

Moderate-to-regular Daily Sleep Patterns are Associated with Enhanced Cognitive Function

A recent study conducted by researchers at the University of Tsukuba showed that individuals who maintain regular daily sleep patterns tend to have greater global cognitive performance. The study also found that blood biomarkers related to the pathology of Alzheimer's disease were most elevated in individuals with moderate sleep regularity and lowest among those with either highly irregular or excessively rigid patterns—indicating a potential inverse U-shaped relationship.

Daily sleep and activity are fundamental to both physical and mental health. Although previous studies have largely emphasized quantitative aspects such as sleep duration and physical activity time, there is increasing focus on how daily sleep varies among days. Less variable and consistent daily sleep patterns have been associated with decreased cardiovascular risk, lower mortality rates, and protective effects against incident dementia. Nevertheless, whether such associations of daily sleep patterns vary in individuals in the preclinical stage of Alzheimer's disease or those experiencing subjective cognitive decline remains poorly understood.

In this study, researchers evaluated the sleep regularity of 458 participants aged 45–89 years who subjectively reported cognitive and/or sleep issues. Each participant wore a three-axis accelerometer on the nondominant hand continuously for 24 h for 7 days. In addition to undergoing a standardized cognitive assessment battery, blood samples were collected from the participants to measure the levels of serum brain-derived neurotrophic factor (BDNF), a protein essential for synaptic plasticity and overall cognitive health. The results demonstrated a clear linear relationship between sleep regularity and global cognitive performance. However, serum BDNF levels showed an inverse U-shaped relationship—peaking in participants with moderate sleep regularity and declining at both ends—among those with either highly irregular or excessively rigid.

These findings suggest that maintaining moderate-to-regular daily sleep patterns supports cognitive health, whereas rigid daily sleep patterns could potentially reduce an individual's adaptability to daily changes in real-world situations. Therefore, this study emphasizes the importance of balance in lifestyle schedules and its value in future strategies to prevent Alzheimer's disease, as well as dementia.

Correspondence

Professor Tomohiro Okura

Institute of Health and Sport Sciences / International Institute for Integrative Sleep Medicine (WPI-IIS), Tsukuba Institute for Advanced Research, University of Tsukuba

URL: <https://trios.tsukuba.ac.jp/en/researcher/0000002039>



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