Effectiveness of Tai Chi and yoga in improving mobility in seniors

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KEYWORDS

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ABSTRACT

Objective: The aim of this study was to compare the effectiveness of Tai Chi and yoga in improving mobility in seniors, with a focus on functional mobility, balance, endurance, and lower extremity function.

Methods: A prospective interventional study was conducted over 12 months at a community-based senior wellness center. A total of 200 seniors aged 60 years and above, with self-reported mobility limitations, were randomly assigned to either a Tai Chi group (n=100) or a yoga group (n=100). Both groups participated in 60-minute sessions, three times a week, under the guidance of certified instructors. Mobility was assessed at baseline, 6 months, and 12 months using the Timed Up and Go (TUG) Test, Six-Minute Walk Test (6MWT), Berg Balance Scale (BBS), and Short Physical Performance Battery (SPPB).

Results: At 12 months, both groups showed significant improvements in all mobility measures. The Tai Chi group demonstrated a greater reduction in TUG time (31.1% improvement) compared to the yoga group (26.0%, p=0.04). The Tai Chi group also showed a greater improvement in the 6MWT (24.2% vs. 19.0%, p=0.03) and BBS (15.2% vs. 13.1%, p=0.05). The SPPB improvement was higher in the Tai Chi group (29.3%) compared to the yoga group (27.2%, p=0.07). No significant differences in adverse events were reported between the two groups, with mild muscle soreness and joint pain being the most common occurrences.

Conclusion: Both Tai Chi and yoga are effective interventions for improving mobility in seniors. Tai Chi demonstrated slightly more favorable outcomes, particularly in functional mobility, balance, and endurance. These findings support the inclusion of both Tai Chi and yoga as part of senior wellness programs to enhance mobility and prevent falls in older adults. Further studies are needed to explore long-term benefits and mechanisms underlying these improvements.

INTRODUCTION

As the global population ages, maintaining mobility in older adults has become an increasingly important focus for healthcare providers. Reduced mobility in seniors can lead to decreased independence, increased fall risk, and a lower quality of life. To address this issue, various interventions, including physical activity programs, have been explored. Among these, Tai Chi and yoga have emerged as popular low-impact exercises that may offer benefits in improving mobility, balance, strength, and flexibility among older adults.

Tai Chi, a traditional Chinese martial art, involves slow, deliberate movements and deep breathing exercises aimed at enhancing balance, flexibility, and strength. Research has suggested that Tai Chi can improve functional mobility and reduce the risk of falls in older adults. Studies have shown that Tai Chi interventions are associated with improvements in balance, lower extremity function, and overall physical performance, particularly in populations with mobility impairments [1, 2].

Yoga, an ancient practice that combines physical postures, controlled breathing, and meditation, has been similarly praised for its potential to improve mobility and balance in seniors. Yoga can enhance flexibility, muscle strength, and postural control, making it beneficial for older adults suffering from conditions such as arthritis and osteoporosis [3, 4].

Previous studies have demonstrated that regular yoga practice may also help in reducing fall risk and improving overall physical performance in the elderly [5, 6].

This study aims to compare the effectiveness of Tai Chi and yoga in improving mobility in seniors. The intervention was carried out in a community-based senior wellness center, and participants were evaluated on various mobility measures such as the Timed Up and Go (TUG) Test, Six-Minute Walk Test (6MWT), Berg Balance Scale (BBS), and Short Physical Performance Battery (SPPB) at baseline, 6 months, and 12 months.

MATERIAL AND METHODS

Study Design and Setting This study is a prospective interventional study conducted over a period of one year to evaluate the effectiveness of Tai Chi and yoga in improving mobility among seniors. The study was carried out at a community-based senior wellness center in collaboration with a tertiary care hospital.

Sample Size and Population; A total of 200 senior participants (aged 60 years and above) were recruited for the study. Participants were selected based on specific inclusion and exclusion criteria.

Inclusion Criteria:

- Individuals aged 60 years and above.
- Participants with self-reported mobility limitations but able to stand and walk independently with or without assistive devices.
- Willingness to participate in the study and provide informed consent.

Exclusion Criteria:

- Individuals with severe musculoskeletal disorders limiting movement (e.g., advanced osteoarthritis, severe osteoporosis).
- Participants with neurological conditions affecting mobility (e.g., Parkinson's disease, stroke with significant impairment).
- Individuals with acute illnesses or uncontrolled chronic conditions.
- Those already practicing Tai Chi or yoga regularly (≥3 times per week) prior to enrollment.

Intervention Participants were randomly assigned into two intervention groups:

1. Tai Chi Group (n=100): Engaged in Tai Chi sessions for 60 minutes, three times a week under certified instructors.
2. Yoga Group (n=100): Participated in guided yoga sessions for 60 minutes, three times a week under certified yoga trainers.

Both interventions focused on gentle, low-impact exercises aimed at improving flexibility, balance, and strength. The programs were progressively modified over time to accommodate participants' improving abilities.

Outcome Measures Mobility was assessed at baseline, 6 months, and 12 months using the following validated tools:

- Timed Up and Go (TUG) Test: Measures functional mobility and risk of falls.
- Six-Minute Walk Test (6MWT): Evaluates endurance and walking capacity.
- Berg Balance Scale (BBS): Assesses balance performance.
- Short Physical Performance Battery (SPPB): Measures lower extremity function.

Data Collection and Analysis Data were collected by trained assessors blinded to group assignments. Statistical analysis was performed using SPSS software. Between-group differences were analyzed using an independent t-test or Mann-Whitney U test for continuous variables, and chi-square tests for categorical variables. A repeated-measures ANOVA was conducted to evaluate changes over time.

Ethical Considerations; The study was approved by the Institutional Ethics Committee. Written informed consent was obtained from all participants before enrollment. Participants were monitored for any adverse events, and appropriate medical attention was provided if necessary.

RESULTS AND OBSERVATIONS;

Table 1: Baseline Characteristics of Participants

Characteristic	Tai Chi Group (n=100)	Yoga Group (n=100)	p-value
Age (years, Mean ± SD)	68.2 ± 5.1	67.9 ± 4.9	0.62
Gender (Male/Female)	48/52	50/50	0.78
BMI (kg/m², Mean ± SD)	26.4 ± 3.5	26.1 ± 3.6	0.71
Hypertension (%)	45 (45%)	47 (47%)	0.82
Diabetes (%)	38 (38%)	41 (41%)	0.68
Prior Falls (%)	32 (32%)	35 (35%)	0.59

p-value <0.05 indicates statistical significance.

Table 2: Baseline Mobility Scores

Outcome Measure	Tai Chi Group (Mean ± SD)	Yoga Group (Mean ± SD)	p-value
Timed Up and Go (TUG) Test (sec)	14.8 ± 2.5	14.6 ± 2.7	0.65
Six-Minute Walk Test (6MWT) (m)	310 ± 50	315 ± 48	0.72
Berg Balance Scale (BBS)	42.1 ± 4.2	41.8 ± 4.5	0.79
Short Physical Performance Battery (SPPB)	8.2 ± 1.5	8.1 ± 1.4	0.68

p-value <0.05 indicates statistical significance.

Table 3: Change in Mobility Outcomes at 6 Months

Outcome Measure	Tai Chi Group (Mean ± SD)	Yoga Group (Mean ± SD)	p-value
Timed Up and Go (TUG) Test (sec)	12.4 ± 2.3	12.9 ± 2.5	0.12
Six-Minute Walk Test (6MWT) (m)	350 ± 45	340 ± 48	0.21
Berg Balance Scale (BBS)	45.0 ± 3.9	44.3 ± 4.0	0.30
Short Physical Performance Battery (SPPB)	9.5 ± 1.4	9.3 ± 1.5	0.43

p-value <0.05 indicates statistical significance.

Table 4: Change in Mobility Outcomes at 12 Months

Outcome Measure	Tai Chi Group (Mean ± SD)	Yoga Group (Mean ± SD)	p-value
Timed Up and Go (TUG) Test (sec)	10.2 ± 2.0	10.8 ± 2.1	0.03*
Six-Minute Walk Test (6MWT) (m)	385 ± 52	375 ± 50	0.04*
Berg Balance Scale (BBS)	48.5 ± 3.8	47.3 ± 4.0	0.02*
Short Physical Performance Battery (SPPB)	10.6 ± 1.3	10.3 ± 1.2	0.05*

p-value <0.05 indicates statistical significance.

Table 5: Percentage Improvement in Mobility Measures Over 12 Months

Outcome Measure	Tai Chi Group (%)	Yoga Group (%)	p-value
Timed Up and Go (TUG) Test	31.1%	26.0%	0.04*
Six-Minute Walk Test (6MWT)	24.2%	19.0%	0.03*
Berg Balance Scale (BBS)	15.2%	13.1%	0.05*
Short Physical Performance Battery (SPPB)	29.3%	27.2%	0.07

p-value <0.05 indicates statistical significance.

Table 6: Adverse Events Reported During the Study

Adverse Event	Tai Chi Group (n=100)	Yoga Group (n=100)	p-value
Muscle soreness	12 (12%)	15 (15%)	0.52
Joint pain	8 (8%)	10 (10%)	0.65
Dizziness	5 (5%)	7 (7%)	0.48
Falls	3 (3%)	4 (4%)	0.72

p-value <0.05 indicates statistical significance.

DISCUSSION

This study was designed to compare the effectiveness of Tai Chi and yoga in improving mobility in seniors. Both interventions, which are increasingly recommended for older adults to improve physical function, were evaluated across four key mobility measures: the Timed Up and Go (TUG) Test, the Six-Minute Walk Test (6MWT), the Berg Balance Scale (BBS), and the Short Physical Performance Battery (SPPB). Over the course of 12 months, both groups demonstrated significant improvements, with Tai Chi showing slightly more favorable results in some measures. These findings contribute to the growing body of evidence supporting the use of both Tai Chi and yoga as beneficial interventions for improving mobility and functional independence in older adults.

At the baseline, both the Tai Chi and yoga groups had comparable demographic characteristics, such as age, BMI, and comorbidity status. This is important because it suggests that the observed improvements in mobility outcomes were primarily due to the interventions themselves rather than confounding factors. Given that both interventions were well tolerated, the study provides further support for the safety and feasibility of Tai Chi and yoga for older adults, particularly those with various health conditions.

Improvement in Functional Mobility and Balance: The Timed Up and Go (TUG) Test is an established measure of functional mobility, assessing an individual's ability to stand from a seated position, walk a set distance, turn, return, and sit down. Both groups showed improvements in TUG scores, but the Tai Chi group demonstrated a more substantial reduction in time (31.1%) compared to the yoga group (26.0%). This finding is consistent with previous studies that have suggested that Tai Chi, due to its emphasis on balance and slow, controlled movements, may be more effective in improving functional mobility compared to other forms of exercise, including yoga [1, 2].

Similarly, the Six-Minute Walk Test (6MWT), which measures endurance by assessing the distance an individual can walk in six minutes, revealed improvements in both groups. The Tai Chi group showed a greater distance walked (385 meters) compared to the yoga group (375 meters). These results align with other studies that have found Tai Chi to be effective in improving cardiovascular endurance, particularly in older adults [3, 4]. The yoga group also showed a significant improvement in walking distance, underscoring the beneficial effects of both interventions on physical fitness.

The Berg Balance Scale (BBS), which evaluates balance ability, showed improvements in both groups, with the Tai Chi group showing a greater percentage improvement (15.2%) compared to the yoga group (13.1%). This is in line with the growing evidence suggesting that Tai Chi,

which emphasizes weight shifting, postural control, and mindful movement, has a more pronounced effect on balance than other exercise modalities, including yoga [5]. The slow, controlled movements characteristic of Tai Chi may enhance proprioception and stability, making it particularly beneficial for older adults at risk of falls.

Lower Extremity Function: The Short Physical Performance Battery (SPPB), a composite measure of lower extremity function, also demonstrated improvements in both groups. The Tai Chi group had a slightly higher percentage improvement (29.3%) compared to the yoga group (27.2%). These results suggest that both Tai Chi and yoga are beneficial for enhancing lower limb strength, flexibility, and function. Research supports the notion that both forms of exercise can help maintain or improve mobility, strength, and function in older adults [6, 7].

Safety and Adverse Events: One of the key strengths of this study is its focus on safety. Both interventions were well tolerated by participants, with few adverse events reported. Most adverse events, such as muscle soreness, joint pain, dizziness, and occasional falls, were similar in both groups and were mostly mild in nature. These findings are consistent with previous studies, which have demonstrated that both Tai Chi and yoga are safe for older adults when practiced with proper instruction and supervision [8, 9]. The low incidence of adverse events further supports the recommendation for these interventions as part of senior wellness programs.

Comparison with Other Studies: The results of this study are consistent with several other studies that have examined the effects of Tai Chi and yoga on mobility in older adults. Li et al. (2005) found that Tai Chi significantly improved balance and reduced the risk of falls in older adults, which is in line with our findings in the BBS and TUG test. A systematic review by Cramer et al. (2013) also concluded that yoga is effective in improving physical performance, including flexibility and strength, which was supported by the results observed in our study, particularly in the 6MWT and SPPB [10, 11].

Furthermore, the finding that Tai Chi outperformed yoga in some measures, particularly in functional mobility and balance, is consistent with a study by Wayne et al. (2008), which suggested that Tai Chi may have more pronounced effects on balance and postural control compared to yoga. On the other hand, studies like those by Ross & Thomas (2010) have suggested that yoga, particularly restorative or Hatha yoga, can have similar benefits in improving flexibility, strength, and endurance, which aligns with the improvements observed in the yoga group in this study.

Limitations and Future Directions: While the results of this study are promising, several limitations should be acknowledged. First, the study was conducted in a community-based senior wellness center, which may limit the generalizability of the findings to other populations or settings, such as hospitals or nursing homes. Additionally, the sample was relatively homogenous in terms of age and health conditions, which may limit the applicability of the results to more diverse groups. Future studies should aim to include a broader range of participants with varying health conditions, including those with severe mobility impairments, to better understand the impact of Tai Chi and yoga across different populations.

Moreover, the study only measured mobility outcomes, and future research should explore other outcomes, such as mental health, quality of life, and social well-being, to provide a more comprehensive understanding of the benefits of Tai Chi and yoga in seniors. It would also be valuable to examine the long-term effects of these interventions, as well as their impact on fall risk and cognitive function.

CONCLUSION: In conclusion, both Tai Chi and yoga are effective interventions for improving mobility in older adults. While Tai Chi showed slightly greater improvements in balance, functional mobility, and endurance, both interventions were associated with significant benefits. These findings suggest that Tai Chi and yoga can be used as safe and effective strategies for promoting physical health and mobility in seniors, ultimately enhancing their quality of life and reducing the risk of falls. Further research is needed to explore the long-term effects and broader health benefits of these interventions.

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