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Disrupted rest and activity patterns could be an early indicator of Alzheimer's

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Scientists from the US have found a link between certain biological fingerprints thought to indicate early stages of Alzheimer's and sleep disturbances. Their findings are published today in *JAMA Neurology*.

Links between poor sleep and dementia have been known of for some time but teasing out the precise cause and effect relationship is difficult – does poor sleep contribute to developing dementia, or is it that poor sleep is an early indicator of the condition?

To try to understand this relationship, a team of researchers from Washington University studied a group of 186 volunteers, using wearable activity monitors (actigraphy) day and night to measure periods of rest and activity as this group went about their normal daily lives in their homes. The study participants were all over the age of 45 (mean age, 66), and did not have any problems with memory or thinking. Participants (155 people) had donated samples of spinal fluid, in which the researchers measured the levels of two Alzheimer's proteins, tau and amyloid. Some participants (142 people) had also undergone specialised brain scans to measure the level of amyloid in their brain, called a PiB-PET scan.

The researchers found that increasing age was linked with decreased sleep quality, shown by a fragmenting of normal rest-activity patterns, such as increased napping during the day and being awake during the night. Looking at the brain scans, the researchers set a level to determine which scans showed amyloid build-up, finding 26 people showed

amyloid high levels of amyloid in their brains and 116 people did not.

When they compared the two groups, the scientists found that people with amyloid build-up showed more fragmented rest-activity patterns, even when age and sex were taken into account. Similarly, people with an increased ratio of tau to amyloid in their spinal fluid, indicative of early Alzheimer's changes, were also found to have fragmented rest-activity patterns.

Dr. David Reynolds, Chief Scientific Officer at Alzheimer's Research UK, said:

"Research has faced a bit of a chicken and egg situation when looking at the links between sleep and dementia. While we know that people with Alzheimer's experience disturbed sleep patterns, whether this contributes to the disease or is an early consequence has been unclear. This study observes changes in daily rest and activity patterns at an early stage, where people are showing signs of Alzheimer's in the brain but before symptoms begin.

"In the past, studies have used sleep diaries to look at the links between sleep and health conditions, but the development of wearable activity monitors is helping researchers gain deeper and more accurate insight into the factors at play. We can't conclude from this study that napping more during the day can lead to dementia, and future studies will need to follow volunteers over longer periods of time. Studies like this add new pieces to the jigsaw of our understanding, and could lay the groundwork for new ways to detect the condition earlier, focusing on a range of factors and not just memory and thinking tests."

Provided by Alzheimer's Research UK