

Length of breathing disruption in OSA may be better predictor of mortality risk

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In OSA, the duration of apnea and hypopnea events during sleep is linked to mortality risk. Credit: ATS

How long a person with obstructive sleep apnea (OSA) stops breathing may be a better predictor of mortality risk from OSA than the number of

times they stop breathing, according to new research published online in the American Thoracic Society's *American Journal of Respiratory and Critical Care Medicine*.

In "Apnea-hypopnea Event Duration Predicts Mortality in Men and Women in the Sleep Heart Health Study," lead study author Matthew P. Butler, Ph.D., and colleagues report that participants who had short apneas and hypopneas (stopped breaths and shallow breaths, respectively) were at greater risk of dying over a decade of follow up.

"This result seems counter-intuitive because you might expect longer periods of not breathing to be more severe," said Dr. Butler, assistant professor in the Oregon Institute of Occupational Health Sciences at Oregon Health & Science University. "On the other hand, shorter periods of disturbed breathing indicate a low arousal threshold, which would associate with sleep fragmentation, elevated sympathetic tone and greater risk for hypertension."

Previous studies have shown that the apnea-hypopnea index (AHI), the most widely used measure of sleep apnea severity, is linked to mortality and heart disease. However, according to Dr. Butler, AHI remains a coarse measure of sleep apnea severity and is not a good risk predictor for women.

The current study found that the duration of abnormal breathing events may be a better predictor of mortality risk in both women and men. The duration of these events, the authors wrote, is easily determined from the same polysomnography studies that patients now undergo to measure AHI.

The researchers analyzed the records of 5,712 adults (average age 63) who participated in the National Heart, Lung, and Blood Institute (NHLBI)'s Sleep Heart Health Study made available through the

Institute's National Sleep Research Resource.

This community-based study enrolled an approximately equal number of men and women and followed them for up to 11 years.

The study found:

- Participants with the shortest duration of breathing events were 31 percent more likely to die.
- This association was strongest in participants with moderate sleep apnea as measured by AHI. In this group, participants with the shortest duration of breathing events had a 59 percent increased risk of dying.

"This study shows the power of 'big data' analysis to identify novel predictors of disease outcomes," said senior study author Susan Redline, MD, senior physician, Division of Sleep and Circadian Disorders at Brigham and Women's Hospital in Massachusetts. "The findings indicate that there may be several mechanisms by which [sleep apnea](#) leads to increased mortality and a need to measure several features associated with apnea occurrence. In particular, apneas of different types and event durations may result in adverse health outcomes."

According to the researchers, these findings suggest a phenotype of OSA that may be genetically encoded. They add that other studies have shown that the duration of breathing events is highly heritable and that shorter abnormal breathing events are more common in women and in African Americans.

The study has an important limitation. Because it was not a randomized controlled trial, the study could not determine causality between shorter events and death. Shorter events, the authors explained, may be a marker for underlying problems that result in increased deaths, rather than the

cause itself.

"This study shows that a readily available trait that is usually not analyzed—the [duration](#) of respiratory disturbances—predicts mortality over and beyond that predicted by AHI in both women and men," Dr. Butler said. "Further research is needed to determine how OSA and a low arousal threshold interact as a health risk."

Michael Twery, Ph.D., director of the National Center on Sleep Disorders Research at NHLBI, part of the National Institutes of Health, said, "Discovering new ways to measure the connection between abnormal [breathing](#) during sleep and risks to health is a great example of how NIH-supported research sets the stage for future medical advances."

More information: www.thoracic.org/about/newsroom/2018-10-length-disruption-osa-predictor-mortality.pdf

Matthew P Butler et al, Apnea-Hypopnea Event Duration Predicts Mortality in Men and Women in the Sleep Heart Health Study, *American Journal of Respiratory and Critical Care Medicine* (2018). DOI: 10.1164/rccm.201804-0758OC

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