

# Sleep apnea tied to increased risk of stroke

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Obstructive sleep apnea is associated with an increased risk of stroke in middle-aged and older adults, especially men, according to new results from a landmark study supported by the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health. Overall, sleep apnea more than doubles the risk of stroke in men. Obstructive sleep apnea is a common disorder in which the upper airway is intermittently narrowed or blocked, disrupting sleep and breathing during sleep.

Researchers from the Sleep Heart Health Study (SHHS) report that the risk of [stroke](#) appears in men with mild sleep apnea and rises with the severity of sleep apnea. Men with moderate to severe sleep apnea were nearly three times more likely to have a stroke than men without sleep apnea or with mild sleep apnea. The risk from sleep apnea is independent of other risk factors such as weight, [high blood pressure](#), race, smoking, and diabetes.

They also report for the first time a link between sleep apnea and increased risk of stroke in women. Obstructive Sleep Apnea Hypopnea and Incident Stroke: The Sleep Heart Health Study, was published online March 25 ahead of print in the [American Journal of Respiratory and Critical Care Medicine](#).

Stroke is the second leading cause of death worldwide. "Although scientists have uncovered several risk factors for stroke - such as age, high blood pressure and [atrial fibrillation](#), and diabetes - there are still many cases in which the cause or contributing factors are unknown,"

noted NHLBI Acting Director Susan B. Shurin, M.D. "This is the largest study to date to link sleep apnea with an increased risk of stroke. The time is right for researchers to study whether treating sleep apnea could prevent or delay stroke in some individuals."

Conducted in nine medical centers across the United States, the SHHS is the largest and most comprehensive prospective, multi-center study on the risk of cardiovascular disease and other conditions related to sleep apnea. In the latest report, researchers studied stroke risk in 5,422 participants aged 40 years and older without a history of stroke. At the start of the study, participants performed a standard at-home sleep test, which determined whether they had sleep apnea and, if so, the severity of the sleep apnea.

Researchers followed the participants for an average of about nine years. They report that during the study, 193 participants had a stroke - 85 men (of 2,462 men enrolled) and 108 women (out of 2,960 enrolled).

After adjusting for several cardiovascular risk factors, the researchers found that the effect of sleep apnea on stroke risk was stronger in men than in women. In men, a progressive increase in stroke risk was observed as sleep apnea severity increased from mild levels to moderate to severe levels. In women, however, the increased risk of stroke was significant only with severe levels of sleep apnea.

The researchers suggest that the differences between men and women might be because men are more likely to develop sleep apnea at younger ages. Therefore, they tend to have untreated sleep apnea for longer periods of time than women. "It's possible that the stroke risk is related to cumulative effects of sleep apnea adversely influencing health over many years," said Susan Redline, M.D., MPH, professor of medicine, pediatrics, and epidemiology and biostatistics, at Case Western Reserve University in Cleveland and lead author of the paper.

"Our findings provide compelling evidence that obstructive sleep apnea is a risk factor for stroke, especially in men," noted Redline. "Overall, the increased risk of stroke in men with sleep apnea is comparable to adding 10 years to a man's age. Importantly, we found that increased stroke risk in men occurs even with relatively mild levels of sleep apnea."

"Research on the effects of sleep apnea not only increases our understanding of how lapses of breathing during sleep affects our health and well being, but it can also provide important insight into how cardiovascular problems such as stroke and high blood pressure develop," noted Michael J. Twery, Ph.D., director of the NIH National Center on Sleep Disorders Research, an office administered by the NHLBI.

The new results support earlier findings that have linked sleep apnea to stroke risk. SHHS researchers have also reported that untreated sleep apnea is associated with an increased risk of high blood pressure, heart attack, irregular heartbeats, heart failure, and death from any cause. Other studies have also linked untreated sleep apnea with overweight and obesity and diabetes. It is also linked to excessive daytime sleepiness, which lowers performance in the workplace and at school, and increases the risk of injuries and death from drowsy driving and other accidents.

More than 12 million American adults are believed to have sleep apnea, and most are not diagnosed or treated. Treatments to restore regular breathing during sleep include mouthpieces, surgery, and breathing devices, such as continuous positive airway pressure, or CPAP. In people who are overweight or obese, weight loss can also help.

These treatments can help improve breathing and reduce the severity of symptoms such as loud snoring and excessive daytime sleepiness, thereby improving sleep-related quality of life and performance at work

or in school. Randomized clinical trials to test whether treating sleep apnea lowers the risk of stroke, other cardiovascular diseases, or death are needed.

"We now have abundant evidence that sleep apnea is associated with cardiovascular risk factors and diseases. The next logical step is to determine if treating sleep apnea can lower a person's risk of these leading killers," said Redline. "With stimulus funds, our research group is now developing the additional research and resources to begin answering this important question."

Through funding from the American Recovery and Reinvestment Act, the NHLBI is awarding approximately \$4.4 million to Redline to conduct the first NIH-funded comparative effectiveness study of treatments for sleep apnea. In the two-year multi-center pilot study, SHHS researchers and others will compare the cardiovascular effects of adding either CPAP or supplemental oxygen during sleep to standard care in patients with moderate to severe [sleep apnea](#) who are at high risk for cardiovascular disease events such as heart attack or stroke.

**More information: Resources:**

- Sleep Apnea, [www.nhlbi.nih.gov/health/dci/D...eepApnea\\_WhatIs.html](http://www.nhlbi.nih.gov/health/dci/D...eepApnea_WhatIs.html)
- Your Guide to Healthy Sleep, [www.nhlbi.nih.gov/health/publi...ep/healthy\\_sleep.htm](http://www.nhlbi.nih.gov/health/publi...ep/healthy_sleep.htm)

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