Gait speed and physical exercise in people with dementia

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Akademisk avhandling

som med vederbörligt tillstånd av Rektor vid Umeå universitet för avläggande av medicine doktorsexamen framläggs till offentligt försvaret.

Hörsal Betula, By. 6M, fredagen den 13 januari, kl. 09:00.

Avhandlingen kommer att försvaras på engelska.

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Umeå universitet
Umeå 2016
Abstract

The aim of the thesis was to investigate the importance of physical function for survival in very old people, and furthermore, whether physical exercise could influence physical function, cognitive function, and dependence in activities of daily living (ADLs) in older people with dementia living in nursing homes.

The association between gait speed and survival was investigated in a population-based cohort study of 772 people aged 85 years and over. Usual gait speed was assessed over 2.4 m and mortality followed for five years. Cox proportional hazard regression adjusted for potential confounders was used in analyses. Effects of physical exercise in people with dementia were investigated in a randomised controlled trial including 186 participants with dementia living in nursing homes. Participants were randomized to a High-Intensity Functional Exercise (HIFE) program or a seated control activity, both lasting 45 minutes, held five times fortnightly for four months. Dependence in ADLs was assessed using Functional Independence Measure and Barthel ADL Index, and balance using Berg Balance Scale. Usual gait speed was evaluated over 4.0 m in two tests; first with habitual walking aid if any, and thereafter without walking aid and with minimum living support. Global cognitive function was assessed using the Mini-Mental State Examination, the Alzheimer’s Disease Assessment Scale-Cognitive subscale, and executive function using Verbal fluency. Blinded testers performed assessments at baseline, four (directly after intervention completion) and seven months. Analyses used linear mixed models in agreement with the intention-to-treat principle.

Gait speed was an independent predictor of five-year all-cause mortality, where inability to complete the gait test or a gait speed below 0.5 meters per second (m/s) was associated with higher mortality risk. In analyses of exercise effects on ADLs there was no difference between groups in the complete sample. Interaction analyses showed a difference in exercise effect according to dementia type at seven months. Positive between-group exercise effects were found for dependence in ADLs in participants with non-Alzheimer’s type of dementia (non-AD) at four and seven months. In balance, a difference between groups was found at four but not at seven months in the complete sample, and interaction analyses indicated a difference in effect according to dementia type at four and seven months. Positive between-group exercise effects were found in participants with non-AD. No difference between groups in gait speed was found in the complete sample, where the majority habitually walked with a walking aid. In interaction analyses exercise effects differed according to walking aid use. Positive between-group exercise effects in gait speed were found in participants that walked unsupported at four and seven months. No difference between groups in cognitive function was found in the complete sample. The effects of exercise on gait speed and cognitive function did not differ according to sex, cognitive level, or dementia type.

In conclusion, among people aged 85 or older, including those dependent in ADLs and with dementia, gait speed seems to be a useful clinical indicator of health status. In older people with mild to moderate dementia living in nursing homes, a four-month high-intensity functional exercise program benefited ADL dependence and balance, albeit only in participants with non-AD dementia. Further studies are needed to validate this result. Furthermore, exercise had positive effects on gait speed when tested unsupported, in contrast to when walking aids or minimum support were used, which may conceal effects. The exercise program had no superior effects on global cognition or executive function when compared with an attention control activity. This study suggests that, in older people with dementia, exercise effects on physical function rather than cognitive function explains effects on dependence in ADLs.

Keywords
Exercise, dementia, residential facilities, postural balance, activities of daily living, cognitive function, mobility limitation, Alzheimer’s disease, rehabilitation, frail elderly, gait speed, mortality, aged 80 and older.