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The Relationship Between Body Mass Index and Aortic Stiffness in Females Across the Lifespan

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Obesity, classified by a body mass index (BMI) greater than 30 kg/m^2 , continues to be a problem for women in the United States across all ages. Prevalence of obesity is a traditional risk factor for the development of cardiovascular disease (CVD). One novel non-traditional risk factor for assessing CVD risk is aortic stiffness. Previous literature has identified that obese individuals have increased aortic stiffness compared to those of normal body size. **PURPOSE:** Determine the relationship between body mass index and aortic stiffness in females across the lifespan. **METHODS:** Children ($n=121$, age 9-12, $\text{BMI } 20.65 \pm 4.93 \text{ kg/m}^2$), adults ($n=122$, age 18-39, $\text{BMI } 25.64 \pm 4.88 \text{ kg/m}^2$), middle age adults ($n=138$, age 40-59, $\text{BMI } 26.70 \pm 4.21 \text{ kg/m}^2$), and elderly women ($n=79$, age 60-83, $\text{BMI } 26.39 \pm 4.40 \text{ kg/m}^2$) participated in the study for a total of 460 females. BMI was calculated by measuring barefoot standing height to the nearest 0.1 centimeter and measuring weight to the nearest 0.1 kilogram while wearing light clothing. Aortic stiffness was measured as carotid-femoral pulse wave velocity (PWV) using applanation tonometry (SphygmoCor; Sydney, Australia). **RESULTS:** BMI was a significant predictor of PWV for the children ($\beta=0.365$, 95% CI 0.028 – 0.077), adults ($\beta=0.524$, 95% CI 0.103 – 0.189) and middle age adults ($\beta=0.506$, 95% CI 0.117 – 0.212). BMI was not a significant predictor of PWV in the elderly women ($\beta=0.109$, 95% CI -0.063 – 0.180). **CONCLUSION:** Our data suggests that BMI is a significant predictor of aortic stiffness in women between the ages of 9-59. Interestingly there was no relationship between BMI and aortic stiffness in the elderly women (60+). In older women changes in body comp (i.e. increases in body fat and decrease in muscle mass) may change the relationship between BMI and aortic stiffness.