Can Disrupted Circadian Rhythms Affect Parkinson's Risk?

A weakened biological clock affecting rest and activity cycles could be an early warning sign of this neurodegenerative disease.

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The circadian rhythm is a 24-hour internal clock that affects sleep patterns, body temperature and overall activity. Among older men, even a tiny disruption in this sleep/wake cycle, as it is also known, was linked with the development of Parkinson's disease later in life, in a study by researchers at the University of California San Francisco (UCSF) published in the journal JAMA Neurology.

For the study, UCSF investigators enrolled almost 3,000 men with an average age of 76.3 who did not have Parkinson's. Scientists evaluated participants' baseline health and checked their progress via follow-up visits and questionnaires. (All individuals lived independently, that is, not in nursing homes.)

The men wore an actigraph—a watch-like device that records even the slightest wrist movements—to monitor their rhythms of rest and activity during three 24-hour periods.

Scientists measured amplitude, the difference between the period of greatest to least activity; mesor, the average activity; robustness, how well the measured cyclical rest-activity matched a regular curve similar to a cosine wave; and acrophase, a measure of advance or delay in the 24-hour cycle relative to the population average.

Data collected from the gadgets were independently associated with later Parkinson's development. Of the study's overall participants, 78 were eventually diagnosed with Parkinson's. Those who scored lowest in actigraph amplitude, mesor or robustness were three times more likely to develop the disease compared with those who scored highest.

Researchers concluded that a weakened circadian rhythm may represent an early stage of Parkinson's in some cases. In addition, investigators believe that circadian rhythm disruptions might also contribute to neurodegenerative disease.

Although Parkinson's is the second most common neurodegenerative disorder in the United States—behind Alzheimer's disease—many people are undiagnosed.

“These neurodegenerative diseases are not reversible,” said Yue Leng, MD, PhD, an assistant professor of psychiatry at USCF and the study’s lead author. “But if research points to sleep or circadian problems being risk factors for neurodegeneration prior to traditional symptoms, then we may be able to use that information for early detection and diagnosis, or we might be able to intervene in ways that prevent development of neurodegenerative loss of function.”

For related coverage, read “Excessive Antibiotic Use May Raise Parkinson’s Risk.”
