

REVIEW ARTICLE (META-ANALYSIS)

# Effect of Pilates Exercise for Improving Balance in Older Adults: A Systematic Review With Meta-Analysis



Anna Lucia Barker, PhD,<sup>a</sup> Marie-Louise Bird, PhD,<sup>b</sup>  
Jason Talevski, BHLthSci (Public Health)<sup>a</sup>

From the <sup>a</sup>Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria; and <sup>b</sup>Faculty of Health, School of Health Sciences, University of Tasmania, Launceston, Tasmania, Australia.

## Abstract

**Objectives:** To investigate the effect of Pilates on balance and falls in older adults, and whether programs tested in prior studies met best-practice recommendations for exercise to prevent falls.

**Data Sources:** MEDLINE, SPORTDiscus, CINAHL, PubMed, Physiotherapy Evidence Database, and The Cochrane Library were searched from earliest record to July 2014.

**Study Selection:** Randomized and controlled clinical trials evaluating the effect of Pilates on balance and/or falls in older adults.

**Data Extraction:** Two reviewers independently extracted demographic, intervention, and outcome data. Six studies were included in this review.

**Data Synthesis:** High-quality studies in this area are lacking. When compared with nonactive control groups, Pilates was shown to improve balance (standardized mean difference [SMD]=.84; 95% confidence interval [CI], .44–1.23; 6 studies) and reduce the number of falls (SMD=−2.03; 95% CI, −2.66 to −1.40; 1 study). Three studies provided sufficient detail to enable assessment of compliance with the recommendation of exercises providing a moderate or high challenge to balance. In these studies, 2% to 36% of exercises were assessed as providing a moderate or high challenge to balance. All studies provided ≥2 hours of exercise per week, and 1 study provided >50 hours of exercise during the study period.

**Conclusions:** The evidence suggests Pilates can improve balance, an important risk factor for falls in older adults. However, there is limited data on the impact of Pilates on falls. Effects may have been overestimated because of the low methodological quality of studies. Best-practice recommendations were rarely applied in prior studies, indicating greater effects may have been achieved if recommendations were incorporated. Archives of Physical Medicine and Rehabilitation 2015;96:715-23

© 2015 by the American Congress of Rehabilitation Medicine

Falls in older adults continue to be a major source of disability, mortality, and health care utilization.<sup>1</sup> In the United States, 1 older adult dies after a fall every 29 minutes.<sup>2</sup> While falls do occur in young<sup>3</sup> and middle-aged people,<sup>4</sup> their sequelae are most deleterious in older adults. Thirty percent of falls in older adults have been reported to result in severe injuries, substantially affecting independence and risk of early death.<sup>5</sup> Balance impairment is a key modifiable risk factor for falls.<sup>6,7</sup> Therefore, exercises that aim to improve balance are a key component of fall prevention programs in both clinical practice and the research literature.<sup>8</sup>

Pilates is a mind-body exercise that has been used since early in the 20th century. It focuses on improving strength, core

stability, flexibility, muscle control, posture, and breathing.<sup>9</sup> Pilates aims to improve coordination and control of the core muscles of the trunk, which contribute to the optimal lumbar-pelvic stabilization needed for daily activities and function.<sup>10</sup> Pilates exercises can be categorized into 2 types: (1) mat exercises (which have commonalities with yoga and tai chi), and (2) equipment exercises (which use springs to achieve muscle strengthening). Many Pilates exercises are performed in a standing position, with a narrow base of support without hand support, challenging trunk muscle stability to maintain upright postures. An example of this is standing leg pumps on the wunda chair, or scooter on the reformer (fig 1).

A recent systematic review<sup>11</sup> of 16 studies concluded that Pilates can improve dynamic balance in healthy populations. However, this conclusion was based on findings from only 2 of the

Disclosures: none.



**Fig 1** Pilates equipment exercises for balance.

16 included studies. Additionally, only 1 of the 2 studies that reported on dynamic balance was completed in older adults ( $\geq 65$ y), therefore limiting the generalizability of this finding to older adults. The review also reported a significant decrease in number of falls; however, this result was also concluded from only 1 study.<sup>11</sup>

In addition to this review of the effectiveness of Pilates exercise, a systematic review<sup>12</sup> including 54 randomized controlled trials (RCTs) on all forms of exercise designed to prevent falls has been completed. This review reported that exercise programs including balance training achieved the greatest reductions in falls. Since many Pilates exercises provide a challenge to balance, Pilates may achieve similar effects on falls as reported by this review. After this initial review, an updated review<sup>13</sup> was published and provided best-practice recommendations to guide the use of exercise for falls prevention (box 1). The authors recommended that exercises for falls prevention should provide a moderate or high challenge to balance; be undertaken for  $\geq 2$ h/wk; and provide a total dose of more than 50 hours of exercise over the study period. Programs with these characteristics achieved a 38% reduction in the rate of falls (95% confidence interval [CI], 27%–46%).<sup>13</sup>

The primary aim of this systematic review was to evaluate the evidence for the effect of Pilates on balance and falls in older adults. A secondary aim was to identify whether Pilates programs tested in prior studies met the best-practice recommendations for exercise to prevent falls<sup>13</sup> in terms of program content and dose of exercise.

**List of abbreviations:**

<b>CI</b>	<b>confidence interval</b>
<b>POMA</b>	<b>Performance-Oriented Mobility Assessment</b>
<b>RCT</b>	<b>randomized controlled trial</b>
<b>SMD</b>	<b>standardized mean difference</b>

## Methods

This systematic review was performed according to the criteria of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses.<sup>14</sup>

## Search strategy

A systematic search of literature was conducted in July 2014. MEDLINE, SPORTDiscus, and CINAHL were searched to find published research. Supplementary searches were also conducted in PubMed, the Physiotherapy Evidence Database (PEDro), and The Cochrane Library. Comparative research studies published up to July 2014 were selected for evaluation. A sensitive search strategy was developed using the terms *Pilates AND Balance OR Accidental Falls OR Postural Stability*, and was translated for each database as appropriate. The search strategy was validated by identifying a “validation set” of references based on studies obtained from the MEDLINE search and ensuring that these were also included in searches in each of the other databases.

## Inclusion criteria

Studies were included in this review if they were published in a peer-reviewed journal; written in the English language; conducted as an RCT or controlled clinical trial in older adults (mean age of participants  $\geq 60$ y); tested an exercise intervention described as “Pilates” (mat, equipment, or both); included a comparison group that participated in no exercise (including nonactive activities such as education); and reported on at least 1 performance-based measure of balance (dynamic or static) or falls. Studies that recruited people living in the community or residential aged care, including nursing homes and long-term care, were included.

Download English Version:

<https://daneshyari.com/en/article/3448166>

Download Persian Version:

<https://daneshyari.com/article/3448166>

[Daneshyari.com](https://daneshyari.com)