Objectives: Arterial stiffness is an important measure of pathologic changes in the arterial system and is associated with cardiovascular disease morbidity and mortality. Early identification of an increase in arterial stiffness in young persons may improve cardiovascular health outcomes. The objectives were to evaluate the sex and ethnic differences in arterial stiffness levels among young adults.

Methods: Demographic information, body size, blood pressure, and serum lipid measures were obtained cross-sectionally among tri-ethnic college students in an urban setting (N=491). Arterial pulse pressure (APP) was mathematically derived as a surrogate measure of arterial stiffness. Multiple regression models were fitted to determine the adjusted APP levels.

Results: The average (plus or minus standard error) age of participants were 21.2 (+/-2) years. No differences were seen in age or body mass index (BMI) between White non-Hispanic (n=160), Hispanic (n=165), and Black non-Hispanic (n=166). Males were slightly older (21.7 ± 3 years) and heavier (24.6 ± .3 kg/m²) than females (20.7 ± 2 years and 22.4 ± 2 kg/m²). Adjusted APP was higher in males (41.8 ± .6 mm Hg) compared to their female counterparts (38.9 ± .6) (P<.01). However, ethnic variations in adjusted APP were not significant.

Conclusions: Variations in arterial stiffness levels by sex exist among young adults. Further exploration of important cardiovascular risk among young individuals is recommended.

Key Words: Arterial Stiffness, Black, Ethnicity, Hispanic, Sex, White, Young Adults

INTRODUCTION

Although cardiovascular disease (CVD) is the leading cause of death in US adults,1 screening for CVD is not common among healthy young adults. While CVD does not usually manifest until adulthood, its risk factors, such as elevated blood pressure, increased body weight, and serum cholesterol, may exist early in life.2–3 Pathologic changes in the arterial system, such as stiffening of the arteries, may also exist early in life and can contribute to CVD morbidity and mortality.4 Identification of arterial stiffness in young adults may predict CVD in later life.2,4 Recognizing changes in the arterial system in young individuals has public health and clinical implications for several cardiovascular outcomes of adults.

Elevated arterial stiffness is a condition associated with pathologic changes in the arterial system and is related to the structural and functional components of the artery. The structural and functional components depend on the intrinsic properties of muscle, elastin, and collagen in the artery.4–7 Arterial stiffness is related to the artery’s ability to expand and recoil with cardiac pulsation and relaxation. The capacity of the arterial system to receive blood pumped from the heart is related to its ability to distend for a given pressure as well as its size. When such capacity of the arterial system is reduced, compliance of the artery is decreased, resulting in stiffness of the artery.8

Since arterial stiffness increases with age,9–10 studies are commonly seen in older adults but are scant among young adults in the United States. To identify arterial stiffness in asymptomatic and healthy young adults, its measurement should be relatively easy, noninvasive, and cost-effective. Several ways exist of measuring arterial stiffness in population studies. These methods are either in vivo or surrogate measures.4,11–12 In vivo measures are either indirectly measured with the pulse wave velocity or directly visualized on ultrasound. A surrogate measure of arterial stiffness is defined by arterial pulse pressure (APP), which is the difference between systolic blood pressure (SBP) and diastolic blood pressure (DBP).13–15 Each measurement method (pulse wave velocity, ultrasound,APP) has its own limitations. While increased APP level suggests elevated arterial stiffness, APP is influenced by other factors, such as the presence of wave reflection and rapidity of the ventricular ejection.13 Currently, no gold standard method exists to measure arterial stiffness. While pulse wave velocity is increasingly recognized as the classical index, APP is considered the most cost-effective index of arterial stiffness.16

Increased arterial stiffness is commonly observed in older adults, since it has been considered intrinsic to the aging process of the arteries.11,17–18 Therefore, one correlate of increased arterial stiffness is age.1,8,19–23 Other correlates of increased arterial stiffness are obesity4,12 and lipid abnormalities19,24 In addition, hypertension,2,12,25–26 diabetes,19,25,27 and atherosclerosis,27–28 coronary heart dis-