Impaired Sleep as a Modifiable Risk Factor for Alzheimer's Disease

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Background & Purpose

Alzheimer's Disease (AD) affects 6.7 million Americans above the age of 65, which is around 1 in every 9 people. The presence of Aβ or tau neurofibrillary tangles in the brain is a diagnostic finding specific to AD and differentiates it from other forms of dementia, used for research of AD. Identifying risk factors are important to aid in early diagnosis as well as determining which are modifiable, which can improve future outcomes.

Purpose:

The goal of this research is to analyze the disease process of AD in the brain and its relationship with sleep to determine whether sleep quality impacts an individual's risk for developing AD.

PICOT

Are adults, ages 18-65, who have disturbed sleep at an increased risk for Alzheimer's Disease compared to those with good sleeping cycles?

Design & Methods

- **Keywords:** Alzheimer's Disease, impaired sleep, neurocognitive degeneration, risk factor, amyloid-beta, tau neurofibrillary tangles, risk factor.
- **Inclusion:** Published within the last 5 years, English language, academic journals, peer-reviewed articles.
- **Exclusion:** Failure to meet inclusion criteria, endpoints irrelevant to the PICOT question, research limitations.

Summary of Evidence Search:

Database	Yielded	Reviewed	Included in Analysis
PubMed	61	14	2
Valpo Summon	649	23	8
Total:	710	37	10

Synthesis of Evidence

The types of studies used for this research included cohort studies, meta-analysis, randomized control trial, and a cross-sectional study to collect various data.

Cohort Study	Meta-Analysis	Randomized Control Trial	Cross-Sectional Study
2	1	1	1

Results:

- There was found to be an increase Aβ and tau pathology participants after the evening of sleep deprivation.[2]
- Aβ and tau burden impacts the individual's REM sleep and furthermore progresses the disease pathology.[3]
- Individuals with AD are shown to have decreased amounts of SWS (slow wave sleep) and REM (rapid eye movement) sleep and therefore declining cognition.[4]
- Individuals with higher Aβ status and NREM SWA sleep activity had improved memory in item prediction the following, but not in participants with low Aβ burden.[5]
- Increased AD pathology (Aβ and tau) is associated with decreased cognitive function.[6]

Conclusion:

The results of these studies answered the PICOT question, that sleep quality is a risk factor for AD. Prioritizing sleep can aid in preventing AD and is crucial for maintaining cognitive function. Public health is more important than ever not only for prevention of progressive diseases but also decreasing the risk for developing other conditions, such as AD.

Best Practice

Discussion:

- Sleep deprivation and poor sleep increases levels of Aβ and tau in the brain, which were found to impair cognitive function.
- Deep sleep had positive benefits for cognitive function in individuals with AD pathology.
- Therefore, poor sleep is a modifiable risk factor for AD.
- Patients and practitioners should be aware of this risk factor to prevent future risk of AD and preserve cognitive function.

Limitations/Further study:

Some study limitations included a small sample size, participants not being chosen or excluded based on prior sleeping history, previous neurological or medical history, and some not being completed in a controlled environment. Further studies would need to be completed on a larger population of ages 18-65 with no previous medical history that could have chronically impacting their sleep and in a better controlled environment to monitor their sleep and cognitive function.

References:

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