Effect of pilates exercise for improving balance in older adults (PEDro synthesis)

▶ Barker AL, Bird ML, Talevski J. Effect of Pilates exercise for improving balance in older adults: a systematic review with meta-analysis. *Arch Phys Med Rehabil* 2015;96:715–23.

BACKGROUND

Falls among older adults are considered an important source of disability, mortality and healthcare use.[1] One crucial modifiable risk factor for falls is balance impairment.[2][3] Hence, exercises that target balance improvement have been considered an essential component of fall prevention programmes.[4] Pilates is a type of mind–body exercise that focuses on improving strength, core stability, flexibility, muscle control, posture and breathing.[5] Various pilates exercises challenge balance.

AIM

The primary aim of this systematic review was to evaluate the effect of pilates on balance and falls in older adults. A secondary aim was to identify whether pilates programmes investigated in previous studies met the best practice recommendations for exercise to prevent falls, that is: (1) exercises provided a moderate or high challenge to balance (ie, performed in standing and using a small base of support while moving the centre of mass over that base); and (2) programmes were of sufficient dose (≥2 hours/week and a total of >50 hours over the study period).[6]

SEARCHES AND INCLUSION CRITERIA

Six databases were searched (MEDLINE, SPORTDiscus, CINAHL, PubMed, PEDro and Cochrane) using the terms *Pilates AND Balance OR Accidental Falls OR Postural Stability*. Eligible studies were those published in a peer-reviewed journal; written in English; conducted as randomised controlled trials (RCTs) or controlled clinical trials including older adults (mean age of participants 60 years), who were living in the community or in care facilities.

INTERVENTION

Studies investigating an exercise intervention described as 'Pilates' (mat, equipment or both) which included a comparison group that participated in no exercise (including non-active activities such as education); and which reported on at least one measure of balance or falls, were included in the review.

MAIN OUTCOMES

Performance-based measure of balance (dynamic or static) and falls.

METHODS

A meta-analysis was conducted to investigate intervention effects on balance outcomes and falls, using unadjusted, pooled data and described as standardised mean differences (SMDs) and 95% CIs. Random-effects models were used and heterogeneity between studies was assessed using the I^2 statistic. To be included in the meta-analysis, studies must have reported outcome measures known to be responsive for measuring change in balance.

Study quality was assessed according to six criteria described in the Cochrane Handbook for Systematic Reviews of Interventions: blinding of provider, patient or assessor; concealment of allocation; co-intervention avoided, controlled or used similarly across comparison groups; loss to follow-up <20% and equally distributed between comparison groups; and intention-to-treat analysis performed. These items were assessed as met, unclear or not met. The authors also assessed the risk of bias of included studies using the six domains of the Cochrane Collaboration's tool for assessing risk of bias in clinical trials: selection bias, performance bias, detection bias, attrition bias, reporting bias, and other bias. Risk of bias was assessed as high, low or unclear.

RESULTS

Six of the 309 identified study reports met the criteria for inclusion in the review. Five of these were RCTs and one was a controlled clinical trial. Overall, a high risk of bias was identified across most of the included studies. Common problems included lack of blinding of participants, assessors and therapists; lack of reporting of allocation concealment; no reporting of intention-to-treat analysis; and no inclusion of a placebo group delivery intervention for control group participants.

A significant pooled effect of pilates on balance (SMD=0.84; 95% CI 0.44 to 1.23) was observed but significant heterogeneity was detected (I^2=61%). Consistent effects were seen across dynamic (SMD=0.62; 95% CI 0.15 to 1.08), static (SMD=1.21; 95% CI 0.66 to 1.77) and combined static and dynamic (SMD=1.25; 95% CI 0.66 to 1.85) balance outcomes (test for subgroup differences, p=0.15).

Only one study (n=60) reported data on falls. The results revealed a significant reduction in the number of falls in the pilates intervention participants (preintervention, 1.87; postintervention, 0.37) compared with the control group participants (preintervention, 1.63; postintervention, 1.30) during the 12-week follow-up period (SMD=2.03; 95% CI −2.66 to −1.40).

Programme duration ranged from 5 to 24 weeks and all studies provided exercise sessions of ≥2 hours per week. Only one study provided >50 hours of exercise during the study period. Three studies provided enough data to enable assessment of compliance with best practice recommendations of exercises providing a moderate or high challenge to balance. Among these studies, 2–36% of exercises were assessed as providing a moderate or high challenge to balance.

CONSIDERATIONS/LIMITATIONS

The results of this meta-analysis reveal that pilates can be considered as an effective form of exercise to improve balance in older adults. However, the findings should be interpreted with caution due to the high heterogeneity (I^2=61%) associated with balance outcomes, the high risk of bias in the included studies and the small sample sizes in all included studies (30–60 participants). Further well-designed RCTs that address these flaws are needed to progress the quality of work in this field.

CLINICAL IMPLICATIONS

This meta-analysis suggests that pilates may be effective for improving balance among older adults. However, given the limitations found in this review, further high-quality studies are required to provide robust evidence regarding the effect of pilates on balance and falls among the older population.

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Correction notice This paper has been amended since it was published Online First. The author order has been changed.

Competing interests None declared.

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