INPLASY

Effectiveness of Yijin Jing Exercise in Improving Senile Sarcopenia: A Systematic Review and Meta-Analysis

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ADMINISTRATIVE INFORMATION

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 5 December 2024 and was last updated on 5 December 2024.

INTRODUCTION

Review question / Objective In elderly patients with sarcopenia, does Yijin Jing exercise, compared to control interventions or other exercise regimens, improve muscle strength, physical fitness, physical flexibility, and relative skeletal muscle mass index , considering different study designs, durations, and outcome measurement methods.

Rationale Sarcopenia, a prevalent condition in the elderly, is characterized by the progressive decline of skeletal muscle mass, strength, and function. It leads to increased risks of falls, physical disability, and frailty, thereby severely impairing the quality of life. The growing prevalence of sarcopenia due to global aging has spurred an urgent need for effective interventions.
Current treatment modalities include exercise therapy, nutritional support, and pharmacological approaches. However, drugs have limitations such as adverse reactions and a lack of specific medications for sarcopenia. Exercise therapy is thus emphasized as a primary treatment strategy.
The Yijin Jing, a traditional Chinese fitness exercise rooted in Traditional Chinese Medicine theory, involves coordinated movements with breathing and intention. It features gentle, slow, and balanced motions suitable for the elderly. Preliminary clinical trials on its role in sarcopenia have yielded inconsistent results with methodological shortcomings.

Condition being studied Sarcopenia is a geriatric muscular disorder characterized by the insidious and progressive deterioration of skeletal muscle mass, strength, and function. With the global population aging at an accelerated pace, sarcopenia has emerged as a significant health concern. Its prevalence is on the rise, reaching

approximately 10% among community-dwelling elderly globally and around 12% in China.

This condition is not only associated with a marked increase in the susceptibility to falls but also precipitates a notable decline in physical functionality. It ushers in a state of frailty that restricts the elderly's capacity for daily activities and self-care. The consequences include reduced mobility, impaired balance, and a higher likelihood of developing comorbidities such as osteoporosis and cardiovascular diseases. As such, sarcopenia poses a formidable threat to the quality of life and independence of the elderly population.

METHODS

Participant or population The participants targeted in this review are elderly individuals aged 60 years and above. This specific age group is selected due to the elevated susceptibility to sarcopenia with advancing age. The included studies involve both male and female participants, encompassing a diverse range of health backgrounds within the context of sarcopenia. This includes those with varying degrees of muscle mass reduction, strength decline, and functional impairment associated with the condition. The aim is to comprehensively assess the impact of Yijin Jing exercise on sarcopenia across different subgroups within this elderly population, providing a more generalized and clinically relevant understanding of its effectiveness.

Intervention The primary intervention under scrutiny in this review is the Yijin Jing exercise. Yijin Jing is a traditional Chinese fitness regimen deeply rooted in Traditional Chinese Medicine principles. It entails a sequence of meticulously choreographed movements that seamlessly integrate physical motion, respiration regulation, and mental concentration.

Typically, the exercise program involves performing Yijin Jing for specific durations and frequencies. The durations range from 20 minutes to 60 minutes per session, with frequencies varying from 3 to 5 times a week. The overall treatment courses span from 8 weeks to 6 months. The exercise is often guided by experienced Tai Chi experts or professional instructors well-versed in the practice. Some studies also explore combinations of Yijin Jing with other interventions. For instance, it is combined with resistance training, where participants engage in a set period of Yijin Jing practice followed by structured resistance exercises. In other cases, it may be integrated with massage manipulation or incorporated into autonomous sequence exercise programs that incorporate strength training elements. These variations in intervention strategies are investigated to discern the most efficacious approach for ameliorating senile sarcopenia.

Comparator The comparative interventions applied to the target population of elderly individuals with sarcopenia include several modalities. In some studies, the control group undertakes self-exercise, mainly engaging in unstructured physical activities for approximately 30 minutes each time, 3 times a week, over a similar time frame as the intervention group. This serves as a baseline comparison to assess the specific benefits of Yijin Jing exercise.

Another common comparative intervention is health education. Participants in the control group receive informational sessions regarding general health maintenance, lifestyle modifications, and basic knowledge about sarcopenia. However, no specific exercise regimen like Yijin Jing is implemented.

In certain trials, specific exercise modalities are used for comparison. For example, aerobic training, resistance training, or balance training are employed as alternatives. These training programs are designed with standardized protocols in terms of intensity, duration, and frequency to ensure a valid comparison with Yijin Jing exercise. Additionally, massage is used as a comparative intervention in some cases, with participants receiving regular massage sessions while the experimental group practices Yijin Jing. Such diverse comparative interventions are crucial for comprehensively evaluating the relative effectiveness of Yijin Jing in improving senile sarcopenia.

Study designs to be included This review will incorporate randomized controlled trials (RCTs) to address its objective. RCTs are the gold standard for evaluating the effectiveness of interventions as they minimize biases through random allocation of participants to intervention and control groups. This design allows for a direct comparison between the effects of Yijin Jing exercise and the comparative interventions. By randomly assigning participants, potential confounding factors are more evenly distributed, enhancing the internal validity of the results.

Eligibility criteria Non-randomized controlled studies are excluded as they lack the necessary methodological rigor to establish causal relationships and control for biases effectively. Studies involving non-human subjects are not relevant to the current research question focused on the improvement of senile sarcopenia in humans.

If the text of a study does not mention the diagnostic criteria or guidelines for sarcopenia, it is excluded to ensure the reliability and comparability of the data.

In the absence of any reported primary or secondary outcome indicators related to the pre-defined measures, a study is excluded as it does not provide the necessary data for analysis.

Information sources To comprehensively address the research question, multiple information sources will be utilized. Electronic databases play a pivotal role. Databases such as CNKI, VIP, WANFANG, PubMed, Cochrane Library, Web of Science, and Embase will be systematically searched. These databases cover a wide range of academic disciplines and geographical regions, ensuring a diverse and extensive collection of relevant research.

Main outcome(s) The review outcomes focus on multiple dimensions related to the impact of Yijin Jing exercise on senile sarcopenia. In terms of muscle strength, measures include grip strength and isokinetic muscle strength (e.g., peak torque, average power) of knee joint muscle groups. For physical fitness, gait speed, Berg Balance Scale scores, and results of Chair Stand and Squatting-to-Standing tests were considered. These were measured at the end of the intervention periods to gauge lower limb function and balance. Physical flexibility was evaluated through shoulder joint range of motion and sit and reach tests. Regarding muscle mass, relative skeletal muscle mass index and skeletal muscle area were analyzed. Subgroup analyses explored effects of Yijin Jing alone or combined with resistance training. Overall, the review comprehensively determines Yijin Jing's efficacy in enhancing muscle strength, fitness, flexibility, and mass, providing a basis for clinical sarcopenia management.

Quality assessment / Risk of bias analysis The quality assessment of primary studies will be conducted based on the evaluation criteria in Section 8 of the Cochrane Handbook for Systematic Reviews of Interventions. This approach ensures a standardized and comprehensive evaluation.

Six aspects will be meticulously examined. Selection bias will be assessed by evaluating the random sequence generation and allocation concealment methods. Performance bias will be gauged by determining whether blinding of participants and experimental personnel was implemented. Detection bias will be analyzed through the blinding of outcome assessors. Attrition bias will be inspected by considering the completeness of outcome data. Reporting bias will be scrutinized by checking for selective reporting. Additionally, other potential biases will be explored. Each aspect will be categorized as having a "low risk of bias", "high risk of bias", or "unclear risk of bias". This detailed classification enables a nuanced understanding of the study quality.

Strategy of data synthesis Data analysis will be performed using Windows Review Manager Version 5.4. For continuous variables such as grip strength, isokinetic muscle strength parameters (including peak torque, average power, etc.), gait speed, Berg Balance Scale scores, Chair Stand test results, Squatting-to-Standing test outcomes, sit and reach test values, shoulder joint range of motion, relative skeletal muscle mass index, and cross-sectional area of the third lumbar skeletal muscle, appropriate statistical methods will be applied.

If there is no heterogeneity between the trials ($I^2 \leq 50\%$), a fixed-effects model will be utilized. This model assumes that the true effect size is the same across all studies and provides a more precise estimate when heterogeneity is low. In contrast, if there is high heterogeneity ($I^2 > 50\%$), a random-effects model will be adopted. This model accounts for the variability in effect sizes between studies and provides a more conservative estimate.

Subgroup analysis Subgroup analysis will be conducted to explore potential sources of heterogeneity and better understand the effects of Yijin Jing exercise on senile sarcopenia within different subgroups. The subgroups will be defined based on various factors. One key factor is the type of intervention, distinguishing between Yijin Jing exercise alone and Yijin Jing combined with resistance exercise. This allows us to determine if the addition of resistance training modifies the impact on muscle strength, physical fitness, flexibility, and muscle mass.

Sensitivity analysis We will examine the impact of different methodological quality levels. By re-analyzing the data after excluding studies with a high risk of bias, we can evaluate whether the results are driven by lower-quality studies. This helps to ensure that the conclusions are based on more reliable evidence.

Another aspect of sensitivity analysis will focus on the choice of statistical models. We will compare the results obtained using fixed-effects and random-effects models when the heterogeneity levels are close to the decision threshold (I^2 around 50%). This comparison will provide insights into

the stability of the findings under different model assumptions.

Country(ies) involved China.

Keywords Yijin Jing; Senile Sarcopenia; Systematic Review; Meta-Analysis; Exercise Therapy.

Contributions of each author
Author 1 - Zizheng Wang - Led study design, managed lit search, analyzed data using RevMan 5.4. Wrote key sections. Ensured method rigor and result clarity for this Yijin Jing-sarcopenia study.
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