

**Effects of Sleep Deprivation on Endothelial Function in Adult Humans: A Systematic Review**

*Geroscience*

**Brady J. Holmer<sup>a</sup>, Stephanie S. Lapierre<sup>a</sup>, Danielle E. Jake-Schoffman<sup>b</sup>, PhD, Demetra D. Christou, PhD<sup>a</sup>**

**<sup>a</sup>Department of Applied Physiology and Kinesiology, College of Health and Human Performance, University of Florida, 1864 Stadium Road, Gainesville, FL, 32611-8205, USA**

**<sup>b</sup>Department of Health Education and Behavior, College of Health and Human Performance, University of Florida, 1864 Stadium Road, Gainesville, FL, 32611-8205, USA**

**Corresponding author:**

Demetra Christou, PhD, FAHA

University of Florida

1864 Stadium Road

Gainesville, FL, 32611-8205, USA

email: [ddchristou@ufl.edu](mailto:ddchristou@ufl.edu)

**Supplementary Table 1** Studies excluded from the systematic review at full-text screening

<b>Citation</b>	<b>Title</b>	<b>Reason for exclusion</b>
<b>Akdemir et al. 2013 [97]</b>	Impact of acute sleep deprivation on aortic elastic properties in healthy workers	Did not assess endothelial function
<b>Anujou et al. 2015 [98]</b>	Relationship between short sleep duration and cardiovascular risk factors in a multi-ethnic cohort – the HELIUS study	Did not assess endothelial function
<b>Anujou et al. 2016 [99]</b>	Relationship between sleep duration and arterial stiffness in a multi-ethnic population: The HELIUS study	Did not assess endothelial function
<b>Cao et al. 2016 [100]</b>	Association between sleep condition and arterial stiffness in Chinese adult with nonalcoholic fatty liver disease	Did not assess endothelial function
<b>Chen et al. 2017 [101]</b>	Association between short sleep duration and carotid atherosclerosis modified by age in a Chinese community population	Did not assess endothelial function
<b>Cooper et al. 2014 [102]</b>	Endothelial function and sleep: associations of flow-mediated dilation with perceived sleep quality and REM sleep	Did not measure sleep duration
<b>Culver et al. 2020 [103]</b>	Self-reported sleep quality is associated with central hemodynamics in healthy individuals	Did not measure sleep duration
<b>Dominguez et al. 2019 [104]</b>	Association of sleep duration and quality with subclinical atherosclerosis	Did not assess endothelial function
<b>Hijmans et al. 2019 [105]</b>	Insufficient sleep is associated with a pro-atherogenic circulating microRNA signature	Did not assess endothelial function
<b>Kim et al. 2015 [106]</b>	Sleep duration, sleep quality, and markers of subclinical arterial disease in healthy men and women	Did not measure sleep duration or endothelial function
<b>Logan et al. 2018 [107]</b>	Actigraphy based sleep characteristics and aortic stiffness: The Multi-Ethnic Study of Atherosclerosis (MESA)	Did not assess endothelial function

**Supplementary Table 1 (Continued)**

<b>Citation</b>	<b>Title</b>	<b>Reason for exclusion</b>
<b>Martinez-Gomez et al. 2011 [108]</b>	Sleep duration and emerging cardiometabolic risk markers in adolescents. The AFINOS Study	Study conducted in adolescents
<b>Morita et al. 2017 [109]</b>	Inverse relationship between sleep duration and cardio-ankle vascular index in children	Study conducted in children
<b>Nagai et al. 2013 [110]</b>	Sleep duration and insomnia in the elderly: associations with blood pressure variability and carotid artery remodeling	Did not assess endothelial function
<b>Sands et al. 2012 [111]</b>	Short sleep duration is associated with carotid intima-media thickness among men in the coronary artery risk development in young adults (CARDIA) study	Did not assess endothelial function
<b>Slomko et al. 2018 [85]</b>	Hemodynamic, autonomic, and vascular function changes after sleep deprivation for 24, 28, and 32 hours in healthy men	Did not assess endothelial function
<b>Tsai et al. 2014 [112]</b>	Long sleep duration associated with a higher risk of increased arterial stiffness in males	Did not assess endothelial function
<b>Weil et al. 2011 [113]</b>	Habitual short sleep duration and circulating endothelial progenitor cells	Did not assess endothelial function
<b>Yoshioka et al. 2011 [114]</b>	Relation between self-reported sleep duration and arterial stiffness: a cross-sectional study of middle-aged Japanese civil servants	Did not assess endothelial function
<b>Zonoozi et al. 2017 [115]</b>	Self-reported sleep duration and napping, cardiac risk factors, and markers of subclinical vascular disease: cross-sectional study in older men	Did not assess endothelial function