

## Physical Activity Mediates the Relationship between Sleep and Vascular Health in Older Adults

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Stiffening of the arterial wall with advancing age increases risk for cardiovascular disease. Optimal sleep quality is correlated with lower arterial stiffness. Sleep quality decreases with age which may negatively impact vascular health. It is unclear if there is a direct relationship between arterial stiffness and sleep quality in older adults, and if the relation is mediated by other lifestyle factors such as physical activity (PA). **PURPOSE:** To evaluate PA as a mediating factor in the relationship between sleep quality and arterial stiffness in older adults. **METHODS:** Seventy-five older adults (mean age  $68 \pm 6$  years, body mass  $74.2 \pm 15$  kg, 40 female) participated in the study. Body fat was assessed using air displacement plethysmography. Central artery stiffness was assessed as carotid-femoral pulse wave velocity (PWV) using applanation tonometry, and brachial systolic and diastolic blood pressure were assessed using an automated oscillometric brachial cuff. Self-reported sleep quality was assessed using the Pittsburgh Sleep Quality Index. PA was measured using an accelerometer worn around the waist and expressed as total activity counts. The accelerometer was worn for at least 3 days (mean wear  $4.92 \pm 1.5$  days). **RESULTS:** When separating participants into low and high sleep quality index using cluster analysis, those with higher sleep quality index (indicating poor sleep quality) had higher PWV ( $11.0 \pm 2.7$  vs  $9.4 \pm 2.4$  m/s,  $p < 0.05$ ) and lower total activity counts ( $184,129 \pm 95,322$  vs  $275,726 \pm 164,323$  counts/day,  $p < 0.05$ ) compared to participants with lower sleep quality index. After co-varying for sex, body fat, and mean arterial pressure, higher sleep quality index was associated with lower total activity counts ( $\beta = -0.22$ ,  $p < 0.05$ ) and higher PWV ( $\beta = 0.29$ ,  $p < 0.05$ ). The significant association between sleep quality index and PWV was attenuated when the indirect effect of total activity counts on PWV ( $\beta = -0.27$ ,  $p < 0.05$ ) was statistically removed using mediation analysis ( $\beta = 0.23$ ,  $p > 0.05$ ). **CONCLUSION:** PA may have a mediating effect on the relationship between sleep quality and arterial stiffness in older adults. Whether higher PA contributes to better sleep quality or *vice versa* requires further study.

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