

PERSPECTIVE:
 CARDIOVASCULAR DISEASE
 AMONG YOUNG AFRICAN
 AMERICAN MALES

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INTRODUCTION

The high mortality rate of young African American males has been a subject of inquiry among scholars for at least three decades. This line of investigation has largely focused on outcomes associated with behaviors (ie, violence, sex, drug use) that violate or at least challenge societal norms, but are often maladaptive responses to society’s endemic institutionalized forms of racism. This research is important; however, the focus on explicitly behavior-oriented health outcomes (eg, homicide, suicide) has overshadowed the emerging chronic disease crisis among this population. Cardiovascular disease (CVD) is one of the leading causes of premature death among middle-aged African American males, who as youth have a higher prevalence of CVD risk factors leading to accelerated rate of disease progression, and a higher rate of age-related complications than other groups of males. CVD can have long latency periods with some processes beginning in youth. Data on CVD risk among

young African American males are limited; however, there is some evidence highlighting the elevated CVD risks among this group.¹

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Hypertension, a known risk factor for CVD, is a salient condition for young African American males as

it has been found that college-aged African American males are twice as likely to have hypertension than their White peers.² Obesity has also been a growing problem among young African American males. A recent study using data from the National Health and Nutrition Examination Survey presents findings indicating that African American adolescent males comprise the largest segment of extremely obese (BMI \geq 120% of the 95th percentile or BMI \geq 35) 12- to 19-year old males.³ It has been estimated that 75% of the incidence in hypertension can be directly attributed to obesity,⁴ and current evidence suggests that the poor health prospects of African American males are likely to worsen in the coming years.¹

NEED FOR METABOLIC RISK FACTOR RESEARCH

The number of studies examining metabolic risk factors among children and adolescents have increased considerably in recent years; however, African American boys, adolescents, and young adults have been vastly underrepresented in the scientific literature on research investigating obesity, type 2 diabetes, and hypertension. Until recently, the Bogalusa study⁵ was one of the few sources of data about cardiovascular risks among African American boys and adolescents. But, these data were collected prior to the obesity epidemic when the prevalence

of excess weight among African American boys was relatively low. A recent pilot study examining cardio-metabolic risks among the children and grandchildren of Jackson Heart Study participants found that half of male participants (49.6%) were overweight or obese.⁶ There were no sex differences in the prevalence of overweight and obesity in the JHS-KIDS pilot study; however, male participants had a mean systolic blood pressure that was 5 mm Hg higher than the corresponding mean for their female peers.⁶ The results from this pilot study underscore the importance of understanding factors associated with the early onset and accelerated progression of CVD-related conditions among young African American males.

FACTORS RELATED TO CVD RISK DISPARITIES

Race and gender disparities in the development of CVD are linked to biologic, behavioral, social, and environmental factors often shared across generations. The disproportionate levels of CVD risk among African American males may be linked to the three-hit hypothesis,⁷ which asserts that chronic conditions like hypertension, stroke, and chronic kidney disease result from the combination of genetic predisposition (hit 1) and early- and later-life environmental insults (hit 2 and 3, respectively). Cumulative stress is identified as a central factor

in the three-hit hypothesis because it has implications for psychological and physiological functioning.⁷ African American males experience disproportionately high levels of social and psychological stress from multiple sources during child-

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hood and adolescence (eg, family, peers, school, law enforcement).⁸ The increased understanding of epigenetics⁹ and its underlying mechanisms presents an opportunity for health disparities researchers to consider how cumulative stress during a sensitive developmental period like adolescence can prompt significant shifts in different mechanistic pathways such as hypothalamic-pi-

tuitary-adrenal (HPA) axis reactivity, which induces hormonal and inflammatory responses that elevate risks for CVD-related conditions extending into young adulthood.¹⁰

PRECISION MEDICINE SHOWS PROMISE

Epigenetics, which considers the impact of the psychological and physical environment on biology, holds considerable promise for advancing precision medicine approaches to improve the health profile and prospects of higher risk populations such as African American males. But, the realization of this potential requires a commitment to expand the current evidence base regarding African American and other under-represented youth. The Framingham Heart Study, Bogalusa Heart Study, Jackson Heart Study and other large cardiovascular cohort studies have generated ancillary studies of offspring to examine genetic and/or biologic risk; however, no studies, to our knowledge, have examined how factors like cumulative stress influence epigenetic mechanisms among young African American males to increase their vulnerability for CVD and related conditions. There is a need for prospective longitudinal studies to gather data allowing the specification of models outlining how CVD risks among African American males and other vulnerable populations are a func-

tion of local environment, genetic predisposition, historically rooted societal structures, behavioral practices, and geo-evolutionary differences in gene polymorphisms, and how the interaction of these factors lead to epigenetic modulation.

The primary catalyst, cumulative stress, has multiple dimensions and sources, therefore having implications for chronic disease development through multiple pathways. The complexity of biopsychosocial models explaining heightened CVD vulnerability among young African American males extends beyond traditional disciplinary boundaries and requires the collaboration of researchers from multiple disciplines. Expertise is needed from the biological, health, and social sciences to derive empirical models that can be assessed with sophisticated statistical techniques (ie, structural equation, latent class models) specifying how cumulative stress may have implications for CVD-related conditions through multiple pathways simultaneously. Studying the persistent disproportionate risks for CVD-related conditions among vulnerable populations like young African American males presents a considerable challenge for the scientific community; however, the return on this investment can be substantial due to advancements in our understanding of disease etiology and ultimately, clinical treatment for all Americans.

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REFERENCES

1. Bruce MA, Beech BM, Griffith DM, Thorpe RJ Jr. Weight status and blood pressure among adolescent African American males: The Jackson Heart KIDS Pilot Study. *Ethn Dis*. 2015;25(3):305-312. <https://doi.org/10.18865/ed.25.3.305>. PMID:26672894.
2. Courtenay WH. Constructions of masculinity and their influence on men's well-being: a theory of gender and health. *Soc Sci Med*. 2000;50(10):1385-1401. [https://doi.org/10.1016/S0277-9536\(99\)00390-1](https://doi.org/10.1016/S0277-9536(99)00390-1). PMID:10741575.
3. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA*. 2014;311(8):806-814. <https://doi.org/10.1001/jama.2014.732>. PMID:24570244.
4. Landsberg L, Aronne LJ, Beilin LJ, et al. Obesity-related hypertension: pathogenesis, cardiovascular risk, and treatment—a position paper of the The Obesity Society and The American Society of Hypertension. *Obesity (Silver Spring)*. 2013;21(1):8-24. <https://doi.org/10.1002/oby.20181>. PMID:23401272.
5. Freedman DS, Mei Z, Srinivasan SR, Berenson GS, Dietz WH. Cardiovascular risk factors and excess adiposity among overweight children and adolescents: the Bogalusa Heart Study. *J Pediatr*. 2007;150(1):12-17 e12. <https://doi.org/10.1016/j.jpeds.2006.08.042>.
6. Bruce MA, Beech BM, Norris KC, Griffith DM, Sims M, Thorpe RJ Jr. Sex, obesity, and blood pressure among African American adolescents: The Jackson Heart KIDS Pilot Study. *Am J Hypertens*. 2017; hpx071 (ePub ahead of print). <https://doi.org/10.1093/ajh/hpx071>. PMID:28633388.
7. Daskalakis NP, Bagot RC, Parker KJ, Vinkers CH, de Kloet ER. The three-hit concept of vulnerability and resilience: toward understanding adaptation to early-life adversity outcome. *Psychoneuroendocrinology*. 2013;38(9):1858-1873. <https://doi.org/10.1016/j.psyneuen.2013.06.008>. PMID:23838101.
8. Umberson D, Thomeer MB, Williams K, Thomas PA, Liu H. Childhood Adver-

Perspective: CVD and Young Black Males - Bruce et al

- sity and Men's Relationships in Adulthood: Life Course Processes and Racial Disadvantage. *J Gerontol B Psychol Sci Soc Sci.* 2016;71(5):902-913. <https://doi.org/10.1093/geronb/gbv091>. PMID:26589348.
9. Heard E, Martienssen RA. Transgenerational epigenetic inheritance: myths and mechanisms. *Cell.* 2014;157(1):95-109. <https://doi.org/10.1016/j.cell.2014.02.045>. PMID:24679529.
 10. Niwa M, Lee RS, Tanaka T, Okada K, Kano S, Sawa A. A critical period of vulnerability to adolescent stress: epigenetic mediators in mesocortical dopaminergic neurons. *Hum Mol Genet.* 2016;25(7):1370-1381. <https://doi.org/10.1093/hmg/ddw019>. PMID:26908623.