

Adults Who Go to Bed Lonely Get Stress Hormone Boost Next Morning

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A new study that takes a rare look at the physiological, social and emotional dynamics of day-to-day experiences in real-life settings shows that when older adults go to bed lonely, sad or overwhelmed, they have elevated levels of cortisol shortly after waking the next morning.

Elevated levels of cortisol -- a stress hormone linked to depression, obesity and other health problems when chronic -- actually cue the body on a day-to-day basis that it is time to rev up to deal with loneliness and other negative experiences, according to Northwestern University's Emma K. Adam, the lead investigator of the study.

The study, "Day-to-day experience-cortisol dynamics," was published online the week of Oct. 30 by the *Proceedings of the National Academy of Sciences* (PNAS).

"You've gone to bed with loneliness, sadness, feelings of being overwhelmed, then along comes a boost of hormones in the morning to give you the energy you need to meet the demands of the day," said Adam, assistant professor of education and social policy and faculty fellow at the Institute for Policy Research.

The morning cortisol boost could help adults who went to bed with troubled or overwhelming feelings go out in the world the next day and have the types of positive social experiences that help regulate hormone levels, she said.

Adam also is a faculty fellow at C2S: The Center on Social Disparities and Health. C2S is a new center within the Institute for Policy Research that is reaching across Northwestern's two campuses and a number of social, life and biomedical disciplines to offer a 21st century look at how biological, social and cultural dynamics intersect and affect health throughout the life span.

Cortisol is often characterized as a negative hormone because of evidence, mostly in animal models, that long-term elevations could be potentially harmful to physical health. But in the short term the stress hormone is adaptive and helpful, according to Adam.

“Cortisol helps us respond to stressful experiences and do something about them,” she said. “It is necessary for survival -- fluctuations in this hormone assist us in meeting the changing demands we face in our daily lives.”

The first of its type, the study shows that it is not just on average that people who have more negative emotions have higher levels of cortisol. Rather, with its detailed and intricate methodology, the study shows a sensitive day-to-day dance between experience and cortisol. Experience influences stress hormones, and stress hormones influence experience, the study shows.

“Cortisol responds to and interacts with our daily experiences in subtle and important ways,” Adam concluded.

Cortisol levels are generally high immediately upon waking, increase in the first 30 minutes after waking and then decline to low values at bedtime.

Adam, with her colleagues John T. Cacioppo and Louise C. Hawkley at the University of Chicago, and Brigitte M. Kudielka from the University

of Trier, Germany, showed that changes in this pattern from one day to the next are closely interwoven with changes in our daily experiences.

The study, based on data from the Chicago Health, Aging, and Social Relations Study (CHASRS) at the University of Chicago includes 156 older adults living in Cook County who were born between 1935 and 1952 and represent a range of socioeconomic classes. Their cortisol levels were measured from small samples of saliva provided three times a day for three consecutive days. Study participants reported their feelings each night in a diary, and researchers looked at whether cortisol levels on a particular day were predicted by experiences the day before or were predictive of experiences that same day.

In addition to noting that loneliness the night before predicted higher cortisol the next morning, Adam and colleagues found that people who experience anger throughout the day have higher bedtime levels of cortisol and flatter overall levels of the stress hormone, typically considered a risk factor for disorder. “High levels of cortisol in the evening are a kind of biological signature of a bad day,” Adam noted.

The study also provided evidence that, in addition to simply being at the mercy of your daily experiences, cortisol also plays a role in influencing them. Individuals with lower levels of cortisol in the morning experienced greater fatigue during the day, a result with potential implications for understanding chronic fatigue.

In all of her work, Adam is interested in how people’s changing social environments get under the skin to influence their biology and health. “Stress systems are designed to translate social experience into biological action,” she said. “They are designed to be a conduit from the outside world to our internal worlds so that we can better respond to our social context. The overarching question of my studies of these systems in a variety of contexts is whether overuse of these systems plays a role in

disease outcomes.”

Source: Northwestern University

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