

Defining Hypertension by Blood Pressure 130/80 mm Hg Leads to an Impressive Burden of Hypertension in Young and Middle-Aged Black Adults: Follow-Up in the CARDIA Study

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Hypertension is a major contributor to a greater cardiovascular and renal disease burden among blacks than whites.¹ The racial disparities are greatest in younger adults and decline with advancing age.² The article in this issue of *the Journal of the American Heart Association (JAHA)* by Thomas et al,³ “Cumulative Incidence of Hypertension by 55 Years of Age in Blacks and Whites: the CARDIA Study,” highlights large racial disparities in incident hypertension between young black and white adults and has important implications for reducing disparities in prevalent hypertension and cardiovascular and renal complications in younger black adults.

This commentary will address 4 points related to the current report by Thomas et al³:

- 1 High absolute risk of hypertension, defined by systolic blood pressure (BP) ≥ 130 mm Hg and/or diastolic BP ≥ 80 mm Hg or treatment for hypertension.
- 2 Relative and absolute risk of stage 1 hypertension (130–139/85–89 mm Hg) for clinical cardiovascular disease (CVD) in blacks.
- 3 Benefits of lifestyle intervention for prevention of hypertension and CVD.
- 4 Rationale for pharmacotherapy of stage 1 hypertension in blacks.

High Absolute Risk of Hypertension in Blacks With Normal and High Normal BP

In US adults, the prevalence of hypertension using the 2017 American College of Cardiology/American Heart Association

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Hypertension Guideline definition of systolic BP ≥ 130 mm Hg and/or diastolic BP ≥ 80 mm Hg is $\approx 46\%$ versus 32% at $\geq 140/\geq 90$ mm Hg.⁴ Among young adults in the CARDIA (Coronary Artery Risk Development in Young Adults) Study who had baseline BP $< 130/< 80$ mm Hg at ages 18 to 30 years, by age 55 years, $\approx 75\%$ of black men and women were hypertensive in contrast to 54% of white men and 40% of white women (Figure).³ For the subset of black men and women who had baseline BP in the high normal range of 120 to 129/75 to 79 mm Hg at age 18 to 30 years, $\approx 60\%$ were hypertensive by age 35 years and $\approx 87\%$ were hypertensive by age 55 years. Moreover, black men and women with baseline BP in the 110 to 119/70 to 74 mm Hg range developed hypertension over time at a rate similar to white men and women with baseline BP 120 to 129/75 to 79 mm Hg (ie, a difference of $\approx 10/5$ mm Hg, with $\approx 60\%$ of both racial groups hypertensive by age 47 years).

From another perspective, the age at which 30% of each of the 4 race-sex groups was hypertensive occurred at 35 and 39 years among black men and women versus 44 and 53 years for white men and women, respectively (Figure). In fully adjusted models accounting for age, sex, body mass index, systolic BP, diastolic BP, cigarette smoking, parental history of hypertension, highest level of education, physical fitness, serum uric acid, alcohol consumption, and Dietary Approaches to Stop Hypertension eating plan concordance, blacks were ≈ 1.5 to 2.5 times more likely to develop hypertension than their white counterparts.³ Treating hypertension does not completely abolish excess hypertension-related risk.⁵ Thus, eliminating racial disparities in incident hypertension, which ultimately will lead to eliminating disparities in prevalent hypertension, is an important component of any credible plan to attain cardiovascular health equity in black and white Americans.

Relative and Absolute Risk of Stage 1 Hypertension for Clinical CVD in Blacks

In the ARIC (Atherosclerosis Risk in Communities) Study, high normal BP was defined as 130 to 139/85 to 89 mm Hg.

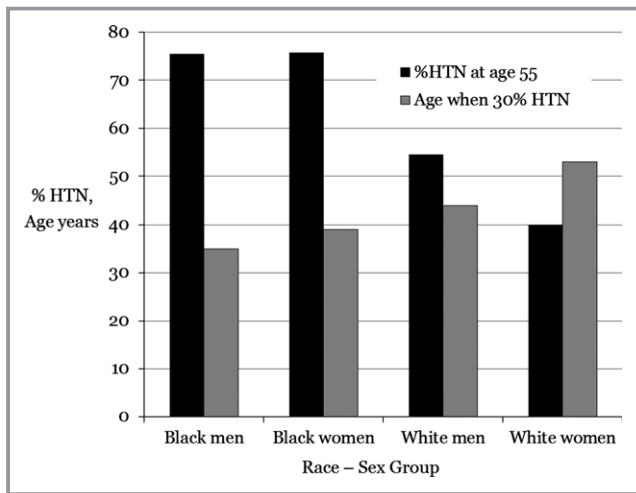


Figure. The incidence of hypertension (HTN) at age 55 years is depicted for 4 race-sex groups who were nonhypertensive at age 18 to 30 years (black bars). The age is depicted at which 30% of each of the 4 race-sex groups developed HTN (gray bars).

Compared with subjects with normal BP (<120/<80 mm Hg), individuals with high normal BP had a hazards ratio for CVD of 2.33 (95% confidence interval, 1.85–2.92), adjusted for study center, age, sex, race, body mass index, smoking, low- and high-density lipoprotein cholesterol, education level, physical activity, cholesterol-lowering medications, diabetes mellitus, fibrinogen, von Willebrand factor, and white blood cell count.⁶ Among blacks, the multivariable adjusted HR was even higher at 3.29 (95% confidence interval, 1.68–6.45), with an absolute CVD event rate of \approx 1% annually. This is the threshold atherosclerotic CVD event rate for antihypertensive pharmacotherapy in the American College of Cardiology/American Heart Association 2017 Hypertension Guideline among adults with stage 1 hypertension and no major clinical CVD events (ie, primary prevention).

A report from the REGARDS (Reasons for Geographic and Racial Differences in Stroke) Study confirmed a greater risk for stroke among blacks than whites for each 10-mm Hg increase of systolic BP after adjusting for confounders. The greater risk of stroke among blacks than whites with prehypertension and hypertension was more evident at ages <65 years than \geq 65 years.⁷

Comment on Masked Hypertension

Another study by the investigative team raises the possibility that masked hypertension, which occurs more often in blacks than whites, contributes to the greater risk for incident hypertension as well as cardiovascular events in blacks.⁸ In other words, virtually all studies showing greater risk for incident hypertension and cardiovascular events in blacks than whites, while adjusted for numerous confounders, have

typically not included out-of-office or nighttime BPs. Out-of-office daytime and nighttime BP values, which are higher in blacks than whites, are related to incident hypertension and cardiovascular outcomes.

Benefits of Lifestyle Intervention for Preventing Hypertension and CVD

The authors documented that higher levels of physical activity in blacks are associated with a lower incidence of hypertension.⁹ They also reported a powerful effect of concordance with the American Heart Association's Life's Simple 7 (LS7; nutrition, physical activity, cigarette smoking, body mass index, BP, cholesterol, and glucose) and incident hypertension in blacks.¹⁰ Blacks concordant on 6 of 7 LS7 variables had a 90% lower incidence of hypertension than their counterparts with 0 to 1 LS7 variables. The Dietary Approaches to Stop Hypertension eating plan lowers BP more effectively in blacks than whites, which is partially explained by differences in angiotensinogen polymorphisms.¹¹ Numerous other studies have also linked healthy LS7 to a lower incidence of diabetes mellitus, CVD, chronic kidney disease, dementia, and cancer.¹² Given the extraordinarily high risk of hypertension by age 55 years in blacks as well as a substantial risk in whites, greater attention to effective and low-cost community-wide (highly scalable) interventions is urgently needed.

Rationale for Pharmacotherapy of Stage 1 Hypertension in Blacks Without Major Clinical CVD Events

Blacks have a much higher incidence of hypertension by age 55 years than whites, defined by systolic BP \geq 130 mm Hg. Blacks also appear to have a greater incidence of clinical CVD in the BP range of 130 to 139/85 to 89 mm Hg than whites. The 2017 American College of Cardiology/American Heart Association Hypertension Guideline recommendation to begin antihypertensive pharmacotherapy for stage 1 hypertension when 10-year atherosclerotic CVD risk is \geq 10% for primary prevention has a substantial evidence base and potentially may be more beneficial in blacks than whites.¹³

This author has expressed concern about the class I recommendation for antihypertensive pharmacotherapy as primary prevention in adults with stage 1 hypertension (BP, 130–139/80–89 mm Hg) given the paucity of data on the benefit of antihypertensive medications for primary prevention in this group.¹⁴ Yet, in 2010, we stated that concerned clinicians may elect to begin antihypertensive pharmacotherapy for primary prevention when systolic BP is 130 to 139 mm Hg and absolute 10-year CVD risk is \geq 10%.¹⁵ The concern is with the level of evidence and not the recommendation.

Clinical Implications

Blacks have a markedly higher incidence than whites of stage 1 hypertension by age 55 years. Moreover, the age at which 30% of previously nonhypertensive young adults become hypertensive is substantially lower in blacks than whites. In fact, 30% of black men developed stage 1 hypertension by age 35 years, a time of life in which primary health care is infrequently obtained. In contrast, 30% of white women developed hypertension by age 53 years, a time when the overwhelming majority of this group receives regular primary health care. Although stroke incidence has declined \approx 80% in the past 60 years, the 4-fold greater risk of stroke in black men than white women persists. Reducing the persistent relative disparity will almost certainly require effective attention to the wide disparity in age of onset and the prevalence of hypertension between black men and white women, especially at ages <55 years.

The authors have other reports indicating that physical activity and greater concordance with LS7, and especially physical activity, good nutrition, and maintenance of normal body weight, are highly effective in reducing incident hypertension in blacks. Cost-effective and highly scalable approaches to healthy lifestyles patterns are urgently needed, especially in younger blacks. Because many blacks \leq 55 years of age have 10-year CVD risk \geq 10% or higher, effective pharmacotherapy should attenuate progression to more severe hypertension and potentially reduce cardiovascular events. Novel approaches to hypertension prevention, detection, treatment, and control¹⁶ may be required to improve health equity, given large racial differences in the age of onset, prevalence, and severity of hypertension.

Disclosures

None.

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