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Effects of different weekly frequencies of Baduanjin exercise on balance, bone health and quality of life in patients with primary osteoporosis

Submission date
02/06/2026

Recruitment status
Not yet recruiting

Registration date
03/06/2026

Overall study status
Ongoing

Last Edited
03/06/2026

Condition category
Musculoskeletal Diseases

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Primary osteoporosis can affect balance, muscle strength, and confidence in moving, which increases the risk of falls. Baduanjin is a traditional Chinese mind-body exercise that combines slow, gentle movements with breathing and mental focus. Previous studies suggest that Baduanjin may help improve balance, bone health and overall well-being in people with osteoporosis. However, it is not known how often people need to practise Baduanjin each week to get the most benefit. This study aims to compare the effects of doing Baduanjin 5, 3, or 1 session(s) per week with continuing usual daily activities. The objective is to find out which exercise frequency works best for improving balance, bone health, muscle strength, mood, sleep and quality of life in people with primary osteoporosis.

Who can participate?
Adults aged 50 to 79 years who have been diagnosed with primary osteoporosis and can stand and walk slowly without help. They need to have a balance score within a specific range.

What does the study involve?
Participants will be randomly divided into four groups: Group A (high frequency) – supervised Baduanjin 5 times per week; Group B (medium frequency) – 3 times per week; Group C (low frequency) – 1 time per week; Group D (control) – continue normal daily activities without structured Baduanjin. All sessions last about 60 minutes and are led by a qualified instructor following the official "Health Qigong · Baduanjin" programme. The exercise programme runs for 6 months, followed by a 3-month follow-up with no supervised sessions to see if benefits last. Assessments will be done at the start, after 6 months and after 9 months. Balance and physical function tests, grip strength, calf measurement, blood samples and questionnaires will be assessed at all three time points, while bone density and body composition scans will be performed at baseline and after 6 months.

What are the possible benefits and risks of participating?
Possible benefits include improvements in balance, muscle strength, confidence, bone health, mood, sleep and quality of life. Baduanjin is a low-risk, gentle exercise. The instructor will guide participants to move safely, avoiding excessive force or strain. Exercise intensity is moderate. There is a very small risk of minor muscle soreness. Blood sampling may cause brief discomfort or slight bruising. The DXA scan involves a very small amount of radiation, similar to natural background radiation over a few days.

Where is the study run from?
The Wangjing Hospital of China Academy of Chinese Medical Sciences (Beijing, China), together with the Nanyang Orthopaedic Hospital and Nanyang Hospital of Traditional Chinese Medicine (Henan Province, China).

When is the study starting and how long is it expected to run for?
Enrolment starts in June 2026. Each participant will be in the study for about 9 months (6-month exercise programme + 3-month follow-up). The whole study is expected to finish by the end of June 2027.

Who is funding the study?
This study is funded by the Scientific and Technological Innovation Project of China Academy of Chinese Medical Sciences — Innovation Team for the Prevention and Treatment of Bone Metabolic Diseases and Their Comorbidities with Traditional Chinese Medicine.

Who is the main contact?
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Scientific and Technological Innovation Project of China Academy of Chinese Medical Sciences — Innovation Team for the Prevention and Treatment of Bone Metabolic Diseases and Their Comorbidities with Traditional Chinese Medicine grant number
CI2024D003

Study information

Scientific Title
A four-arm randomized controlled trial comparing different weekly frequencies of Baduanjin exercise versus usual daily activities on balance, bone mineral density and quality of life in patients with primary osteoporosis

Study objectives
1. To compare the effects of Baduanjin exercise practised at 5, 3, or 1 sessions per week versus usual daily activities on Berg Balance Scale scores in patients with primary osteoporosis.
2. To evaluate the effects of different exercise frequencies on physical function, psychological and sleep health, bone mineral density, bone metabolism, body composition and quality of life.

3. To determine the optimal frequency of Baduanjin for osteoporosis management and to provide evidence for individualised traditional exercise prescription.

Ethics approval required
Ethics approval required

Ethics approval(s)
approved 30/04/2026, Ethics Committee of Wangjing Hospital, China Academy of Chinese Medical Sciences (No.6. Huajiadi Street, Chaoyang District, Beijing, 100102, China; +86 (010) 84739047; peterxfx@126.com), ref: WJEC-YJS-2026-005-P002

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Blinded (masking used)

Control
Dose comparison

Assignment
Parallel

Purpose
Treatment

Study type(s)

Health condition(s) or problem(s) studied
Primary osteoporosis

Interventions
This is a four-arm, parallel-group, randomised, single-blind assessor-blinded controlled trial. A total of 168 participants with primary osteoporosis will be randomly allocated in a 1:1:1:1 ratio to one of four groups:
(1) high-frequency Baduanjin group: supervised Baduanjin exercise 5 sessions per week, at least 60 minutes per session;
(2) medium-frequency Baduanjin group: supervised Baduanjin exercise 3 sessions per week, at least 60 minutes per session;
(3) low-frequency Baduanjin group: supervised Baduanjin exercise 1 session per week, at least 60 minutes per session;
(4) control group: usual daily activities without structured Baduanjin exercise.
The randomisation sequence will be generated by an independent statistician using R software, version 4.5.1. Allocation will be concealed using sequentially numbered, opaque, sealed envelopes prepared according to the randomisation sequence. The envelopes will be opened only after completion of baseline assessment and confirmation of participant eligibility. Outcome assessors will remain blinded to group allocation.

Participants in the Baduanjin groups will practise the official “Health Qigong · Baduanjin” programme issued by the General Administration of Sport of China. The sessions will be delivered as supervised group-based exercise sessions at the participating study centres by certified Baduanjin/Health Qigong instructors. Each session will include a 5-10 minute warm-up, 30-45 minutes of main Baduanjin practice, and a 5-10 minute cool-down. Exercise intensity will be controlled at a Borg Rating of Perceived Exertion of 11-13. The intervention will last for 6 months, followed by a 3-month follow-up period.
Attendance at each supervised session will be recorded using a Baduanjin exercise log, and adherence will be calculated as the number of completed sessions divided by the number of planned sessions. Adverse events will be recorded throughout the study by active questioning and spontaneous reporting.

Intervention Type
Behavioural

Primary outcome(s)
1. Balance Ability measured using Change from baseline in Berg Balance Scale score at the end of the intervention period (month 6) and at the end of follow-up (month 9), to investigate the short-term and long-term effects of different frequencies of Baduanjin exercise on balance function in patients with primary osteoporosis. at Baseline, month 6, month 9

Key secondary outcome(s))
1. Bone mineral density (g/cm²) at the lumbar spine (L1-L4) and left hip measured using dual-energy X-ray absorptiometry (DXA) at baseline and month 6

2. Bone turnover markers: Procollagen type I N-terminal propeptide (PINP), Beta C-terminal telopeptide of type I collagen (β-CTX), N-terminal mid-fragment osteocalcin (N-MID OC), Parathyroid hormone (PTH), and 25-hydroxyvitamin D (25(OH)D) measured using a fasting venous blood test at baseline and months 6 and 9

3. Fear of falling measured using the Chinese version of the Falls Efficacy Scale-International (FES-I) at baseline and months 6 and 9

4. Physical performance measured using the Short Physical Performance Battery (SPPB) score at baseline and months 6 and 9

5. Body composition parameters analysis, including total body fat mass, appendicular skeletal muscle mass, body fat percentage, and bone mineral content measured using dual-energy X-ray absorptiometry (DXA) at baseline and month 6

6. Physical function indicators (handgrip strength, calf circumference) measured using electronic dynamometer for handgrip strength and a tape for calf circumference at baseline and months 6 and 9

7. Psychological and quality of life indicators measured using the Warwick-Edinburgh Mental Well-being Scale (WEMWBS), Pittsburgh Sleep Quality Index (PSQI), and 12-Item Short Form Health Survey (SF-12) at baseline and months 6 and 9

8. Overall health status measured using the Traditional Chinese Medicine Health Scale (HSTCM) score at baseline and months 6 and 9

9. Long-term safety of Baduanjin intervention measured using data recording of all adverse events throughout the study period collected by active questioning and spontaneous reporting, analysed descriptively, at baseline to month 9 (entire study period)

10. New fragility fractures measured using data recording of all new fragility fractures throughout the study period collected by active questioning and imaging confirmation (X-ray /CT), analysed descriptively, at baseline to month 9 (entire study period)

Completion date
01/06/2027

Eligibility

Key inclusion criteria
1. Diagnosis of primary osteoporosis (DXA T-score ≤ -2.5 at lumbar spine, total hip or femoral neck, or presence of a hip/vertebral fragility fracture)
2. Aged 50–79 years, any sex
3. Berg Balance Scale score between 22 and 51
4. Able to give informed consent and voluntarily participate

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
50 years

Upper age limit
79 years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. Secondary osteoporosis (e.g., due to hyperparathyroidism, long-term glucocorticoid use, rheumatoid arthritis, etc.)
2. Use of anti-osteoporosis prescription medication (bisphosphonates, denosumab, teriparatide, selective estrogen receptor modulators, etc.) within 6 months prior to enrolment
3. Severe or unstable cardiovascular, respiratory or neurological disease (e.g., uncontrolled hypertension ≥ 160/100 mmHg, heart failure, stroke sequelae)
4. Severe knee, hip or spinal conditions that prevent standing or slow walking (e.g., severe osteoarthritis, acute lumbar disc herniation, spinal deformity)
5. Fragility fracture or orthopaedic surgery within the last 3 months
6. Pregnancy, breastfeeding, or planning to become pregnant within the next year
7. Currently engaged in regular exercise (moderate-intensity or above, ≥3 times per week, ≥30

minutes each session, including Baduanjin, Tai Chi, brisk walking, jogging, etc.)
8. Concurrent participation in another clinical trial that may affect balance or bone metabolism, or participation in another interventional clinical trial within the last 3 months
9. Unable to use a smartphone (if required for follow-up reminders or questionnaires)
10. Any factors that may limit adherence to follow-up, such as plan to leave the local area for a long time, alcohol or substance abuse, dementia or cognitive impairment

Date of first enrolment
08/06/2026

Date of final enrolment
30/09/2026

Locations

Countries of recruitment
China

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Sponsor information

Organisation
China Academy of Chinese Medical Sciences

ROR
https://ror.org/042pgcv68

Funder(s)

Funder type

Funder Name
Scientific and Technological Innovation Project of China Academy of Chinese Medical Sciences

Alternative Name(s)
CACMS

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
China

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available