

Effects of a Nurse-Led Digital Telerehabilitation-Based Multicomponent Exercise Intervention on Muscle Strength and Physical Function in Community-Dwelling Older Adults with Sarcopenia

Objective: To evaluate the effectiveness of a nurse-led digital telerehabilitation-based multicomponent exercise intervention on muscle strength and physical function among community-dwelling older adults with sarcopenia.

Methods: A randomized controlled trial was conducted with 128 community-dwelling older adults diagnosed with sarcopenia according to the Asian Working Group for Sarcopenia 2025 criteria: low muscle mass. Participants were randomly assigned to either the intervention group (n=64) receiving a 12-week nurse-led multicomponent exercise program delivered, or the control group (n=64) receiving standard health education. Primary outcomes included handgrip strength and Short Physical Performance Battery (SPPB) scores. Secondary outcomes encompassed gait speed, five-time chair stand test, and exercise adherence rate.

Results: At 12 weeks, the intervention group demonstrated significantly greater improvements in handgrip strength (mean difference: 2.84 kg, 95% CI: 1.92-3.76, $P<0.001$) and SPPB scores (mean difference: 1.68 points, 95% CI: 1.12-2.24, $P<0.001$) compared with controls. Gait speed improved by 0.12 m/s ($P<0.001$), and chair stand time decreased by 2.36 seconds ($P<0.001$). The mean exercise adherence rate in the intervention group was 87.3%. At 24-week follow-up, handgrip strength mean difference: 2.16 kg, $P<0.001$; SPPB mean difference: 1.42 points, $P<0.001$, with an effect retention rate of 76.1%.

Conclusion: Nurse-led digital telerehabilitation-based multicomponent exercise intervention significantly improves muscle strength and physical function in community-dwelling older adults with sarcopenia, with high exercise adherence rates.

Keywords: Sarcopenia; Multicomponent exercise; Nurse-led intervention; Digital telerehabilitation; Mobile health; Older adults