Medical Xpress

Poor sleep quality increases inflammation, study finds

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People who sleep poorly or do not get enough sleep have higher levels of inflammation, a risk factor for heart disease and stroke, researchers have found.

Data from a recent study are scheduled to be presented Sunday, Nov. 14 at the American Heart Association Scientific Sessions in Chicago by Alanna Morris, MD, a cardiology fellow at Emory University School of Medicine.

The results come from surveying 525 middle-aged people participating in the Morehouse-Emory Partnership to Eliminate Cardiovascular Health Disparities (META-Health) study on their sleep quality and sleep duration. The META-Health study's co-directors are Arshed Quyyumi, MD, professor of medicine at Emory University School of Medicine and director of Emory's Cardiovascular Research Center, and Gary Gibbons, MD, director of the Cardiovascular Research Institute at Morehouse School of Medicine. Donald Bliwise, MD, director of the Emory University Sleep Program, contributed additional guidance.

Acute sleep deprivation leads to an increased production of inflammatory hormones and changes in blood vessel function, but more research is needed on the physiological effects of chronic lack of sleep, Morris says.

"Most of the studies looking at the body's response to lack of sleep have looked at subjects who have been acutely sleep deprived for more than

24 hours in experimental sleep laboratories," she says. "Nothing of this sort has been investigated in epidemiologic studies."

In the META-Health study, the researchers assessed sleep quality using the Pittsburgh Sleep Quality Index survey, where a score over six (based on the median sleep score of the study population) is considered poor. They also analyzed their data based on hours of sleep.

Individuals who reported six or fewer hours of sleep had higher levels of three inflammatory markers: fibrinogen, IL-6 and C-reactive protein. In particular, average C-reactive protein levels were about 25 percent higher (2 milligrams per liter compared to 1.6) in people who reported fewer than six hours of sleep, compared to those reporting between six and nine hours.

That difference was still significant even when the data is corrected for known risk factors such as smoking, blood pressure, diabetes and obesity, Morris says.

C-reactive protein is used extensively as a marker of inflammation and heart disease risk. People whose C-reactive protein levels are in the upper third of the population (above 3 milligrams per liter) have roughly double the risk of a heart attack, compared with people with lower C-reactive protein levels, according to the American Heart Association and Centers for Disease Control and Prevention.

"For people who got little sleep, the C-reactive protein levels were increased, but still in the range of what health authorities would consider low to intermediate risk," she says. "However, our study population represents a community-based population [as opposed to patients in the hospital or with known cardiovascular disease], so they have overall lower risk and lower C-reactive protein levels than many of the high risk populations in other studies."

Inflammation may be one way poor sleep quality increases the risks for heart disease and stroke, Morris says.

"It remains uncertain whether short sleep duration contributes directly to cardiovascular mortality, or whether it is a mediating or moderating factor," she says.

Previous research has shown that people who sleep between seven and eight hours per night live longest, and that especially short or especially long sleep durations bring higher mortality. Researchers find that short and long sleep durations are often seen together with high blood pressure, obesity, diabetes and psychological stress – all risk factors for heart disease and stroke.

Long sleep duration may reflect a compensation for sleep apnea, which the sleep quality survey does not directly address. However, in the META-Health study, people who slept for more than nine hours didn't show significantly higher levels of inflammation markers.

In a separate poster, Morris is also presenting research on a difference between men and women in the interaction between sleep quality and arterial stiffness. Her results show that both men and women with poor sleep quality had higher blood pressures, but only men with poor sleep quality had a higher arterial stiffness, a lack of blood vessel flexibility which drives hypertension and puts more burden on the heart.

More information: More on the META-Health study is available here: www.medicine.emory.edu/divisio … arch/meta_health.cfm

More on the Pittsburgh Sleep Quality Index is available here: www.sleep.pitt.edu/content.asp?id=1484&subid=2316