

The Mediating Role Handgrip Strength Between Estimated Pulse Wave Velocity and Dementia: A Cross-sectional Study Based on the CHARLS

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Abstract

Background: Several studies have shown that there is an association between estimated pulse wave velocity (ePWV), handgrip strength (HGS) and dementia. However, the extent to which HGS mediates the relationship between pulse wave velocity and dementia remains unclear. This study aims to explore the extent to which handgrip strength mediates the relationship between pulse wave velocity and dementia, and is based on a large-scale population-based sample of middle-aged and elderly individuals in China. **Methods:** This study conducted a cross-sectional analysis utilizing 2015 data from the China Health and Retirement Longitudinal Study (CHARLS), including 7,403 participants aged ≥ 45 years. Employed multivariate logistic regression analyses to evaluate the associations of ePWV and HGS with dementia, adjusting for demographic characteristics, behavioral factors, and biomedical covariates. The mediating effect of HGS in the relationship between ePWV and dementia was evaluated using the bootstrap method with 1,000 bootstrap samples. Stratified analyses were conducted to assess the robustness of findings across sex, age categories, educational attainment levels, and other pertinent demographic factors. **Results:** After adjusting for confounding factors, ePWV was significantly positively related to dementia (OR: 1.12, 95% CI: 1.05-1.19; $P < 0.001$). Conversely, HGS was significantly inversely associated with dementia, (OR: 0.95, 95% CI: 0.93-0.96; $P < 0.001$). ePWV demonstrated a significant negative correlation with HGS (β : -0.61, 95% CI: -0.73 to -0.49; $P < 0.001$). Mediation analysis revealed that HGS partially mediated the relationship between ePWV and dementia, accounting for 15.38% of the total effect. subgroup analysis confirmed the consistency of these associations across sex, age groups, educational levels, and other pertinent demographic factors (all interaction P-values > 0.05). **Conclusion:** ePWV is positively correlated with dementia, and HGS plays a mediating role in this relationship. Comprehensive assessment of vascular function and muscle health may enhance the prediction and prevention of dementia.

Keywords

Dementia, Handgrip Strength, Estimated Pulse Wave Velocity, Middle-aged and Elderly

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