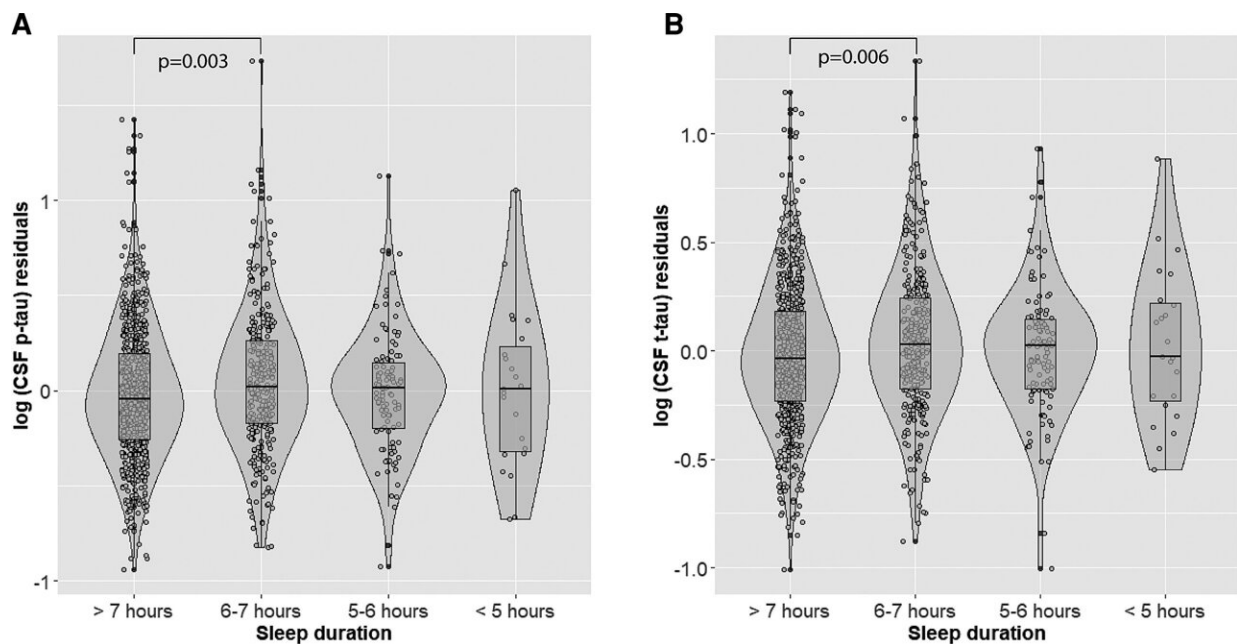


# Association between poor sleep quality and an increased risk of developing Alzheimer's

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Main effects of sleep duration on CSF p-tau and t-tau levels. On the X-axis are represented participants' groups categorized based on sleep duration >7 h, 6–7 h, 5–6 h and Brain Communications (2022). DOI: 10.1093/braincomms/fcac257

New research has shown an association between sleep quality—less than seven hours—and Alzheimer's disease-related pathology in people without cognitive impairment. The study by an international team led by the Pasqual Maragall Foundation research center, the Barcelonaβeta Brain Research Center (BBRC), together with researchers from the

University of Bristol and North Bristol NHS Trust, was published in the journal *Brain Communications* on Nov. 3.

The results of the analysis, part of the European Prevention of Alzheimer's Dementia Longitudinal Cohort Study (EPAD LCS), indicate that poor [sleep quality](#) is related to an increase in pathology of Alzheimer's disease. This finding is relevant to help define future therapies, so that they can be targeted at the appropriate phase of the disease.

## **A cross-sectional analysis of sleep quality**

Sleep abnormalities are common in Alzheimer's disease, and sleep quality can be affected early in the preclinical stage of the disease, even when no other symptoms are experienced. Understanding how and when sleep deprivation contributes to Alzheimer's disease progression is important for the design and implementation of future therapies.

Laura Stankeviciute, a predoctoral researcher at the BBRC and one of the main authors of the study, said, "The epidemiological and [experimental data](#) available to date already suggested that sleep abnormalities contribute to the risk of Alzheimer's disease.

"However, previous studies had limitations due to the lack of biomarkers of Alzheimer's disease, because they had a non-cross-sectional design, or because of the small size of the sample of participants." This is the first study to include all of these factors.

## **The largest cohort to date for an analysis of sleep quality and efficiency**

Using data from the largest cohort to date, the EPAD LCS, researchers

were able to validate the hypothesis that [sleep deprivation](#) is associated with cerebrospinal fluid (CSF) biomarkers of Alzheimer's disease cross-sectionally, and which predicts future increases in disease in people without identifiable symptoms of Alzheimer's disease at baseline.

The BBRC team, in collaboration with researchers from the University of Bristol, analyzed data from 1,168 adults over 50 years of age, including biomarkers of Alzheimer's disease in cerebrospinal fluid, cognitive performance and sleep quality. To measure the latter, they used the Pittsburgh Sleep Quality Index (PSQI) questionnaire.

Dr. Liz Coulthard, Associate Professor in Dementia Neurology at the University of Bristol and neurologist at North Bristol NHS Trust, added, "Sleep is an untapped opportunity to help prevent Alzheimer's and promote brain health. Our patients were fantastically committed to the EPAD study, completing many tests including lumbar punctures for research. Their invaluable data, combined with other sites around Europe, has now led to a better understanding of the links between sleep and Alzheimer's."

Dr. Oriol Grau, Head of the Clinical Research Group and Risk Factors for Neurodegenerative Diseases of the BBRC, explained, "Through these analyses, we have been able to study associations between the main biomarkers of Alzheimer's disease and different measures of sleep quality, such as its total score, duration, efficiency and alteration."

By analyzing cerebrospinal fluid samples from 332 participants taken at baseline and after an average period of 1.5 years, researchers assessed the effect of baseline sleep quality on change in biomarkers of Alzheimer's disease over time.

## **Preventive practices to improve sleep quality**

Cross-sectional analyses revealed that poor sleep quality is significantly associated with increased t-tau protein in [cerebrospinal fluid](#). Among other findings, it was shown that a short duration of sleep, less than seven hours, is associated with higher values of p-tau and t-tau, key biomarkers to measure Alzheimer's risk in the preclinical phase of the disease. Furthermore, longitudinal analyses showed that greater sleep disturbances were associated with a decrease in the A $\beta$ 42 biomarker over time.

This study demonstrates that participant-reported poor sleep quality is associated with greater Alzheimer's disease-related pathology in individuals without cognitive impairment.

Laura Stankeviciute added, "Our results further strengthen the hypothesis that sleep disruption may represent a risk factor for Alzheimer's disease. For this reason, future research is needed to test the efficacy of preventive practices, designed to improve sleep in the presymptomatic stages of the disease, in order to reduce the pathology of Alzheimer's disease."

**More information:** Jonathan Blackman et al, Cross-sectional and longitudinal association of sleep and Alzheimer biomarkers in cognitively unimpaired adults, *Brain Communications* (2022). [DOI: 10.1093/braincomms/fcac257](https://doi.org/10.1093/braincomms/fcac257)

Provided by University of Bristol

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