24.73036**	2.18588
	No	181	**149.1768**	**25.92943**	1.92732

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
BP True SBP Measurement	Equal variances assumed	.001	.972	**.663**	**307**	.254	**.508**	1.94820	2.93803	**-3.83302**	**7.72943**
	Equal variances not assumed			.669	281.278	.252	.504	1.94820	2.91421	-3.78822	7.68463

Comparison of Willingness and RaLES-B Score

Group Statistics

	Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	N	Mean	Std. Deviation	Std. Error Mean
RaLES-B score	Yes	128	12.7500	6.07823	.53724
	No	181	12.4420	5.72938	.42586

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
RaLES-B score	Equal variances assumed	.511	.475	**.454**	**307**	.325	**.650**	.30801	.67863	**-1.02734**	**1.64336**
	Equal variances not assumed			.449	263.373	.327	.654	.30801	.68556	-1.04186	1.65788

Comparison of Willingness and AHA Score

Group Statistics					
	Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	N	Mean	Std. Deviation	Std. Error Mean
AHA score	Yes	128	**3.1250**	**.86943**	.07685
	No	181	**3.0829**	**.86203**	.06407

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
AHA score	Equal variances assumed	.380	.538	**.422**	**307**	.337	**.674**	.04213	.09991	**-.15446**	**.23872**
	Equal variances not assumed			.421	272.155	.337	.674	.04213	.10006	-.15485	.23911

Comparison of Willingness and Healthy Habits for BP Control Scores

Group Statistics						
	Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	N	Mean	Std. Deviation	Std. Error Mean
Healthy Habits Total Score	Yes	128	**185.7656**	**68.62548**	6.06569
	No	180	**193.7500**	**75.95293**	5.66120

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Healthy Habits Total Score	Equal variances assumed	.938	.334	**-.946**	**306**	.172	**.345**	-7.9843	8.44041	**-24.59297**	**8.62422**
	Equal variances not assumed			-.962	289.023	.168	.337	-7.9843	8.29709	-24.31477	8.34602

Appendix F: Secondary Objective Univariate Testing for Categorical Variables

Comparison of Willingness and Sex at Birth

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Sex at birth * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	309	100.0%	0	0.0%	309	100.0%

Sex at birth * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)? Crosstabulation

			Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?		
			Yes	No	Total
Sex at birth	Male	Count	60	67	127
		Expected Count	52.6	74.4	127.0
		% within Gender at birth	47.2%	52.8%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	46.9%	37.0%	41.1%
		% of Total	19.4%	21.7%	41.1%
	Female	Count	68	114	182
		Expected Count	75.4	106.6	182.0
		% within Gender at birth	37.4%	62.6%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	53.1%	63.0%	58.9%
		% of Total	22.0%	36.9%	58.9%
Total		Count	128	181	309
		Expected Count	128.0	181.0	309.0
		% within Gender at birth	41.4%	58.6%	100.0%
		% within Would you be willing to cover any additional costs	100.0%	100.0%	100.0%

	to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?			
	% of Total	41.4%	58.6%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.010[a]	1	.086	.083	.053	
Continuity Correction[b]	2.617	1	.106			
Likelihood Ratio	3.004	1	.083	.100	.053	
Fisher's Exact Test				.100	.053	
Linear-by-Linear Association	3.000[c]	1	.083	.100	.053	.021
N of Valid Cases	309					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 52.61.

b. Computed only for a 2x2 table

c. The standardized statistic is 1.732.

Comparison of Willingness and Education

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Education * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	302	97.7%	7	2.3%	309	100.0%

Education * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)? Crosstabulation

			Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?		
			Yes	No	Total
Education	< HS Diploma	Count	23	40	63
		Expected Count	25.7	37.3	63.0
		% within Education	36.5%	63.5%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	18.7%	22.3%	20.9%
		% of Total	7.6%	13.2%	20.9%
	HS Diploma	Count	31	67	98
		Expected Count	39.9	58.1	98.0
		% within Education	31.6%	68.4%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	25.2%	37.4%	32.5%
		% of Total	10.3%	22.2%	32.5%
	Some College	Count	48	41	89
		Expected Count	36.2	52.8	89.0
		% within Education	53.9%	46.1%	100.0%
		% within Would you be willing to cover any	39.0%	22.9%	29.5%

		additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?			
		% of Total	15.9%	13.6%	29.5%
	Associates Degree/ Technical	Count	**11**	**18**	29
		Expected Count	11.8	17.2	29.0
		% within Education	37.9%	62.1%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**8.9%**	**10.1%**	9.6%
		% of Total	3.6%	6.0%	9.6%
	Bachelors Degree	Count	**5**	**7**	12
		Expected Count	4.9	7.1	12.0
		% within Education	41.7%	58.3%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**4.1%**	**3.2%**	4.0%
		% of Total	1.7%	2.3%	4.0%
	Masters Degree	Count	**4**	**5**	9
		Expected Count	3.7	5.3	9.0
		% within Education	44.4%	55.6%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**3.3%**	**2.4%**	3.0%
		% of Total	1.3%	1.7%	3.0%
	Post Graduate	Count	**2**	**0**	2
		Expected Count	.8	1.2	2.0
		% within Education	50.0%	50.0%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**0.8%**	**0%**	0.7%

		% of Total	0.3%	0.3%	0.7%
Total		Count	123	179	302
		Expected Count	123.0	179.0	302.0
		% within Education	40.7%	59.3%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	100.0%	100.0%	100.0%
		% of Total	40.7%	59.3%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	10.472[a]	6	.106	.097		
Likelihood Ratio	10.443	6	.107	.131		
Fisher-Freeman-Halton Exact Test	**10.739**	**6**		**.081**		
Linear-by-Linear Association	2.043[b]	1	.153	.164	.084	.013
N of Valid Cases	302					

a. 4 cells (28.6%) have expected count less than 5. The minimum expected count is .81.

b. The standardized statistic is -1.429.

Comparison of Willingness and Employment Status

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Employment Status * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**304**	98.4%	5	1.6%	309	100.0%

Employment Status * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)? Crosstabulation					
			Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?		Total
			Yes	No	
Employment Status	Employed	Count	**68**	**105**	173
		Expected Count	71.1	101.9	173.0
		% within Employment Status	39.3%	60.7%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**54.4%**	**58.7%**	56.9%
		% of Total	22.4%	34.5%	56.9%
	Retired	Count	**11**	**12**	23
		Expected Count	9.5	13.5	23.0
		% within Employment Status	47.8%	52.2%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**8.8%**	**6.7%**	7.6%
		% of Total	3.6%	3.9%	7.6%
	Unemployed	Count	**29**	**43**	72
		Expected Count	29.6	42.4	72.0

		% within Employment Status	40.3%	59.7%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**23.2%**	**24.0%**	23.7%
		% of Total	9.5%	14.1%	23.7%
	Disability	Count	**15**	**17**	32
		Expected Count	13.2	18.8	32.0
		% within Employment Status	46.9%	53.1%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**12.0%**	**9.5%**	10.5%
		% of Total	4.9%	5.6%	10.5%
	Home Manager	Count	**1**	**1**	2
		Expected Count	.8	1.2	2.0
		% within Employment Status	50.0%	50.0%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**0.8%**	**0.6%**	0.7%
		% of Total	0.3%	0.3%	0.7%
	Full-time Student	Count	**1**	**1**	2
		Expected Count	.8	1.2	2.0
		% within Employment Status	50.0%	50.0%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	**0.8%**	**0.6%**	0.7%
		% of Total	0.3%	0.3%	0.7%
Total		Count	125	179	304
		Expected Count	125.0	179.0	304.0
		% within Employment Status	41.1%	58.9%	100.0%

	% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	100.0%	100.0%	100.0%
	% of Total	41.1%	58.9%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.251[a]	5	.940	.950		
Likelihood Ratio	1.240	5	.941	.950		
Fisher-Freeman-Halton Exact Test	**1.870**	**5**		**.921**		
Linear-by-Linear Association	.543[b]	1	.461	.490	.246	.030
N of Valid Cases	304					

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is .82.

b. The standardized statistic is -.737.

Comparison of Willingness and the Presence of a Primary Care Provider

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Does patient have a primary care physician or clinic? * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	307	99.4%	2	0.6%	309	100.0%

Does patient have a primary care physician or clinic? * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)? Crosstabulation

			Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?		
			Yes	No	Total
Does patient have a primary care physician or clinic?	Yes	Count	89	129	218
		Expected Count	89.5	128.5	218.0
		% within Does patient have a primary care physician or clinic?	40.8%	59.2%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	70.6%	71.3%	71.0%
		% of Total	29.0%	42.0%	71.0%
	No	Count	37	52	89
		Expected Count	36.5	52.5	89.0
		% within Does patient have a primary care physician or clinic?	41.6%	58.4%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	29.4%	28.7%	29.0%

		% of Total	12.1%	16.9%	29.0%
Total		Count	126	181	307
		Expected Count	126.0	181.0	307.0
		% within Does patient have a primary care physician or clinic?	41.0%	59.0%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	100.0%	100.0%	100.0%
		% of Total	41.0%	59.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	**.015**[a]	**1**	1.000	**.904**	.502	
Continuity Correction[b]	.000	1	1.000			
Likelihood Ratio	.015	1	.904	1.000	.502	
Fisher's Exact Test				.899	.502	
Linear-by-Linear Association	.015[c]	1	.904	1.000	.502	.101
N of Valid Cases	307					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 36.53.

b. Computed only for a 2x2 table

c. The standardized statistic is -.121.

Comparison of Willingness and Previous Medical History of HTN

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Hypertension * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	307	99.4%	2	0.6%	309	100.0%

Hypertension * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)? Crosstabulation					
			Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?		
			Yes	No	Total
Hypertension	Yes	Count	97	146	243
		Expected Count	100.5	142.5	243.0
		% within Hypertension	39.9%	60.1%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	76.4%	81.1%	79.2%
		% of Total	31.6%	47.6%	79.2%
	No	Count	30	34	64
		Expected Count	26.5	37.5	64.0
		% within Hypertension	46.9%	53.1%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	23.6%	18.9%	20.8%
		% of Total	9.8%	11.1%	20.8%
Total		Count	127	180	307
		Expected Count	127.0	180.0	307.0
		% within Hypertension	41.4%	58.6%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	100.0%	100.0%	100.0%

	% of Total	41.4%	58.6%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	**1.011**[a]	**1**	.322	**.315**	.194	
Continuity Correction[b]	.744	1	.388			
Likelihood Ratio	1.003	1	.317	.322	.194	
Fisher's Exact Test				.322	.194	
Linear-by-Linear Association	1.008[c]	1	.315	.322	.194	.068
N of Valid Cases	307					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 26.48.

b. Computed only for a 2x2 table

c. The standardized statistic is -1.004.

Comparison of Willingness and Antihypertensive Medication Status

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Is patient taking any anti-hypertensive medications? * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	309	100.0%	0	0.0%	309	100.0%

Is patient taking any anti-hypertensive medications? * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)? Crosstabulation

			Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?		
			Yes	No	Total
Is patient taking any anti-hypertensive medications?	Yes	Count	46	68	114
		Expected Count	47.2	66.8	114.0
		% within Is patient taking any anti-hypertensive medications?	40.4%	59.6%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	35.9%	37.6%	36.9%
		% of Total	14.9%	22.0%	36.9%
	No	Count	82	113	195
		Expected Count	80.8	114.2	195.0
		% within Is patient taking any anti-hypertensive medications?	42.1%	57.9%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	64.1%	62.4%	63.1%

		% of Total	26.5%	36.6%	63.1%
Total		Count	128	181	309
		Expected Count	128.0	181.0	309.0
		% within Is patient taking any anti-hypertensive medications?	41.4%	58.6%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	100.0%	100.0%	100.0%
		% of Total	41.4%	58.6%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	**.086**[a]	**1**	.880	**.770**	.432	
Continuity Correction[b]	.030	1	.863			
Likelihood Ratio	.086	1	.770	.811	.432	
Fisher's Exact Test				.811	.432	
Linear-by-Linear Association	.085[c]	1	.770	.811	.432	.091
N of Valid Cases	309					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 47.22.

b. Computed only for a 2x2 table

c. The standardized statistic is -.292.

Comparison of Willingness and Blood Pressure Control Status

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
BP True HTN Controlled * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	309	100.0%	0	0.0%	309	100.0%

BP True HTN Controlled * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)? Crosstabulation					
			Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?		
			Yes	No	Total
BP True HTN Controlled	Controlled (BP True)	Count	35	50	85
		Expected Count	35.2	49.8	85.0
		% within BP True HTN Controlled	41.2%	58.8%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	27.3%	27.6%	27.5%
		% of Total	11.3%	16.2%	27.5%
	Uncontrolled (BP True)	Count	93	131	224
		Expected Count	92.8	131.2	224.0
		% within BP True HTN Controlled	41.5%	58.5%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	72.7%	72.4%	72.5%

		% of Total	30.1%	42.4%	72.5%
Total		Count	128	181	309
		Expected Count	128.0	181.0	309.0
		% within BP True HTN Controlled	41.4%	58.6%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	100.0%	100.0%	100.0%
		% of Total	41.4%	58.6%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	**.003**[a]	**1**	1.000	**.957**	.531	
Continuity Correction[b]	.000	1	1.000			
Likelihood Ratio	.003	1	.957	1.000	.531	
Fisher's Exact Test				1.000	.531	
Linear-by-Linear Association	.003[c]	1	.957	1.000	.531	.103
N of Valid Cases	309					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 35.21.

b. Computed only for a 2x2 table

c. The standardized statistic is -.054.

Comparison of Willingness and Number of CVD Risk Factors

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
CVD Risk Factors (diabetes. dyslipidemia, smoking history) * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	309	100.0%	0	0.0%	309	100.0%

CVD Risk Factors (diabetes, dyslipidemia, smoking history) * Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)? Crosstabulation

			Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?		
			Yes	No	Total
CVD Risk Factors (diabetes, dyslipidemia, smoking history)	no risk factors	Count	59	67	126
		Expected Count	52.2	73.8	126.0
		% within CVD Risk Factors (diabetes. dyslipidemia, smoking history)	46.8%	53.2%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	46.1%	37.0%	40.8%
		% of Total	19.1%	21.7%	40.8%
	1 risk factor	Count	59	87	146
		Expected Count	60.5	85.5	146.0
		% within CVD Risk Factors (diabetes. dyslipidemia, smoking history)	40.4%	59.6%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric	46.1%	48.1%	47.2%

		handgrip, cost ~ 350 USD; gym membership)?			
		% of Total	19.1%	28.2%	47.2%
	2 risk factors	Count	9	25	34
		Expected Count	14.1	19.9	34.0
		% within CVD Risk Factors (diabetes. dyslipidemia, smoking history)	26.5%	73.5%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	7.0%	13.8%	11.0%
		% of Total	2.9%	8.1%	11.0%
	3 risk factors	Count	1	2	3
		Expected Count	1.2	1.8	3.0
		% within CVD Risk Factors (diabetes. dyslipidemia, smoking history)	33.3%	66.7%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	0.8%	1.1%	1.0%
		% of Total	0.3%	0.6%	1.0%
Total		Count	128	181	309
		Expected Count	128.0	181.0	309.0
		% within CVD Risk Factors (diabetes. dyslipidemia, smoking history)	41.4%	58.6%	100.0%
		% within Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	100.0%	100.0%	100.0%
		% of Total	41.4%	58.6%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	4.791[a]	3	.188	.191		
Likelihood Ratio	4.951	3	.175	.233		
Fisher-Freeman-Halton Exact Test	**4.876**	**3**		**.365**		
Linear-by-Linear Association	4.249[b]	1	.039	.045	.023	.008
N of Valid Cases	309					

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.24.

b. The standardized statistic is 2.061.

Appendix G: Secondary Objective Binary Logistic Regression Results

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	302	97.7
	Missing Cases	7	2.3
	Total	309	100.0
Unselected Cases		0	.0
Total		309	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
No	0
Yes	1

Block 0: Beginning Block

Classification Table[a,b]

	Observed		Predicted: Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)? No	Yes	Percentage Correct
Step 0	Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	No	179	0	100.0
		Yes	123	0	.0
	Overall Percentage				59.3

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.375	.117	10.263	1	.001	.687

Variables not in the Equation					
			Score	df	Sig.
Step 0	Variables	Education	2.050	1	.152
		Gender at birth	2.842	1	.092
	Overall Statistics		5.696	2	.058

Block 1: Method = Enter

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	5.712	2	.057
	Block	5.712	2	.057
	Model	**5.712**	**2**	**.057**

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	402.504[a]	.019	**.025**

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a]					
	Observed		Predicted		
			Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?		Percentage Correct
			No	Yes	
Step 1	Would you be willing to cover any additional costs to fund an alternative, non-pharmacological method of lowering your BP (e.g., an isometric handgrip, cost ~ 350 USD; gym membership)?	No	171	8	95.5
		Yes	112	11	8.9
	Overall Percentage				**60.3**

a. The cut value is .500

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Education	.160	.095	2.848	1	**.091**	**1.174**
	Gender at birth	-.463	.242	3.654	1	**.056**	**.629**
	Constant	-.056	.433	.017	1	**.896**	**.945**

a. Variable(s) entered on step 1: Education, Gender at birth.

Vita Auctoris

NAME:	Kiara De Simone
PLACE OF BIRTH:	Windsor, ON
YEAR OF BIRTH:	1997
EDUCATION:	St. Annes High School, Windsor, ON, 2015
	University of Windsor, B.Sc., Windsor, ON, 2020