**Comparing the Effectiveness of Five Traditional Chinese Exercises in Improving Balance Function in Older Adults: A Systematic Review and Network Meta-Analysis**

1. The rationale for conducting the systematic review / meta-analysis;

Firstly, existing studies have confirmed the effectiveness of traditional Chinese exercises (TCEs) in improving balance function of older adults(Y. Huang et al., 2022; Saravanakumar et al., 2014; Zhai Fengming, 2013; Zhu Hanxiao, 2008), but existing research lacks systematic integration. The type of TCEs most effective in improving balance of older adults remains unclear.

Next, while certain meta-analyses have touched upon the subject of improved balance in older adults, the outcomes they choose are not entirely comprehensive. A more complete understanding of the impact of exercise on the improvement of balance in older adults may not be fully realized.

Moreover, there have been meta-analyses on people's balance function in a certain TCE (e.g., Tai Chi)(C. Y. Huang et al., 2022; Lin et al., 2024; Zou et al., 2017), which focus on comparing two groups. While network meta-analysis can compare multiple interventions simultaneously and rank the advantages and disadvantages of various interventions for specific outcomes(Puerto Nino & Brignardello-Petersen, 2023). A network meta-analysis available to combine and assess the effects of various TCEs on balance in older adults has not been implemented.

Therefore, this network meta-analysis aimed to evaluate the effectiveness of five TCEs (Baduanjin, Liuzijue, Tai Chi, Wuqinxi, and Yijinjing) in improving balance in older adults.

1. The contribution that it makes to knowledge in light of previously published related reports, including other meta-analyses and systematic reviews.

This network meta-analysis used five traditional Chinese exercises (TCEs), i.e., Baduanjin, Liuzijue, Tai Chi, Wuqinxi, and Yijinjing, to explore improving balance in older adults.

In contrast to previous studies as shown in Table 1, this study focused on healthy elderly people, adopted multiple TCEs, and included more diverse balance outcomes according to different aspects of balance function.

As a result, 46 randomized controlled trials and 3,333 older adults were included. This research found that all five TCEs had positive effects on improving balance in older adults. Among them, Tai Chi, Liuzijue, and Yijinjing improved the static, dynamic, and overall balance outcomes, respectively. Older adults can make a reasonable choice among these TCEs based on their needs.

**Table 1 literature review**

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| **Systematic reviews / meta-analyses** | **Types** | **Contributions** | **Emphasis** |
| The effects of different types of Tai Chi exercises on preventing falls in older adults: a systematic review and network meta-analysis (Lin et al., 2024) | Network meta-analysis | A network meta-analysis was performed to evaluate the effects of different types of Tai Chi exercises on the prevention of falls in the elderly. | Single intervention (Tai Chi);  Limited outcomes of falls. |
| Effects of traditional Chinese exercise on patients with cognitive impairment: A systematic review and Bayesian network meta-analysis  (Li et al., 2021) | A network meta-analysis to evaluate the effects of traditional Chinese exercises in patients with cognitive impairment. | Specific participants (Patients with cognitive impairment);  Different outcomes. |
| Network Meta-analysis of Four Kinds of Traditional Chinese Fitness Exercises in the Treatment of Osteoporosis in the Elderly  (Yu Ying, 2020) | A network meta-analysis of four traditional Chinese exercises for the treatment of osteoporosis in the elderly. | Fewer interventions (four TCEs);  Specific participants (Older adults with osteoporosis);  Different outcomes of osteoporosis. |
| A Systematic Review and Meta-Analysis Baduanjin Qigong for Health Benefits: Randomized Controlled Trials  (Zou et al., 2017) | Meta-analysis | A meta-analysis to evaluate the effects of Baduanjin Qigong on health benefits. | Single intervention (Baduanjin);  General participants;  Different outcomes of health. |
| The effect of Tai Chi in elderly individuals with sarcopenia and frailty: A systematic review and meta-analysis of randomized controlled trials  (C. Y. Huang et al., 2022) | A meta-analysis to evaluate the effect of Tai Chi in elderly individuals with sarcopenia and frailty. | Single intervention (Tai Chi);  Specific participants (Older adults with sarcopenia and frailty);  Different outcomes. |
| Follow-up of a Wuqinxi exercise at home programme to reduce pain and improve function for knee osteoarthritis in older people: a randomised controlled trial  (Xiao et al., 2021) | Randomized controlled trial | A randomized controlled trial was conducted to evaluate the effect of Wuqinxi in elderly individuals with knee osteoarthritis and pain. | Single intervention (Wuqinxi);  Specific participants (Older adults with knee osteoarthritis);  Different outcomes. |
| The influence of Baduanjin exercise on the physiological function of the elderly  (Zhai Fengming, 2013) | A randomized controlled trial was conducted to evaluate the effects of Baduanjin in elderly individuals with physiological functions.. | Single intervention (Baduanjin);  Different outcomes of physiological function. |
| Ours | Network meta-analysis | A network meta-analysis to evaluate the effects of five traditional Chinese exercises on balance function in the elderly. | Focusing on the balance function of older adults;  Comprehensive intervention (Five TCEs);  Comprehensive outcomes of balance function (static, dynamic, overall balance outcome, auxiliary balance outcomes);  Including comparison of interventions; |

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