

TITLE: The intensity of physical activity improves cognitive performance among aging Americans

Dowllah IM¹, Lopez- Alvarenga J², Maestre G², Karabulut UK¹, Karabulut M¹

¹Department of Health and Human Performance, The University of Texas Rio Grande Valley

²School of Medicine, The University of Texas Rio Grande Valley

BACKGROUND: Currently there is no pharmacological cure for Alzheimer's disease and related dementias, physical activity (PA) has emerged as a promising approach. The optimal intensity of PA to improve cognitive health remains unknown. Therefore, this study aimed to evaluate associations between different durations and intensities of PA on performance across cognitive domains (executive function, processing speed, and memory) among aging Americans.

METHODS: 2377 adults aged ≥ 60 years from the cross-sectional National Health and Nutrition Examination Survey 2011-2014, were included. Linear regression in hierarchical blocks and the size of effect (η^2) were analyzed with R software.

RESULTS: The mean age was 69.3 ± 6.73 , 50.86% females. Despite the attenuation of association following adjustments for covariates, participants who engaged in 3-6 hr/wk of vigorous- and > 1 hr/wk of moderate-intensity PA performed significantly higher in executive function and processing speed tests compared to inactive peers ($\eta^2 = 0.005$ & 0.007 respectively, $p < 0.05$). However, there was no clear dose-response relationship between the executive function and processing speed test scores and duration of weekly moderate-intensity PA. For the adjusted model, the effects of 1-3 hr/wk of vigorous-intensity PA became trivial for the delayed recall memory test scores ($\beta = 0.33$; 95% CI: -0.01, 0.67; $\eta^2 = 0.002$; $p = 0.56$). Interestingly, higher handgrip strength and higher late-life body-mass-index were associated with a higher performance across all cognitive domains.

CONCLUSION: Observed associations provide evidence linking habitual PA with superior cognition health among older adults. Furthermore, increased muscle strength and higher late-life adiposity may impact cognition and require further investigation.