Study links sleep-disordered breathing to age acceleration

June 7 2019

Increasing severity of sleep-disordered breathing and sleep disruption are associated with epigenetic age acceleration, according to preliminary results of a new study.

Results show that each standard deviation increase in the apnea-hypopnea index, a measure of sleep-disordered breathing severity, was associated with the equivalent of 215 days of biological age acceleration. Similarly, each standard deviation increase in the arousal index, a measure of sleep disruption, was associated with the equivalent of 321 days of age acceleration.

"People's biological age might not be the same as their chronological age," said lead author Xiaoyu Li, Sc.D., a postdoctoral research fellow in the Division of Sleep and Circadian Disorders in the Department of Medicine at Brigham and Women's Hospital and the Department of Social and Behavioral Sciences at the Harvard T.H. Chan School of Public Health in Boston, Massachusetts. "Individuals whose biological age is higher than their chronological age exhibit age acceleration or fast aging. In our study, we found that more severe sleep-disordered breathing is associated with epigenetic age acceleration. Our data provide biological evidence supporting adverse physiological and health effects of untreated sleep-disordered breathing."

Sleep-disordered breathing, such as obstructive sleep apnea, is characterized by abnormalities of respiration during sleep. Episodes often result in reductions in blood oxygen saturation and are usually

terminated by brief arousals from sleep. Nearly 30 million adults in the U.S. have obstructive sleep apnea. Common warning signs include snoring and excessive daytime sleepiness.

According to the authors, epigenetic age acceleration is a DNA methylation-based marker of fast biological aging, and it is associated with modifiable lifestyle factors. Although sleep-disordered breathing is associated with multiple age-related health disorders, its relationship with epigenetic aging has not been well studied.

The study involved 622 adults with a mean age of 69 years; 53.2% were women. Participants were measured for blood DNA methylation, and their sleep was evaluated at home by polysomnography. Age acceleration measures were calculated as residuals from the regression of each epigenetic age on chronological age. The association of each sleep-disordered breathing trait with age acceleration was estimated using linear regression, controlling for socio-demographics, health behaviors, body mass index, and study site.

Another surprising finding was that the associations were stronger in women than in men, suggesting that women may be particularly vulnerable to the adverse effects of sleep-disordered breathing.

"While women are often considered to be at lower risk for health outcomes related to sleep-disordered breathing, our findings suggest increased biological susceptibility," said Li.

The authors suggested that future work should study whether treatment reduces epigenetic age acceleration among people who have sleep-disordered breathing.

"Since sleep-disordered breathing is not only common and treatable, but often undiagnosed and under-treated, our data highlight the potential for

sleep-disordered breathing treatment to improve age-related chronic conditions and longevity," said Li. "Because epigenetic changes are reversible, epigenetic age estimators may be useful for identifying and validating anti-aging interventions."

The research abstract was published recently in an online supplement of the journal *Sleep* and will be presented Wednesday, June 12, in San Antonio at SLEEP 2019, the 33rd annual meeting of the Associated Professional Sleep Societies LLC (APSS), which is a joint venture of the American Academy of Sleep Medicine and the Sleep Research Society.

More information: Xiaoyu Li et al, 0291 Sleep Disordered Breathing Associated with Epigenetic Age Acceleration: Evidence from the Multi-Ethnic Study of Atherosclerosis, *Sleep* (2019). DOI: 10.1093/sleep/zsz067.290

Provided by American Academy of Sleep Medicine