

Older adults who sleep poorly react to stress with increased inflammation

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Older adults who sleep poorly have an altered immune system response to stress that may increase risk for mental and physical health problems, according to a study led by a University of Rochester Medical Center researcher.

In the study, [stress](#) led to significantly larger increases in a marker of [inflammation](#) in [poor](#) sleepers compared to good sleepers—a marker associated with poor health outcomes and death.

"This study offers more evidence that better [sleep](#) not only can improve overall well-being but also may help prevent poor physiological and psychological outcomes associated with inflammation," said Kathi L. Heffner, Ph.D., assistant professor of Psychiatry at the Medical Center.

The association between poor sleep and a heightened inflammatory response to acute stress could not be explained by other factors linked to immune impairment, including depression, loneliness and perceived stress, the researchers said in the study published by the *American Journal of Geriatric Psychiatry*.

"Our study suggests that, for healthy people, it all comes down to sleep and what poor sleep may be doing to our physiological stress response, our fight or flight response," Heffner said.

The study, advertised as an investigation of stress and memory, involved 45 women and 38 men with an average age of 61 years. The participants

were evaluated for cognitive status using a standard assessment. Each participant completed a self-report of sleep quality, perceived stress, loneliness and medication use. The participants had to be in good physical health to be in the study, but even so, about 27 percent of the participants were categorized as poor sleepers.

On the day of the study, the participants were given a series of tests of verbal and working memory, a battery of questions that served as the stressor. Blood was drawn before any testing began and then immediately following the testing and at three intervals spaced out over 60 minutes. The blood was studied for levels of interleukin-6 (IL-6), a protein primarily produced at sites of inflammation.

Poor sleepers reported more depressive symptoms, more loneliness and more global perceived stress relative to good sleepers. Poor sleepers did not differ from good sleepers when IL-6 was measured before the tests began. Across the group, the participants showed increases in IL-6. However, poor sleepers had a significantly larger increase in IL-6 in response to the stressful tests compared to good sleepers, as much as four times larger and at a level found to increase risk for illness and death in older adults.

A further analysis of the results for the impact of loneliness, depression or perceived stress on IL-6 levels found no association. Poor sleep stood as the predictor of elevated inflammation levels.

"We found no evidence that poor sleep made them deal poorly with a stressful situation. They did just as well on the tests as the good sleepers. We did not expect that," Heffner said. "We did find that they were in a worse mood after the stressor than a good sleeper, but that change in mood did not predict the heightened inflammatory response."

As people age, a gradual decline in the immune system occurs along with

an increase in inflammation. Heightened inflammation increases the risk for cardiovascular disease, diabetes and other illnesses, as well as psychiatric problems.

While relatively little is known about the pathways through which poor sleep impacts circulating levels of inflammatory proteins, the study led by Heffner provides a clinical target for preventing poor outcomes for older adults.

"There are a lot of sleep problems among older adults," Heffner said. "[Older adults](#) do not have to sleep poorly. We can intervene on sleep problems in older adulthood. Helping an elderly person become a better sleeper may reduce the risk of poor outcomes associated with inflammation."

Provided by University of Rochester Medical Center

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