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INPLASY

Home-Based Exercise in Postmenopausal Women: Effects on Body Composition, Physical Function, Cardiometabolic Health and Quality of Life—A Systematic Review and Meta-Analysis

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ADMINISTRATIVE INFORMATION

Support - None. The review has no external funding and no agreed support from an academic institution; it was conducted in the authors' own time.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared. No author has commercial or financial relationships that could be construed as a potential conflict of interest in relation to this review.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 26 April 2026 and was last updated on 26 April 2026.

INTRODUCTION

Review question / Objective This systematic review and meta-analysis aims to evaluate the effects of home-based exercise (HBE) on body composition, physical function, cardiometabolic health, and health-related quality of life (HRQoL) in postmenopausal women, compared with non-exercise or usual care. The review further explores whether intervention duration, training frequency, and the presence of comorbidities modify these effects.

Rationale After menopause, women experience oestrogen decline and adverse changes in body composition, musculoskeletal function, and cardiometabolic risk profile, increasing their risk of cardiovascular disease, type 2 diabetes, sarcopenia, and falls. Structured exercise is established as a key non-pharmacological countermeasure, but most existing evidence is based on supervised, facility-delivered programmes that are constrained by cost, travel burden, facility access, and the post-pandemic shift in delivery formats. Home-based exercise is a scalable and sustainable alternative, yet existing meta-analyses have generally focused on a single outcome domain or have not separated home delivery from facility delivery. To our knowledge, no meta-analysis has integrated the effects of home-based exercise across body composition, physical function, cardiometabolic health and HRQoL in postmenopausal women. This review fills that gap and provides evidence to inform exercise recommendations and public-health strategies for this population.

Condition being studied Health outcomes of postmenopausal women in relation to home-based exercise interventions, including: (i) body composition (body mass index, body fat

percentage); (ii) physical function (Timed Up-and-Go test, Five-Times Sit-to-Stand test, handgrip strength, six-minute walk test); (iii) cardiometabolic markers (systolic and diastolic blood pressure, serum triglycerides); and (iv) health-related quality of life.

METHODS

Search strategy A systematic search will be conducted in PubMed, Embase, Cochrane Central Register of Controlled Trials (CENTRAL), and Web of Science Core Collection from database inception to March 2026. The search combines population, intervention, and study-design terms with Boolean operators: ("postmenopause" OR "postmenopausal period" OR "post-menopause" OR "post menopause" OR "older women" OR "menopausal women") AND ("exercise" OR "exercise training" OR "physical activity" OR "home-based" OR "in-home" OR "home") AND ("randomized controlled trial" OR "RCT"). Where supported, filters for human participants, English language, and randomised study type are applied. Reference lists of retrieved records and prior meta-analyses are additionally screened to identify further eligible studies.

Participant or population Postmenopausal women, defined as women with at least 12 consecutive months of amenorrhea or as defined by the original studies. Both community-dwelling healthy postmenopausal women and women with comorbidities (osteoporosis, breast cancer survivorship, type 2 diabetes, obesity, cardiovascular conditions, or pre-frailty/frailty) are eligible, provided the intervention is delivered primarily in a home-based setting. Women who are institutionalised or whose menopausal status is not documented are excluded.

Intervention Home-based exercise (HBE), defined as a structured exercise programme delivered primarily in the participant's home environment with minimal or no on-site supervision. Eligible modalities include resistance, aerobic, balance, and flexibility/stretching training, alone or in combination. Eligible programme duration is at least 4 weeks. Trials with interventions delivered primarily in facilities with only a minor home component are excluded.

Comparator No exercise, usual care, routine activities, waiting-list control, health education, or other comparator conditions as reported in the original trials. Trials with active comparators are retained when the intervention of interest is delivered primarily in a home-based setting. Comparator type is extracted and considered when interpreting clinical heterogeneity across studies.

Study designs to be included Only randomised controlled trials (RCTs).

Eligibility criteria Studies are included if they meet ALL of the following: (1) participants are postmenopausal women as defined above; (2) the intervention is a structured home-based exercise programme of ≥4 weeks; (3) the comparator is no exercise, usual care, waiting-list, or another non-home-based comparator; (4) at least one outcome of interest (HRQoL, BMI, body fat percentage, handgrip strength, TUGT, 5×STS, 6MWT, blood pressure, or serum triglycerides) is reported with sufficient data for effect-size calculation; (5) the design is an RCT. Studies are excluded if they enrol institutionalised women or women without documented menopausal status, deliver the intervention primarily in a facility, are duplicates, or are conference abstracts/protocols without a subsequent full publication.

Information sources PubMed; Embase; Cochrane Central Register of Controlled Trials (CENTRAL); Web of Science Core Collection. Reference lists of all included studies and of prior relevant meta-analyses are screened. No grey-literature, dissertation, or trial-registry searches are planned beyond the four databases listed.

Main outcome(s) Primary outcomes are: (1) health-related quality of life (HRQoL); (2) body mass index (BMI, kg/m²); (3) handgrip strength (kg); (4) Timed Up-and-Go (TUGT) time (s); and (5) Five-Times Sit-to-Stand (5×STS) time (s). Effects are pooled across studies using mean difference (MD) when a common scale is used and standardised mean difference (Hedges' g, SMD) when scales differ.

Additional outcome(s) Secondary outcomes are: (1) body fat percentage (BFP, %); (2) systolic blood pressure (SBP, mmHg); (3) diastolic blood pressure (DBP, mmHg); (4) serum triglycerides (mg/dL); and (5) six-minute walk test (6MWT) distance. Adverse events related to the home-based intervention are recorded narratively when reported.

Data management Records retrieved from the four databases are imported into EndNote X9 for de-duplication. Title and abstract screening, full-text screening, and data extraction are conducted independently by two reviewers (SG and YL) using a pre-piloted standardised extraction form. Disagreements at any stage are resolved by

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discussion and, where necessary, adjudication by the senior reviewer (ST). Extracted variables include: first author, publication year, country, study design, sample size per arm, mean age (± SD), comorbidity profile, intervention characteristics (mode, frequency, intensity, session duration, programme duration, supervision format), comparator description, assessment time points, and post-intervention group means with their standard deviations. When multiple follow-up time points are reported, end-of-intervention values are prioritised. Missing standard deviations are converted from confidence intervals, standard errors, or interquartile ranges using the formulae recommended by the Cochrane Handbook (Wan et al., 2014). No automation tools are used; study investigators are not contacted.

Quality assessment / Risk of bias analysis Risk of bias of each included RCT is appraised independently by two reviewers using the Cochrane Risk of Bias 2.0 (ROB 2) tool, across five domains: randomisation process, deviations from intended interventions, missing outcome data, measurement of the outcome, and selection of the reported result. Each domain and the overall judgement are rated as Low risk, Some concerns, or High risk. Disagreements are resolved by consensus. Results are presented using the robvis traffic-light plot and a summary bar chart.

Strategy of data synthesis Quantitative synthesis is performed in R version 4.3 using the meta package. Continuous outcomes measured on a common scale are pooled as mean difference (MD) with 95% confidence intervals; outcomes measured on different scales (e.g., HRQoL across instruments, 6MWT in different units) are pooled as standardised mean difference using the Hedges' g bias-corrected SMD with 95% CI. Statistical heterogeneity is quantified with the I^2 statistic and Cochran's Q test, classified as low (70%). When heterogeneity is moderate or high ($I^2 \geq 50\%$), a random-effects model with REML estimation of τ^2 and Q-Profile confidence intervals is applied; otherwise a fixed-effect inverse-variance model is used. Forest plots are produced for each outcome.

Subgroup analysis Pre-specified exploratory subgroup analyses are conducted, where data permit, by: (i) presence vs absence of comorbidities; (ii) intervention duration (e.g., ≤8, 9–12, >12 weeks); and (iii) training frequency (e.g., 2, 3, ≥4 sessions per week). Because the number of trials per stratum is expected to be small, subgroup findings are interpreted as hypothesis-generating rather than confirmatory.

Sensitivity analysis Leave-one-out sensitivity analyses are performed for each pooled outcome to identify whether the synthesised estimate is driven by any single trial. Reporting bias for each outcome with ≥9 contributing studies is assessed by visual inspection of the funnel plot and Egger's linear regression test, interpreted with caution given the limited number of trials. No formal small-study-effect testing is performed for syntheses based on fewer than 9 studies.

Language restriction Only studies published in English are included. This is acknowledged as a potential source of language bias.

Country(ies) involved China.

Other relevant information The literature search and quantitative synthesis for this systematic review and meta-analysis had been substantially completed before the present registration was submitted; the registration is therefore retrospective relative to the search.

Keywords Home-based exercise; postmenopausal women; body composition; physical function; cardiometabolic health; health-related quality of life; randomised controlled trials; systematic review; meta-analysis.

Dissemination plans Home-based exercise; postmenopausal women; body composition; physical function; cardiometabolic health; health-related quality of life; randomised controlled trials; systematic review; meta-analysis.

Contributions of each author

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