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Sleep Apnea, a Biomarker, and More Linked to Elevated Risk of Alzheimer's Disease in Black Individuals

A new study is revealing ways to prevent or treat Alzheimer's disease in a population at higher risk. Arlener D. Turner, Ph.D., assistant professor of psychiatry and behavioral sciences at the University of Miami Miller School of Medicine Center for Translational Sleep and Circadian Sciences (TSCS), is the lead researcher of the publication, which revealed that conditions that tend to occur more frequently in Black and African American people can be linked to Alzheimer's disease risk.

Arlener D. Turner, Ph.D.,

“The takeaway message for a clinician is to be cognizant of the health disparities – thinking of the disorders that disproportionately affect Black and African American individuals,” Dr. Turner said.

In the study, obstructive sleep apnea (OSA) and a gene known as APOE-e4 – which was discovered by Margaret A. Pericak-Vance, Ph.D., director of the John P. Hussman Institute for Human Genomics at the Miller School – were “interactively associated” with greater Alzheimer’s disease risk. OSA is a sleep-related breathing disorder marked by partial or complete blockage of airflow when someone is asleep. Furthermore, on brain imaging, presence of white matter hyperintensities, brain lesions that shine particularly brightly on MRI, were also part of the risk relationship.

The investigators discovered the significant interaction among these factors only in Black and African American individuals, not in other populations.

The study was published Jan. 4 in the prestigious journal *Frontiers in Aging Neuroscience*.

Dr. Turner, along with senior author Azizi Seixas, Ph.D., interim chair of the Department of Informatics and Health Data Science and associate professor of psychiatry and behavioral sciences, studied 1,387 individuals in the National Alzheimer’s Coordinating Center Uniform Dataset (NACC UDS). Almost 14% were Black or African American; 59% were women; 18% had sleep apnea; and 38% carried the APOE-e4 gene variant.

The researchers found no significant interaction between OSA and APOE-e4 relative to amyloid levels in the brain. Amyloid deposits are widely linked to increased risk for Alzheimer’s

disease.

Beta-Amyloid Levels and Other Alzheimer’s Risk Factors

This finding “highlights the mixed findings from previous studies which have found that people of African descent may have higher levels of beta-amyloid, while others have found no significant differences in beta-amyloid levels between racial groups,” said Dr. Seixas, who is also the associate director of the TSCS center.

Azizi Seixas, Ph.D.

“It's important to keep in mind that beta-amyloid is just one of many factors that can influence the risk of developing Alzheimer's disease, and the relationship between beta-amyloid levels and dementia risk is complex and not yet fully understood. It is likely that amyloid may not be a sensitive risk marker for AD [Alzheimer's disease] among Blacks,” he said.

In contrast, the higher prevalence of white matter hyperintensities – caused by vascular risk factors like high blood pressure – made sense to Dr. Seixas. These lesions were "more pronounced in Blacks because Blacks have greater vascular risk markers."

Similarly, individuals with sleep apnea risk and who carry the APOE gene "had reduced hippocampal volumes, a sign of brain atrophy and neurodegeneration, all signs of dementia. These findings suggest that Black people with elevated genetic risk for dementia and higher sleep apnea risk have poorer brain health outcomes," Dr. Seixas said.

Finding the associations was the first step. Next, the research team is doing a deeper dive to understand how these factors might come together to explain the double risk of Alzheimer's disease in Black and African American populations.

"It is imperative to explore environmental influences related to these racial differences in APOE genotypical risk," the researchers note.

Moving forward, the investigators plan to recruit more participants by using non-invasive measures, including brain imaging, and looking for biomarkers in blood samples instead of in cerebrospinal fluid. Traditionally, the APOE-e4 gene is detected in cerebrospinal fluid withdrawn from the spinal column, an invasive technique. "You're not going to have as many participants who are willing to do that," Dr. Turner said. "And you're definitely not going to have as many participants from marginalized populations who are willing to do that."

Dr. Turner and her colleagues also want to involve more

leaders and residents in affected communities in the research.

“What we do as researchers who are in the community is make sure that we are speaking to the community itself – working with the community and making sure they understand that this is a partnership,” Dr. Turner said.

Additional Miller School co-authors of the *Exploring the Combined Effects of Sleep Apnea and APOE-e4 on Biomarkers of Alzheimer’s Disease* study include Clarence Earl Locklear, Daisha Oruru, Anthony Q. Briggs, and Omonigho Michael Bubu.

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