

Apr 25th, 9:00 AM - 10:00 AM

Link between Insomnia and the Development of Alzheimer's disease?

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Rhodes, Tristan; Fries, Alexa; and Smith, Josie, "Link between Insomnia and the Development of Alzheimer's disease?" (2019). *Carroll College Student Undergraduate Research Festival*. 72.
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Link between Insomnia and the Development of Alzheimer's disease?

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<https://cdn.powerpositivity.com/wp-content/uploads/2015/11/insomnia-man.jpg>

Question

In adults, 65 years and older, does insomnia compared to an adequate night's sleep of 7-8 hours, increase the risk of the development of Alzheimer's disease (AD)?

Background

- ❖ AD affects the older adult population worldwide and is the most common form of dementia,
- ❖ AD is described as "problems with memory, thinking and behavior. Symptoms develop slowly and can become severe enough to interfere with daily tasks" (Alzheimer's Association, 2019).
- ❖ AD is the sixth leading cause of death in the United States, with an estimated 5.7 million Americans who are living with Alzheimer's disease in 2018. Every 65 seconds, someone in the United States develops AD (Alzheimer's Association, 2019).
- ❖ There is no known cure for AD.
- ❖ AD pathophysiology includes the build up of amyloid-beta ($A\beta$) plaques in the brain, structures that are prime suspects in damaging and killing nerve cells, blocking communication and disrupting cell processes necessary for cell survival.
- ❖ Insomnia is defined as "a history of difficulty falling asleep (45 minutes or more to fall asleep), and/or staying asleep (sleeping less than 6.5 hours total) at least 4 nights a week for the past 6 months" (Chen et al., 2018).
- ❖ Many studies suggest that "acute sleep deprivation increases cerebrospinal fluid (CSF) levels of beta-amyloid...this oxidative stress following sleep disorders might contribute to the beta-amyloid metabolism in the brain of insomnia patients (Chen et al., 2018).

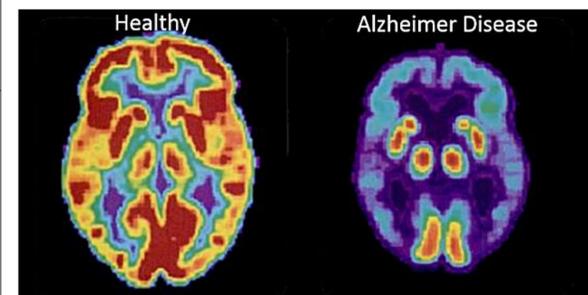
Study	Description	Results
Reduced non-rapid eye movement sleep is associated with that pathology in early Alzheimer's disease (Lucey et al., 2019).	The article is a longitudinal study, level IV. The researchers examine "the cognitive performance, brain imagine, and cerebrospinal fluid (CSF) AD biomarkers in participants enrolled in longitudinal studies of aging" (p. 1).	This study concluded that a decrease in NREM will increase the AB deposition and tau accumulation, which will increase the chance of developing AD.
Sleep quality and preclinical Alzheimer disease (Yo-El S. Ju et al., 2019).	The article is a cross-sectional study, level IV. The article compares $A\beta$ deposition in preclinical AD, prior to the appearance of cognitive impairment, and how this is associated with quantity and quality of sleep.	Ju et al. (2013) demonstrates that a poor sleep quality will decrease the CSF $A\beta$ 42, increase amyloid deposition in the brain, and increase the probability of developing AD.
Treatment of Sleep Disturbance May Reduce the Risk of Future Probable Alzheimer's Disease (Burke et al., 2018).	This article is a secondary analysis, level II of the National Alzheimer's Coordinating Center Uniform Data Set. The article researched if sleep medication neutralize or provide a protective effect against the hazard of AD.	The study results showed that sleep disturbance has significant correlation with future AD development.
Sleep disturbances and later cognitive status: a multi-center study (Shireen Sindi et al., 2018).	The article is a meta-analysis, level I on the associations between sleep disturbances in mid-life and late-life and late-life cognitive status.	The evidence suggests how insomnia and general sleep problems in late life increased the development of AD.
Cerebrospinal Fluid Amyloid- β Levels are Increased in Patients with Insomnia (Chen et al, 2018).	This article is a randomized control trial, level II. This study looked at 23 people with insomnia and used a control group of 23 "healthy volunteers." This study investigated the CSF levels of amyloid-beta, a pathological hallmark of AD.	This study concluded that "insomnia may induce the disruption of amyloid-beta metabolism in the brain, increasing the risk for developing AD.
Insomnia and risk of dementia in older adults: Systematic review and meta-analysis (Almond et al., 2016).	This article is a systematic review and meta-analysis, level I. This study evaluated the risk of incident all-cause dementia in individuals with insomnia.	The researchers concluded that their study provides data that supports that insomnia is associated with a significant risk of all-cause dementia.

Results

- ❖ The evidence suggests that insomnia disrupts the quality of sleep, increasing amyloid-beta deposition in the brain, thus increasing the risk for the development of Alzheimer's disease later in life.
- ❖ The research did not conclude the necessary hours of sleep needed to prevent amyloid-beta deposition.
- ❖ More research is needed to fully answer the question.

Nursing Implications

- ❖ Nurses can "investigate prevention of AD among the elderly through screening and proper management of insomnia" (Almond et al., 2016).
- ❖ Nurses can educate patients to manage insomnia by managing stress, fixing poor sleep habits (Ex. smartphone and other screen time before bed, irregular bedtime schedule, naps...), as well as not eating too much later in the evening.
- ❖ Nurses can address other causes of insomnia such as mental health disorders, medications, medical conditions, and caffeine, nicotine and alcohol intake.
- ❖ Carroll Nursing students could run a booth at the Walk to End Alzheimer's on campus to provide education about the link between insomnia and AD, along with the information stated above.



<https://www.2minutemedicine.com/wp-content/uploads/2013/04/adhe.png>

This work is not original. This is a systematic review of published research conducted by professionals. Guidance was provided by Stephanie Burkholder, professor of NU307: Evidence-Based Practice Research Methods.