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BIOMARKERS

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Biomarkers (non-neuroimaging) / novel biomarkers

Lower average daily step count is associated with poorer executive function and rurality in a veteran cohort

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Abstract

Background: An active lifestyle is associated with better cognitive health in older individuals. This relationship is understudied in U.S. Veterans, a population at risk of cognitive impairment due to the high prevalence of associated risk factors and comorbidities. Passive monitoring of daily activities provides objective measures of activity that may serve as a sensitive index of day-to-day function and dementia risk.

Method: Participants (age $\geq$ 57) were enrolled as part of Collaborative Aging Research using Technology (CART), a multi-site study examining the feasibility of unobtrusive remote sensing and monitoring of physical, cognitive, and health-related activities. The Veteran cohort consists of volunteers living in largely rural communities in the Pacific Northwest, self-identified as being a Veteran, and included their cohabitant, if applicable. Daily step counts were acquired using a wrist-worn device. Baseline one-month averages were compared with rurality and cognitive function.

Result: 114 nondemented participants residing in 67 homes underwent neuropsychological assessment and passive monitoring of daily activities (55% male, age 70.7, MOCA 23.4). 70% resided in a rural area (rural-urban commuting area (RUCA) score $\geq$ 4) and 29% had $\geq$ three vascular risk factors. Participants with 14+ days of gait activity measured within a one-month period near baseline cognitive assessments not using a walker in the home were included (n = 107). Average daily step count obtained over an average of 27.7 days was 3,065 (median 2,515) and was greater in large rural towns compared with small-isolated rural ($p = 0.07$) or urban ($p = 0.04$) towns. After adjusting for potential confounders, lower average daily steps were associated with worse performance in executive function, a relationship observed in Veterans in large rural, but not urban or small rural towns.

Conclusion: In a cohort comprised primarily of rural Veteran's and their spouses, lower average number of steps per day is associated with poorer executive function and this relationship varied by rurality. Real-world monitoring of daily activities may identify those at greatest risk of cognitive decline for interventional studies aimed at dementia prevention in older individuals, and is of particular relevance in rural settings, where access to specialty care is limited.