Reliability, validity and minimal detectable change of 2-minute walk test, 6-minute walk test and 10-meter walk test in frail older adults

Chan, Wayne Lap Sun, PT, PhD[1,2], Pin, Tamis Wai-mun, PT, PhD[2]

[1]Physiotherapy Department, Chi Lin Nunnery Elderly Service, Hong Kong
[2]Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hong Kong

Background
Walk tests are frequently used in evaluating frail older adults with multi-morbidities but their psychometric properties in this population are unclear. This study aimed at determining test-retest and inter-rater reliability, construct and known-group validity, and minimal detectable change at 95% level of confidence (MDC_{95}) of walk tests in frail older adults.

Methods
In this cross-sectional psychometric study with repeated measures, a convenient sample of older adults who were frail and able to walk independently for at least 15 metres were recruited from day care and residential care facilities. All participants completed a 2-minute walk test (2MWT), 6-minute walk test (6MWT) and 10-metre walk test (10MeWT) on six separate occasions over a 2-week period under two independent examiners. Functional status was measured using the Elderly Mobility Scale (EMS), Berg Balance Scale (BBS) and Modified Barthel Index (MBI). Health-related quality of life was measured with the 12-Item Short Form Health Survey (SF-12).

Result
Forty-four frail older adults were examined. Excellent test-rest (ICC=0.95-0.99) and inter-rater reliability (ICC=0.91-0.97) were shown in all the walk tests. Good to strong correlations were found between the walk tests and the EMS (r=0.53-0.57), BBS (r=0.59-0.66) and MBI (r=0.55-0.59). The correlations between the walk tests and the SF-12 were generally weak (r=0.05-0.30). All the walk tests were able to distinguish between those who used no walking aid and quadripod or walking frame ($p \leq 0.004$), and those who could walk outdoor and indoor only ($p \leq 0.002$). The MDC_{95} were 7.7m in the 2MWT, 24.7m in the 6MWT, and 0.13m/s in the 10MeWT.

Discussion
The 2MWT, 6MWT and 10MeWT are reliable and valid measures in evaluating the walking performance of frail older adults. The MDC_{95} of the walk tests has been recommended for this population group.