Commentary on:

Treacy D, Hassett L, Schurr K, Fairhall NJ, Cameron ID, Sherrington C. Mobility training for increasing mobility and functioning in older people with frailty. Cochrane Database of Systematic Reviews 2022, Issue 6. Art. No.: CD010494.

Key Points

- Mobility training improved the level of mobility up to 6 months post-intervention.
- Level of function was likely improved post-intervention but was not maintained at 6 months.
- There is still unclear or uncertain evidence regarding the effects of mobility training on death rates, adverse events, admission to nursing care facilities and falls.
- Long-term effects are unclear and future studies should include outcomes at 12 months and over.

Introduction

Frailty is a term used to describe an increased vulnerability to adverse health outcomes, commonly due to the ageing process (WHO 2017). It is characterized by a decline in the reserve and function of the overall body system and a reduced ability to cope with acute stressors, predisposing slow recovery from illness and a higher risk of hospitalization and mortality (Turner 2014). Within the community dwelling elderly, there is an estimated prevalence of frailty of between 4-59% (Collard et al. 2012).

Life expectancy has significantly increased worldwide due to the advancement of medical treatments and improved public health awareness (Kojima et al. 2019). By 2050, the world's population aged 60 years and over is projected to double to 2.1 billion adults and for those aged 80 and above, the number will triple to reach 426 million (WHO 2022). The increase in the aging population can lead to the development of more chronic diseases due to a decline in an individual's physical and cognitive function (ONS 2018). Frailty has consequently become a major health condition associated with ageing, placing burden and cost on both the

individual and society (Buckinx et al. 2015). Increased healthcare costs for frail individuals also exert a significant financial impact on the healthcare system (Kojima et al. 2019).

Studies have indicated that a higher level of physical activity is associated with lower odds of frailty in community dwelling older adults (Zhao et al. 2022). Mobility is also essential to maintaining independence and wellbeing particularly in the older population (Ross et al. 2013). For older adults with poor mobility, it is recommended that physical activity is undertaken 3 or more days per week to improve balance and reduce falls (WHO 2010). Key determinants of mobility include cognitive, psychosocial, physical, environmental, and financial influences, each consisting of complex factors (Webber et al. 2010). Due to its multi-factorial and complex nature, interdisciplinary approaches to mobility are necessary (Freiberger et al. 2020).

The systematic review by Treacy et al. (2022) aimed to summarise the benefits and safety of different types of mobility training on overall functioning and mobility in frail older people living in the community. This commentary will critically appraise the methods used in the review and consider what the findings mean for community practice.

Methods

The systematic review undertook a comprehensive search of published and unpublished studies up to June 2021 using a range of electronic databases: CENTRAL, MEDLINE, Embase, AMED, PEDro and Clinical Trials Registries. Reference lists of all included studies were also checked and there were no language restrictions. One author screened title, abstract and trial descriptors and three authors independently assessed potential full-text articles for inclusion, resolving disagreement by discussion. Randomised or quasi-randomised controlled trials that delivered interventions to target improvements in mobility were included. Where

there were multiple elements to an intervention, the main aim had to be improving mobility. Trials were compared to gentle exercise (not expected to impact on mobility), no intervention, usual care or a social visit. Participants were older adults over 60 who lived in the community (living at home but not residential care) and were described as being frail according to specific criteria. Three authors independently extracted data using a piloted and standardised data extraction form and risk of bias was assessed using the Risk of Bias tool as described in the Cochrane handbook (Higgins et al. 2020). Outcome data were extracted up to 6 months post-completion of the intervention and the primary outcome was mobility, assessed using physical performance measures. Standardised mean difference (SMD) was calculated and back-translated to the Short Physical Performance Battery (SPPB), an assessment of lower extremity function and mobility in older adults (SPPB Guide 2021). Other major outcomes of interest were: functioning (activity or participation levels), adverse effects, admission to nursing care, falls and death; and minor outcomes were cost. A meta-analysis was undertaken for comparable outcomes and evidence was graded for each using the GRADE approach (a method for assessing certainty of evidence in systematic reviews and strength of recommendations). Sub-group analysis was performed for those studies including participants with and without cognitive impairments and sensitivity analysis for trials with high or unclear risk of bias.

Results

From a total of 13, 473 records identified, the Cochrane systematic review included 12 randomized control trials, conducted in 9 countries, with a total of 1317 participants. The mean age of the included participants was 82 years and women comprised 73% of participants. Included trials compared mobility training with a control intervention not thought to improve mobility. The intervention period ranged from 6 weeks to 12 months and

ten of the studies were conducted in a community setting or gym with the remaining two taking place in the home setting. Eight studies included gait, balance and functional exercises as the primary intervention. Strength or resistance training was the primary component of one study and endurance training the other. Multiple categories were involved in the remaining two studies. Risk of bias assessment showed a high risk of bias for blinding of participants, personnel and outcome assessment.

Mobility

Mobility training improves the level of mobility upon completion of the intervention period compared to no mobility training (0.47 SMD, 95% CI 0.24 to 0.71, GRADE: High certainty evidence). In practical terms this resulted in patients in the intervention group gaining an 8% improvement on the SPPB compared to the control group. This translated to a number needed to treat for additional benefit (NNTB) of 5 (95% CI 3.00-9.00). Which means 5 patients need to receive the mobility training for one patient to benefit from that treatment compared to the control group.

Mobility at 6 Months

When comparing Mobility Training to no mobility training at 6 months post intervention this effect slightly reduced (0.32 SMD, 95% CI 0.10 to 0.54, GRADE: Moderate certainty evidence). There was an absolute improvement of 6% on the SPPB which translated to a NNTB of 7 (95% CI 4.00-22).

Mobility and Cognitive Impairment

Sub-group analysis showed little or no difference of effect on mobility between trials that included participants with cognitive impairment and those that excluded cognitive impairment (Chi^2 = 1.97; degrees of freedom (df) = 1; P = 0.16).

Function

Level of functioning was likely improved by mobility training at the end of the intervention period, compared to no mobility training (0.60 SMD, 95% CI 0.21 to 1.00; GRADE: Moderate certainty evidence). When using the Barthel Index (a higher score indicates better functioning), this would result in a 9% absolute improvement for the intervention group, although this did not reach clinical significance.

Function at 6 months

The effect of mobility training on patients function at six months is still uncertain with no evidence of difference being observed (1.29 SMD, 95% CI -0.38 to 2.96, GRADE: Low certainty evidence).

Function and Cognitive Impairment

Subgroup analysis showed little or no difference in the effect of mobility training on function between trials that included participants with cognitive impairment and those that excluded cognitive impairment (Chi2 = 2.62; df = 1; P = 0.11).

Adverse Effects

5 out of 12 trials reported adverse events and the majority were non-serious and of a musculoskeletal nature. The number of events in the control group was 771 per 1000 and in the intervention group 562 per 1000 (Risk ratio [RR] 0.74, 95% CI 0.63 to 0.88). The effect of mobility training on adverse events was uncertain due to very low certainty evidence.

Admission to Nursing Care Facility

A single study of low certainty found no evidence of difference in the number of people who are admitted to nursing care facilities when comparing those who received mobility training compared to those who received no training (RR 0.84, 95% CI 0.53 to 1.34).

Falls

Mobility training may result in little to no difference in the number of people who fall based on two studies of low certainty evidence (RR 1.02, 95% CI 0.87 to 1.20).

Death

Mobility training probably results in little to no difference in death rate based on 6 studies of moderate certainty evidence (RR 1.16, 95% CI 0.64 to 2.10; GRADE: Moderate certainty evidence).

Commentary

Using the AMSTAR 2 critical appraisal tool the systematic reviews, 15 out of the 16 criteria were judged to be of satisfactory for this review (Shea et al. 2017). The only partial yes was given for the lack of expert consultation and grey literature in the search strategy. One issue noted by the authors was that many studies did not provide sufficient details of the intervention provided and a high risk of performance bias was seen throughout all included studies. Sensitivity analyses removing studies with a high risk of bias however made little difference to mobility outcomes, indicating a robustness in these findings. Therefore, the systematic review overall provides a comprehensive synthesis of the included studies, but some caution should be applied to interpreting the results to practice.

This review was the first to explore the impact of mobility training in the frail community-dwelling elderly, reinforcing the importance of mobility training for this population, to improve mobility and function levels. The findings also reinforce previous reviews which identified that physical exercise (resistance, aerobic, balance and flexibility tasks) can be recommended for pre-frail and frail older adults to improve physical health including mobility outcomes such as walking speed, SPPB, physical function and Activities of Daily Living (Chou et al. 2012; Jadczak et al. 2018; Zhang et al. 2020). Results from the review also showed little difference between studies that included or excluded participants with cognitive impairment suggesting that mobility training may also be effective for those with cognitive disability. This is of relevance, as individuals with cognitive frailty are likely at higher risk of developing functional disability and greater disability burden compared to those without (Tang et al. 2023).

Reduced mobility associated with patient frailty is a risk factor for early readmission to hospital in the older population (Cilla et al. 2023). Targeted interventions such as mobility training may therefore help to avoid further health related issues and readmission to hospital. Within a community setting, referral to a GP and a comprehensive geriatric assessment can establish levels of mobility and function, prompting a referral to therapy, community-based exercise options or help in developing management strategies/enhanced support (BGS 2019). NICE Guidelines advise that providers of local services should work with local communities to understand the range of services needed to reduce the risks of frailty, disability and dementia, providing services at convenient times and easily accessible places, complemented by digital services where appropriate (NICE 2015). NICE public health guidelines also recommend that health and social care professionals offer tailored community-based physical activity programmes, including strength and resistance exercises for frail older people (NICE 2008). The NHS RightCare Frailty Toolkit may also be useful in community nursing to provide practical guidance on the best system wide care for people living with frailty (such as exercise groups) to maintain active and healthy ageing and to help reduce the risk of frailty progression (NHS RightCare 2019).

Methods for promoting physical activity in the elderly can vary from individual to small group exercise regimes to community (families, friends, caregivers) as well as technology solutions (e-health, mixed reality platforms) (Nikitas et al. 2022). A systematic review of home-based exercise programs revealed no differences between home based versus supervised programs for community dwelling older adults in gait mobility and balance (Costa et al. 2023).

Due to the small number of studies reporting adverse events and inconsistent reporting methods, future trials of this nature should aim to communicate a more clinically relevant

safety profile and should consider numerators and denominators for all events, timing, frequency and duration of adverse events (Lineberry et al. 2016). Due to only two included studies reporting outcomes at 12 months, trials with a long-term follow-up would also be welcomed to measure the retention of mobility gains over time, including also the impact of less reported outcomes (fall rates, admission to nursing care and mortality rates). Detailed reporting of participants (frailty level, cognitive impairment) and the intervention provided would also help to improve selection bias and replication for clinical practice.

CPD reflective questions

- What mobility training facilities are available in your own area?
- What important factors should you consider when making the recommendation for mobility training?

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