Stress reduction through meditation may aid in slowing the progression of Alzheimer's disease

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It's well known that the brains of meditators change, but it's not entirely clear what those changes mean or how the changes might benefit the meditator. A new pilot study led by researchers at Beth Israel Deaconess Medical Center suggests that the brain changes associated with meditation and stress reduction may play an important role in slowing the progression of age-related cognitive disorders like Alzheimer's disease and other dementias.

"We know that approximately 50 percent of people diagnosed with mild cognitive impairment – the intermediate stage between the expected declines of normal aging and the more serious cognitive deterioration associated with dementia – may develop dementia within five years. And unfortunately, we know there are currently no FDA approved medications that can stop that progression," says first author Rebecca Erwin Wells, MD, MPH, who conducted her research as a fellow in Integrative Medicine at BIDMC and Harvard Medical School. "We also know that as people age, there's a high correlation between perceived stress and Alzheimer's disease, so we wanted to know if stress reduction through meditation might improve cognitive reserve."

The results of the study appeared online October 10 in *Neuroscience Letters*.

Wells, currently a neurologist at Wake Forest Baptist Medical Center in

Winston-Salem, N.C. evaluated adults between the ages of 55 and 90 in BIDMC's Cognitive Neurology Unit. 14 adults diagnosed with mild cognitive impairment were included in the study.

Participants were randomized two to one either to a group who participated in Mindfulness-Based Stress Reduction (MBSR) using meditation and yoga, or a control group who received normal care. The study group met for two hours each week for eight weeks. They also participated in a day-long mindfulness retreat, and were encouraged to continue their practice at home for 15 to 30 minutes per day.

All participants underwent a functional MRI (fMRI) at baseline and then again after eight weeks to determine if there were any changes in the structures of the brain or in brain activity. The neuroimaging was conducted at Massachusetts General Hospital's Martinos Center.

"We were particularly interested in looking at the default mode network (DMN) – the brain system that is engaged when people remember past events or envision the future, for example – and the hippocampus – the part of the brain responsible for emotions, learning and memory – because the hippocampus is known to atrophy as people progress toward mild cognitive impairment and Alzheimer's disease," says Wells.

Previous studies have shown that the hippocampus is activated during meditation and that mediators have more hippocampal gray matter concentration. "So the big question is, is it possible for MBSR to help attenuate the decline of individuals already experiencing some memory problems?" asks Wells.

The results of fMRI imaging showed that the group engaged in MBSR had significantly improved functional connectivity in the areas of the default mode network. Additionally, as expected, both groups experienced atrophy of the hippocampus, but those who practiced

MBSR experienced less atrophy.

Tests of memory were also done, but the study was not powered to see differences between the two groups, though, Wells and colleagues previously reported that, "most data suggest a trend toward improvement for measures of cognition and well-being."

"This is a small study and more research is needed to further investigate these results, but we're very excited about these findings because they suggest that MBSR may reduce hippocampal atrophy and improve functional connectivity in the same areas of the brain most affected by Alzheimer's disease. MBSR is a relatively simple intervention, with very little downside that may provide real promise for these individuals who have very few treatment options," says Wells. She adds that future studies will need to be larger and evaluate cognitive outcomes as well. "If MBSR can help delay the symptoms of cognitive decline even a little bit, it can contribute to improved quality of life for many of these patients."

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