INPLASY PROTOCOL

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Review Stage at time of this submission: Risk of bias assessment.

Conflicts of interest:
None declared.

Comparative effectiveness of different exercise on bone mineral density in postmenopausal women: a systematic review and network meta-analysis of randomized controlled trials

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Review question / Objective: To determine whether there is sufficient evidence to conclude that exercise interventions are more effective than no exercise control and to compare the effectiveness of different exercise interventions on bone mineral density in postmenopausal women.

Condition being studied: Osteoporosis and postmenopausal bone loss pose a huge social and economic burden worldwide. Exercise training is considered a cost-effective strategy to maximize or maintan bone mass in middle-aged older people.

Information sources: The following electronic database were searched: MEDLINE, EMBASE, CINAHL, AMED, the Cochrane Central Register of Controlled Trials (CENTRAL), Scopus and Web of Science. We also searched using the World Health Organization International Clinical Trials Registry Platform search portal, such as ClinicalTrials.gov and ISRCTN, to identify further studies. Furthermore, the bibliographies of selected articles and relevant review articles were examined for additional potentially relevant studies. A combination of relevant free text terms, synonyms and subject headings relating to postmenopausal osteoporosis, intervention of interest and randomized controlled trial were included in the strategy.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 21 April 2021 and was last updated on 21 April 2021 (registration number INPLASY202140107).

INTRODUCTION

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exercise interventions on bone mineral density in postmenopausal women.

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METHODS

Participant or population: healthy or osteoporotic postmenopausal women.

Intervention: Any kind of exercise intervention.

Comparator: Other forms of exercise, sham exercise or no exercise control group with usual activity.

Study designs to be included: Randomized controlled trial.

Eligibility criteria: (1) A randomized controlled trial (RCTs) designed to compare any therapeutic exercise intervention with other forms of exercise, sham exercise or no exercise control group with usual activity; (2) Subjects were healthy or osteoporotic postmenopausal women; (3) Intervention lasted at least 6 months of duration; (4) The study provided original data or sufficient information about at least one of the following outcomes: BMD measured by dual energy X-ray absorptiometry (DEXA) or dual-photon absorptiometry (DPA) at lumbar spine (LS) , total hip (TH) or/and femoral neck (FN) locations.

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Main outcome(s): BMD at LS, TH or/and FN locations were assessed by DXA or DPA immediately post intervention.

Quality assessment / Risk of bias analysis: Quality assessments were performed with the PEDro scale, which is based on the Delphi List criteria and is considered valid and reliable. The scale contains 11 items. Item 1 reflects external validity and is not included in the total PEDro score. The other 10 items evaluate the internal validity of a clinical trial. One point was given for each criterion that was satisfied. Therefore, a score of 0–10 was allocated to each study (9–10: excellent; 6–8: good; 4–5: fair; and ≤ 3: poor).

Strategy of data synthesis: We performed direct and indirect network meta-analysis using Bayesian models and generated rankings of different exercise interventions using generation mixed treatment comparison (GeMTC)and Stata version 16 (StataCorp). Four parallel Markov chain Monte Carlo simulations were run for a 20,000-stimulation burn-in phase and an additional 50,000-stimulation phase. Convergence was satisfied with a potential scale reduction factor (PSRF) value of 1.0 as the cut-off value. Consistency, referring to agreement between direct and indirect comparisons in terms of effect estimates, was evaluated by comparing consistency model with inconsistency model in terms of standard deviation of the random effect. This Bayesian approach was used to rank the probability of each genetic model for different exercise intervention. We also used the node-splitting method to calculate the inconsistency of the model, which separated evidence for a particular comparison into direct and indirect evidence. We assessed publication bias and small study effect by visual inspection of comparison adjusted and contours enhanced funnel plots complemented by

Peters' and Egger's tests, where appropriate.

Subgroup analysis: Subgroup analyses were performed according to the age, the type of exercise, and the duration of intervention.

Sensitivity analysis: The sensitivity analysis was conducted by deleting small studies with less than 25 patients per intervention arm or changing fix-effect model into random-effect model to evaluate the quality and consistency of the results.

Country(ies) involved: China.

Keywords: exercise, training, bone mineral density, postmenopausal women.

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