Poor sleep quality increases risk of high blood pressure

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Reduced slow wave sleep (SWS) is a powerful predictor for developing high blood pressure in older men, according to new research in *Hypertension: Journal of the American Heart Association.*

SWS, one of the deeper stages of sleep, is characterized by non-rapid eye movement (non-REM) from which it's difficult to awaken. It's represented by relatively slow, synchronized brain waves called delta activity on an electroencephalogram. Researchers from the Outcomes of Sleep Disorders in Older Men Study (MrOs Sleep Study) found that people with the lowest level of SWS had an 80 percent increased risk of developing high blood pressure.

"Our study shows for the first time that poor quality sleep, reflected by reduced slow wave sleep, puts individuals at significantly increased risk of developing high blood pressure, and that this effect appears to be independent of the influence of breathing pauses during sleep," said Susan Redline, M.D., the study's co-author and Peter C. Farrell Professor of Sleep Medicine in the Department of Medicine at Brigham and Women's Hospital and Beth Israel Deaconess Medical Center, Harvard Medical School in Boston, Mass.

Men who spent less than 4 percent of their sleep time in SWS were significantly more likely to develop high blood pressure during the 3.4 years of the study. Men with reduced SWS had generally poorer sleep quality as measured by shorter sleep duration and more awakenings at night and had more severe sleep apnea than men with higher levels of

SWS. However, of all measures of sleep quality, decreased SWS was the most strongly associated with the development of high blood pressure. This relationship was observed even after considering other aspects of sleep quality.

Participant's average body mass index was 26.4 kg/m2. But the study effects of SWS were independent of obesity and continued to be seen after considering the effects of obesity.

The researchers conducted comprehensive and objective evaluation of sleep characteristics related to high blood pressure in 784 men who didn't have hypertension. They were studied in their own homes using standardized in-home sleep studies, or polysomnography, with measurement of brain wave activity distinguishing between REM and non-REM sleep, and sleep apnea through measurement of breathing disturbances and level of oxygenation during sleep.

Using a central Sleep Reading Center directed by Redline, the researchers assessed a wide range of measurements of sleep disturbances, such as frequency of breathing disturbances, time in each sleep state, number of nighttime awakenings, and sleep duration.

The participants were an average 75 years old and almost 90 percent were Caucasian. All were healthy and living in one of six communities, geographically representative of the United States: San Diego, Calif.; Palo Alto, Calif.; Pittsburgh, Pa.; Minneapolis, Minn.; Birmingham, Ala.; and Portland, Oregon. The study was coordinated by California Pacific Medical Center.

Generally, older men and women are more likely to develop high blood pressure than younger people. Sleep disorders and poor quality sleep are more common in older adults than in younger ones. Obesity is also associated with hypertension, researchers said.

In the Sleep Heart Health Study, another large cohort study, researchers found that men were more likely to have less SWS than women. Men were also at an increased risk of high blood pressure when compared to women. The current study raises the possibility that poorer sleep in men may partly explain the male gender predisposition to high blood pressure.

"Although women were not included in this study, it's quite likely that those who have lower levels of slow wave sleep for any number of reasons may also have an increased risk of developing high blood pressure," Redline said.

Slow wave sleep has been implicated in learning and memory with recent data also highlighting its importance to a variety of physiological functions, including metabolism and diabetes, and neurohormonal systems affecting the sympathetic nervous system that contribute to high blood pressure, researchers said.

Good quality sleep is the third pillar of health, Redline said. "People should recognize that sleep, diet and physical activity are critical to health, including heart health and optimal blood pressure control. Although the elderly often have poor sleep, our study shows that such a finding is not benign. Poor sleep may be a powerful predictor for adverse health outcomes. Initiatives to improve sleep may provide novel approaches for reducing hypertension burden."

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