EXERCISE AMELIORATES AGE-ASSOCIATED HIPPOCAMPAL ATROPHY IN AT-RISK ADULTS: EVIDENCE FROM THE WISCONSIN REGISTRY FOR ALZHEIMER’S PREVENTION

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RESULTS

Hippocampal volume: We constructed separate linear models for left (LH) and right (RH) hippocampal volume:

- LH: Older = -0.83, F(1,311) = 18.21, p < .0001; RH, High: Older = -0.37, F(1,311) = 10.30, p = .002. The exercise by sex interaction was nonsignificant in both hemispheres (p > .10) and was removed. Supplementary analyses indicated that Older participants were significantly more likely to report frequent engagement in exercise (≥3 times/week) (β = 0.63, t(311) = 2.40, p = .018). Other exercise effects were also nonsignificant in all other models.

CONCLUSIONS

This study revealed that engagement in physical activities is associated with an attenuation of the deleterious effect of age on hippocampal volume that was significant in the high exercise group (LH, Low exercise: Older = -0.70, t(311) = 8.82, p < .001; LH, High exercise: Older = -0.65, t(311) = 4.59, p < .001; RH, Low exercise: Older = -0.37, t(311) = 2.71, p = .007; RH, High exercise: Older = -0.35, t(311) = 2.71, p = .007). The exercise by sex interaction was nonsignificant in all models, indicating that the effect of older age on hippocampal volume was similar in both sex groups. The exercise by sex interaction was also nonsignificant in all models, indicating that the effect of older age on hippocampal volume was similar in both sex groups.

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Background

Participating in moderate to vigorous physical activities has been associated with a lower risk of cognitive decline and Alzheimer’s disease (AD) in older adults. However, the role of physical activity in midlife is less clear. Therefore, in this study, we investigated whether exercise moderates the effect of age on hippocampal volume and cognition in a cohort of middle-aged adults at high risk for AD.

Methods

Participants: The Wisconsin Registry for Alzheimer’s Prevention (WRAP) is a longitudinal cohort study of individuals who are at high risk of developing AD. The Registry was established in 1994 and consists of 2000 participants who have been followed monthly on average for 7-10 years. Participants were enrolled in the Registry at the University of Wisconsin-Madison using standardized screening criteria. The Registry is enriched for positive family history of AD. Participants for the present analyses were 317 WRAP subjects (216 (68%) female, 101 (32%) male) who had undergone T1-weighted MRI and had completed a self-report questionnaire assessing current physical activity at the time of MRI.

Cognitive measures: A comprehensive neuropsychological test battery was administered to participants at baseline and at annual follow-up visits. The battery includes tests of immediate memory, attention, executive function, and speed of processing. The test battery is normed for a sample of healthy adults of similar age and education level. The test battery includes the Wisconsin Verbal Learning Test, the California Verbal Learning Test, the Rey Auditory Verbal Learning Test, the Brief Visual Memory Test, the Logical Memory II, and the Trail Making Test.

Exercise levels: Exercise levels were assessed at baseline and at annual follow-up visits using a self-report questionnaire designed to assess the frequency and duration of walking and hard, moderate, and mild exercise.

CONCLUSIONS

This study revealed that engagement in physical activities is associated with an attenuation of the deleterious effect of age on hippocampal volume and memory function, suggesting potential mechanisms for the influence of physical activity on AD risk reduction. Longitudinal analyses were not able to capture these effects in midlife, as well as provide information on the extent to which physical participation in midlife activities promotes the development of AD risk-related disorders in later life.

Acknowledgments & Contact

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References


