

Everyday activities associated with more gray matter in brains of older adults

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Rush University College of Nursing researcher Shannon Halloway, PhD and patient. Credit: Rush Photo Group

Higher levels of lifestyle physical activity - such as house cleaning, walking a dog and gardening, as well as exercise - are associated with

more gray matter in the brains of older adults, according to a study by researchers at Rush University Medical Center. *The Journal of Gerontology: Psychological Sciences* will publish the study's findings on Feb. 14.

The [gray matter](#) in the [brain](#) includes regions responsible for controlling muscle movement, experiencing the senses, thinking and feeling, memory and speech and more. The volume of gray matter is a measure of brain health, but the amount of gray matter in the brain often begins to decrease in late adulthood, even before symptoms of cognitive dysfunction appear.

"More gray matter is associated with better cognitive function, while decreases in gray matter are associated with Alzheimer's disease and other related dementias," said Shannon Halloway, PhD, the lead author of the *Journal of Gerontology* paper and the Kellogg/Golden Lamp Society Postdoctoral Fellow in the Rush University College of Nursing. "A healthy lifestyle, such as participating in lifestyle physical activity, is beneficial for brain health, and may help lessen gray matter atrophy (decreases)."

Study used accelerometer to measure activity of 262 older adults

The study measured the levels of lifestyle physical activity by 262 [older adults](#) in Rush's Memory and Aging Project, an ongoing epidemiological cohort study. Participants are recruited from retirement communities and subsidized housing facilities in and around Chicago to participate in annual clinical evaluations and magnetic resonance imaging (MRI) scans, and to donate their brains and other parts of their bodies for research after their deaths.

Participants in the lifestyle study wore a non-invasive device called an accelerometer continuously for seven to ten days. The goal was to

accurately measure the frequency, duration and intensity of a participant's activities over that time.

Lifestyle physical activity is "more realistic for older adults" than a structured exercise program that might require them to go to a gym, according to Halloway.

"Accessibility becomes an issue as one ages," Halloway said.

"Transportation can be a problem. Gym settings can be intimidating for any individual, but especially so for older adults."

Accelerometers provide more precise measures of activity

The use of accelerometers was only one of the ways in which this analysis differed from some other investigations of the health of older people. Most research that explores the effects of exercise relies on questionnaires, which ask participants to "self-report" their levels of activity, Halloway said. She added that questionnaires tend to ask in a fairly non-specific fashion about types and intensity of exercise.

The real problem with questionnaires, though, is that "sometimes, we get really inaccurate reports of activity," Halloway acknowledged. "People commonly over-estimate, and on the flip side, some underestimate the lifestyle activity they're getting from things they don't consider exercise, like household chores, for example."

As to the accelerometer, she says, "it's not as commonly used (in studies of exercise) as we would like," even though accelerometers provide more precise results than self-reporting.

Study provided insights into activity levels of people past 80

Another departure in Halloway's study from some other investigations

was the opportunity she had to assess the effects of exercise on individuals older than 80. In fact, the mean age in this study was 81 years, compared with 70 years for other studies Halloway used as a reference.

"One great strength of the Rush Alzheimer's Disease Center is its amazing ability to follow up with participants, and its high retention rates of participants," Halloway says. As a result, the Memory and Aging Project captures a number of participants in that older age group.

However, no one was included in Halloway's analysis who had a diagnosis or symptoms of dementia, or even mild cognitive impairment; a history of brain surgery; or brain abnormalities such as tumors, as seen on MRIs.

The study compared gray matter volumes as seen in participants' MRIs with readings from the accelerometers and other data, which all were obtained during the same year. Halloway's analysis found the association between participants' actual physical activity and gray matter volumes remained after further controlling for age, gender, education levels, body mass index and symptoms of depression, all of which are associated with lower levels of gray matter in the brain.

"Our daily lifestyle physical activities are supportive of [brain health](#), and adults of all ages should continue to try and increase lifestyle physical activity to gain these benefits," Halloway said. "Moving forward, our goal is to develop and test behavioral interventions that focus on lifestyle physical activity for older adults at increased risk for cognitive decline due to cardiovascular disease."

Provided by Rush University Medical Center

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