

Title: Predictive Ability of Physical Performance Measures in Identifying Falls in Older Adults with Dementia: A Systematic Review and Meta-Analysis

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Background: Falls are very common in older adults with dementia and pose a serious threat to their physical and psychological health, functional independence, and life expectancy. Reduced physical performance (i.e., gait, balance, muscle strength, and mobility impairments) has been shown to be a risk factor for falls in older adults with dementia. Identifying measures of physical performance that can predict falls in this population is crucial for clinicians and researchers to select appropriate assessment tools to evaluate their fall risk and design effective fall prevention strategies.

The objective of this systematic review and meta-analysis is to determine whether physical performance measures commonly used in clinical settings can predict falls in older adults with dementia.

Method: MEDLINE, Embase, PsycINFO, CINAHL, SPORTDiscus, Cochrane Library, and PEDro databases were searched from inception until 27 January 2023 (Prospero Registration: CRD42022303670). Longitudinal cohort and cross-sectional studies that evaluated the associations between physical performance measures and falls in individuals aged  $\geq 65$  with dementia were included. The standardized mean difference (SMD) in each physical performance measure between fallers and non-fallers was calculated.

Result: Twenty-five studies were included in this systematic review and meta-analysis (Figure 1). Five-time chair stands (SMD: 0.23; 95% CI: 0.01, 0.45), postural sway on floor with eyes open (SMD: 0.25; 95% CI: 0.07, 0.43), postural sway on foam with eyes open (SMD: 0.45; 95% CI: 0.25, 0.66), Berg Balance Scale (SMD: -0.52; 95% CI: -0.87, -0.17), and Timed Up and Go test (SMD: 0.34; 95% CI: 0.03, 0.64) predicted falls in older adults with dementia (Figure 2). Sensitivity analyses showed that gait speed could predict falls in those who were staying in residential care facilities or hospitals (SMD: -0.21; 95% CI: -0.38, -0.05). Concerns about the risk of bias in the included studies were noted, and the quality of evidence was generally very low to low.

Conclusion: Chair stands, postural sway on floor and foam, Berg Balance Scale, and Timed Up and Go test can predict falls in older adults with dementia. Gait speed can only predict falls among those who are staying in residential care or hospital units.