

Effect of Mind-Body Exercise on Bone Mineral Density in Elderly Patients with Osteoporosis: A Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Data extraction.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 26 January 2024 and was last updated on 26 January 2024.

INTRODUCTION

Review question / Objective Objective: The effect of mind-body exercise on bone mass is closely related to the way of exercise training and study design. The study was to evaluate the effects of different modes of mind-body exercise on bone mineral density in the elderly. Methods: The system searches the following electronic databases: PubMed, Embase, Springer link, The Cochrane library, China National Knowledge Infrastructure, WanFang, and select eligible literatures. The deadline for searching is March 30, 2023.

Condition being studied Osteoporosis, an age-related skeletal disorder, is characterized by an increased susceptibility to low-impact fractures attributable to reduced bone density. According to projections by the United Nations, the incidence of

hip fractures is anticipated to escalate significantly, reaching a staggering 6.26 million cases globally by the year 2050.

METHODS

Search strategy The system search encompassed a range of esteemed electronic databases, including PubMed, Embase, Springer Link, The Cochrane Library, and the China National Knowledge Infrastructure (CNKI), WanFang, and select eligible literatures. The deadline for searching is March 30, 2023. We used, in various relevant combinations, keywords included "Tai ji" or "Tai Chi" or "Tai ji quan" or "Qigong" or "Wuqinxi" or "Yijinjing" or "Baduanjin" or "Yoga" and "Osteoporosis" or "Bone density" or "bone mineral density" and "Postmenopausal or Menopause" or "elderly". Two authors

independently reviewed the title, abstract and full text to determine the eligible research.

Participant or population Elderly Patients with Osteoporosis.

Intervention taichi + drug / qigong + drug / yoga + drug.

Comparator Elderly Patients with Osteoporosis.

Study designs to be included Follow the PICO model in the reporting design, descriptive data extraction features include: first author, country and year of publication, sample size (attrition rate), mean age or age range, years of menopause, bone mass of participant, intervention design (intervention, time, frequency), and main outcome indicators.

Eligibility criteria The exclusion criteria: (1) articles with incomplete data or bone mineral density measurements cannot be used for statistical analysis; (2) case-studies, observational studies, non-randomized controlled studies, or review papers.

Information sources The system search encompassed a range of esteemed electronic databases, including PubMed, Embase, Springer Link, The Cochrane Library, and the China National Knowledge Infrastructure (CNKI), WanFang, and select eligible literatures.

Main outcome(s) Assessment of BMD at either the lumbar spine, femoral neck, or Ward's triangle.

Quality assessment / Risk of bias analysis The methodological assessment utilized the Physiotherapy Evidence Database Scale (PEDro), which underwent separate evaluation by the two authors. The scale consists of 11 criteria for evaluation, Studies with a score of 6 or above were classified as high quality.

Strategy of data synthesis Stata 14.0 (Version) software was used for statistical analysis. The SD and number of people in each group are extracted from the continuous result data. Considering the differences in the test units of the outcome indicators, using the random effect model of inverse-variance and 95% CI to determine the treatment effect size (ES), the ES is usually divided into small (0.2~0.49), medium (0.50~0.79), and large (≥ 0.80).

Subgroup analysis Both the Q-test and I² results determined heterogeneity in the literature. When

P50%, using the random-effects model. The low I²-value indicates the homogeneity of the experiment and proves the universality of the results. Funnel plot and Egger's regression intercept test were used to evaluate the publication bias of each study.

Sensitivity analysis In addition, we verified the reliability of the results through sensitivity analysis and compared the effect sizes between different subgroups through intervention characteristics classification. Subgroup variables include the age, intervention time, frequency, exercise session time and intervention methods.

Country(ies) involved China.

Keywords Mind-body exercise; Bone mineral density; Femoral neck; lumbar spine.

Contributions of each author

Author 1 - Lin Wang contributed to study concept and design, and interpretation of data, and drafting of the manuscript.

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Author 5 - Zaiqing Chun contributed to acquisition of data and drafting of the manuscript.