INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 14, Issue 9, (2024) E-ISSN: 2222-6990

Feasibility of Tai Chi Intervention for Improving Quality of Life in Older Adults with Gait Disorders: A Pilot Study

Fan Xu[1], Kim Geok Soh[1], Yoke Mun Chan[2]

[1]Department of Sport Studies, Faculty of Education Studies, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia, [2]Department of Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

Corresponding Author Email: kims@upm.edu.my

To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v14-i9/22968 DOI:10.6007/IJARBSS/v14-i9/22968

Published Date: 24 September 2024

Abstract

Maintaining older adults' health and quality of life (QoL) is increasingly important with the global population ageing. Gait disorders can lead to reduced mobility and a heightened risk of falls, significantly impacting the overall well-being of older adults. Tai Chi (TC), a traditional Chinese martial art, is recognised for its potential to improve balance, strength, and mobility, which may, in turn, positively influence the QoL in older adults. This pilot study aimed to evaluate the feasibility and effectiveness of a TC intervention on the QoL of older adults with gait disorders. Recruited 16 participants and conducted a two-week training session. QoL was assessed using the SF-36 questionnaire, with validity and reliability evaluated through the content validity index (CVI) and expert ratings. All statistical analyses were conducted using SPSS version 20.0. Content validity analysis indicated strong correlations among SF-36 items (CVI = 0.833, kappa = 0.816), and internal consistency across dimensions was high (Cronbach's alpha ranged from 0.846 to 0.970). Despite high retention and compliance rates, there were no significant improvements in overall QoL scores post-intervention. This study demonstrates the feasibility and acceptability of a TC intervention for older adults with gait disorders. Although no significant changes in QoL were observed, the findings suggest that further research with extended interventions is warranted to explore the potential benefits of TC for this population.

Keywords: Tai Chi, Quality Of Life, Older Adults, Gait Disorders.

Introduction

Many older adults with gait impairments experience significant quality of life (QoL) and physical function (Mahlknecht et al., 2013; Motl & McAuley, 2010) challenges. Gait impairments frequently lead to falls, which are a leading cause of disability among older adults (Bloem et al., 1992). These impairments can arise from neurological deficits at various levels or may be secondary to non-neurological causes (Ronthal, 2019). As gait deteriorates, postural instability and mobility limitations become more pronounced, increasing the risk of

injury and reducing the ability to perform daily activities (Kim et al., 2013). The effects of gait impairments extend beyond physical limitations, as they are also associated with psychological distress, social isolation, and diminished well-being (Shankar et al., 2017). However, these abnormalities can be readily identified in clinical settings, and timely diagnosis and appropriate interventions can help prevent the decline in QoL and the risks associated with falls in older adults (Rubino, 1993).

Tai Chi, a traditional Chinese mind-body exercise, has garnered attention as a potential therapeutic intervention to enhance physical function in older adults (Choo et al., 2020). Rooted in traditional Chinese medicine (TCM), TC emphasises the harmonious integration of mind and body, promoting overall health. This practice is characterised by slow, deliberate movements, controlled breathing, and focused meditation, making it particularly well-suited for older adults, especially those with gait disorders (Kamieniarz et al., 2021; Wang, 2024). Previous studies have demonstrated that TC can significantly improve physical function in older adults, including balance, gait, and muscle strength, which are essential for maintaining independence and reducing the risk of falls (Liu & Frank, 2010). Moreover, TC's low-impact nature and focus on mindful movement make it accessible to older adults with varying levels of physical ability (Miller et al., 2020). While these findings are promising, further research is needed to explore the effects of TC on the overall QoL of older adults with gait disorders.

While these findings are encouraging, further research is required to examine the effects of TC on the overall QoL of older adults with gait disorders. Addressing these gaps is crucial for developing comprehensive non-pharmacological interventions that not only improve physical function but also enhance the overall QoL in older adults with functional impairments. Therefore, this study aimed to investigate the effects of Yang Style 24-Posture TC on the QoL of older adults with gait disorders and assess its feasibility as a complementary therapeutic approach. This study aimed to evaluate whether TC is a practical, safe, and effective intervention to improve QoL in older adults with gait disorders.

Methodology

Participants

The participants in this study were 16 older adults from Qingchuang Senior University in Taiyuan, Shanxi, China. The inclusion criteria were: (1) Tinetti Gait and Balance Test score of less than 23 points; (2) mild gait disorder; (3) no participation in physical interventions for more than six months; and (4) agreement to undertake the two-week intervention, with voluntary signed informed consent. The exclusion criteria were (1) severe gait disorder, (2) inability to walk independently, and (3) severe visual or hearing impairment. Ethical approval for the study was granted by the Ethics Review Committee of Yancheng People's Hospital (Ethics approval number: 2023-K-099). The participants were all aged 60 years or older. During the study, participants were instructed to refrain from engaging in additional physical interventions, maintaining only their usual daily activities and the TC intervention. Additionally, participants were required to follow a regular diet, which the researchers recorded. After the two-week intervention, repeated measurements were taken to assess the effects and feasibility of the intervention.

Participant Characteristics

Basic demographic and physical tests were conducted on older adults, including measurements of age, gender, height, and weight. Height was measured using a height tape and recorded in centimetres, while weight was recorded in kilograms using a weighing scale. Participants were instructed to wear slippers for height measurements and ensure that their heads, shoulders, and hips were aligned straight. A self-designed questionnaire was used to collect participants' ages and genders uniformly. The average age of the participants was 69.88±7.59 years, with the youngest being 60 and the oldest 84 years old. In terms of gender, there were 12 females and four males. The group's average height was 165.75±5.75 cm, and the average weight was 62.31±6.49 kg.

Training Program

The intervention used in this study was the Yang-style 24-posture TC, which is widely practised among older adults due to its relatively slow, simple, and gentle movements, focusing on balance, mobility, and controlled breathing (Miller et al., 2020). This specific form was selected because it is easy for beginners to learn and has been shown to improve physical function in older adults (Taylor-Piliae & Coull, 2012). The TC sessions were structured into three main components:

i. Warm-up (10 minutes): Participants engaged in light stretching, breathing exercises, and gentle joint mobilisation to prepare their bodies for TC practice.
ii. Main TC Practice (40 minutes): This segment involved practising the Yang-style 24-posture movements, with the instructor guiding participants through each movement to ensure correct posture and technique. The movements were performed slowly to accommodate the abilities of older adults with gait impairments.
iii. Cool-down (10 minutes): At the end of the class, participants performed slow, gentle movements and relaxation exercises to unwind, incorporating controlled breathing and stretching exercises to promote flexibility and relaxation.
iv. Frequency: Participants attended three classes per week over two weeks, each lasting 60 minutes.
v. The TC classes were led by an instructor with ten years of experience and certification in Yang-style TC. The instructor provided continuous feedback on posture and technique, adapting movements when necessary to accommodate participants' varying physical abilities.
vi. Safety considerations: Participant safety was prioritised throughout the intervention. All classes were conducted in a classroom at the University for Older Adults, ensuring a safe and controlled environment.

Test Instrument

To assess the impact of the TC intervention on participants' QoL, this study employed the Short Form 36 Health Questionnaire (SF-36), a widely used and validated tool for measuring health-related QoL. The SF-36 evaluates multiple dimensions of physical and mental health, and in this study, four key dimensions were analysed:

i. Physical Functioning (PF): This dimension assesses how health limitations affect an

individual's ability to perform various physical activities, such as walking or climbing stairs.

ii. Role Physical (RP): The RP scale measures how physical health affects work and daily activities, including difficulties experienced in these areas due to physical health issues.

iii. General Health (GH): This dimension evaluates a person's overall perception of their health, including their current health status and expectations for future health.

iv. Vitality (VT): The VT scale measures energy levels and fatigue, capturing how energetic or tired the participant feels.

Outcome Measures

Main Outcomes – Feasibility: The primary outcome of this pilot study was to assess the feasibility of implementing a TC intervention for older adults with gait disorders. Feasibility was evaluated through several key measures:

i. Recruitment Rate: The proportion of eligible participants who enrolled in the study.

ii. Retention Rate: The percentage of participants who completed the two-week intervention.

iii. Adherence: This was tracked through attendance records, with adherence defined as attending at least 80% of the scheduled sessions.

iv. Adverse Events: Safety and tolerability were closely monitored throughout the study, and any adverse events or injuries occurring during TC sessions were recorded.

v. QoL: Changes in QoL were assessed using the SF-36 questionnaire, administered at baseline and after the intervention. The QoL dimensions evaluated included PF, RP, GH, and VT.

Statistical Analysis

The Content Validity Index (CVI) was calculated to evaluate the questionnaire's reliability, and its validity was further confirmed through expert evaluation and scoring. All preliminary statistical analyses were conducted using SPSS version 20.0 (IBM, USA).

Results

Questionnaire Validity Assessment

The SF-36 is a well-established measurement tool that has been demonstrated to be effective, including among older adults (Lera et al., 2013). In this study, six experts from relevant fields - comprising professors, medical professionals, and TC masters -were invited to evaluate the intervention and training methods to ensure content relevance. The Content Validity Index (CVI) analysis results indicated that the relevance scores for the SF-36 items (CVI = 0.833, kappa = 0.816) fell within the acceptable range for content validity. Thus, the intervention programme possesses high content validity. Please see Table 1 for details.

Table 1
Relevancy and Agreement of the SF-36

Type	Content type	Total agreement	Number of experts	I-CVI	Kappa
QoL	SF-36	5	6	0.833	0.816

Note: QoL: quality of life; I-CVI: Item-Content Validity Index

Reliability

Internal Consistency: The internal consistency of the SF-36 was assessed using Cronbach's alpha for four key dimensions: PF, RP, GH, and VT. Cronbach's alpha values of 0.70 or higher are acceptable for scale reliability. The alpha value for the PF dimension was 0.846, indicating excellent internal consistency. For the RP dimension, the alpha value was 0.970, demonstrating strong reliability. The Cronbach's alpha for the GH dimension was 0.909, reflecting high reliability, while the alpha value for VT was 0.911, indicating acceptable internal consistency. These results suggest that the SF-36 subscales provide consistent and reliable measures of multiple dimensions of QoL for older adults in this study (0.846–0.970). Please refer to Table 2 for further details.

Table 2
Cronbach's Alpha Value of the Questionnaire

Variable	Dimension	Cronbach's alpha
QoL	PF	0.846
	RP	0.970
	GH	0.909
	VT	0.911

Note: PF: physical functioning, RP: role physical, GH: general health, VT: vitality

In addition, reliability tests were conducted for each dimension of the SF-36 scale. The Intraclass Correlation Coefficients (ICCs) revealed the following results: Physical Functioning (PF) ranged from 0.768 to 0.892, Role Physical (RP) ranged from 0.854 to 0.929, General Health (GH) ranged from 0.704 to 0.905, and Vitality (VT) ranged from 0.900 to 0.959. For further details, please refer to Table 3.

Table 3
Reliability of Questions in SF-36 Dimensions

Variable	List of questions	ICC	95% confidence interval	
			Lower bound	Upper bound
PF	Q1	0.828	0.671	0.914
	Q2	0.855	0.719	0.928
	Q3	0.805	0.631	0.902
	Q4	0.775	0.580	0.886
	Q5	0.892	0.787	0.947
	Q6	0.784	0.596	0.890
	Q7	0.871	0.747	0.936
	Q8	0.873	0.753	0.937
	Q9	0.768	0.571	0.882
	Q10	0.843	0.699	0.922
RP	Q1	0.854	0.716	0.928
	Q2	0.861	0.727	0.931
	Q3	0.929	0.858	0.965
	Q4	0.855	0.719	0.928
GH	Q1	0.808	0.637	0.903
	Q2	0.876	0.759	0.939
	Q3	0.895	0.793	0.949
	Q4	0.905	0.810	0.954
	Q5	0.704	0.470	0.846
VT	Q1	0.958	0.883	0.986
	Q2	0.918	0.837	0.960
	Q3	0.900	0.727	0.965
	Q4	0.959	0.885	0.986

Note: PF: physical functioning, RP: role physical, GH: general health, VT: vitality

Feasibility, Adherence, and Safety of the Tai Chi Intervention

The study achieved a high retention rate, with all participants completing the two-week intervention. This indicates that the intervention was well tolerated and demonstrated physical and logistical feasibility. The feasibility assessment results suggest that the TC intervention is appropriate for older adults with gait disorders. Furthermore, a participation rate exceeding 80% indicates that participants consistently attended the TC classes and actively engaged throughout the intervention (Salmoirago-Blotcher et al., 2017). This adherence is crucial for long-term programmes, as it significantly contributes to achieving positive health outcomes.

The recruitment rate was also high, with many eligible participants participating. This finding suggests that older adults with gait disorders are interested in TC as an exercise intervention and perceive it as a convenient and appealing option for improving their health. Notably, no significant adverse events occurred during the intervention, further reinforcing the safety and feasibility of implementing TC within this population.

Quality of Life

In this pilot study, the assessment of QoL using the SF-36 revealed no significant improvement following the two-week TC intervention. The global QoL scores remained unchanged from baseline measurements after the intervention. These results indicate that the participant's QoL did not experience significant alterations over such a short period. Consequently, further studies with extended intervention durations may be necessary to investigate the potential effects of TC on QoL among older adults.

Discussion

This pilot study aimed to evaluate the feasibility and effectiveness of a TC intervention on the QoL of older adults with gait disorders. The findings offer valuable insights into the content validity and reliability of the SF-36 as a measurement tool and the feasibility of implementing a TC programme for this population.

Content validity index (CVI) analysis demonstrated that the SF-36 items exhibited strong correlations, with a CVI of 0.833 and a kappa value of 0.816, confirming the appropriateness of the questionnaire for this cohort. High Cronbach's alpha values for the dimensions of PF, RP, GH, and VT further supported the reliability of the SF-36 in assessing the QoL of older adults. These results are consistent with previous research, underscoring the SF-36's utility as an effective tool for evaluating health-related QoL, particularly in older adults (Bohannon & DePasquale, 2010; Lam et al., 2005).

Despite the robust validity and reliability of the SF-36 (Lam et al., 2005), our results indicated no significant improvement in QoL following the two-week TC intervention. This lack of change may be attributed to the short duration of the intervention. Previous studies have suggested that extended interventions may be necessary to observe substantial improvements in QoL outcomes, particularly in populations with pre-existing health problems (Anderson & Ozakinci, 2018). Consequently, further research with more extended intervention periods could provide more insight into the potential long-term effects of TC on QoL in older adults.

The high retention rate and adherence to the TC programme suggest its feasibility and acceptability among participants. With a participation rate exceeding 80%, it is evident that the older adults were actively engaged and found value in the intervention (Campo et al., 2013). The absence of significant adverse events further highlights the safety of TC as a physical activity for this population. These findings indicate that TC is an appealing option for older adults seeking to enhance their physical fitness and overall well-being.

In conclusion, while this pilot study did not reveal significant improvements in QoL over a short period, it provides essential preliminary data suggesting the feasibility and safety of TC for older adults with gait impairments. Future studies should consider longer intervention durations and explore additional QoL measures to understand the potential benefits of TC for this population fully.

Study Limitations

This preliminary study has several limitations that warrant acknowledgement. Firstly, the short duration of the intervention (two weeks) may have been inadequate for observing significant changes in QoL outcomes. Previous research indicates that longer interventions are generally necessary to assess the effects of exercise programmes on health-related QoL accurately. Secondly, the small sample size constrains the generalisability of the findings. While this study achieved high retention and adherence rates, a larger sample would enhance the robustness of the results and provide a clearer understanding of the intervention's effects across a more diverse population.

Conclusion

This pilot study offers valuable insights into the feasibility and safety of a TC intervention for older adults with gait disorders. Although the results revealed no significant improvements in QoL over the two-week intervention period, the high retention and adherence rates indicate that participants found the programme acceptable and engaging. The strong validity and reliability of the SF-36 further endorse its use as a measurement tool in this population. Despite certain limitations, including the short intervention duration and small sample size, this study lays a foundation for future research. More extended intervention periods and more prominent, more diverse samples are essential to fully explore the potential effects of TC on QoL and assess its long-term benefits for older adults. Ultimately, TC presents as a promising, safe, and enjoyable exercise option that may enhance the health and well-being of older adults with gait disorders.

References

Anderson, N., & Ozakinci, G. (2018). Effectiveness of psychological interventions to improve quality of life in people with long-term conditions: rapid systematic review of randomised controlled trials. *BMC Psychology*, *6*, 1-17.

Bloem, B. R., Haan, J., Lagaay, A. M., van Beek, W., Wintzen, A. R., & Roos, R. A. (1992). Investigation of gait in elderly subjects over 88 years of age. *J Geriatr Psychiatry Neurol*, *5*(2), 78-84. https://doi.org/10.1177/002383099200500204

Bohannon, R. W., & DePasquale, L. (2010). Physical Functioning Scale of the Short-Form (SF) 36: internal consistency and validity with older adults. *Journal of Geriatric Physical Therapy*, *33*(1), 16-18.

Campo, R. A., O'Connor, K., Light, K. C., Nakamura, Y., Lipschitz, D. L., LaStayo, P. C., Pappas, L., Boucher, K., Irwin, M. R., Agarwal, N., & Kinney, A. Y. (2013). Feasibility and acceptability of a Tai Chi Chih randomized controlled trial in senior female cancer survivors. *Integr Cancer Ther*, *12*(6), 464-474. https://doi.org/10.1177/1534735413485418

Choo, Y. T., Jiang, Y., Hong, J., & Wang, W. (2020). Effectiveness of Tai Chi on quality of life, depressive symptoms and physical function among community-dwelling older adults with chronic disease: A systematic review and meta-analysis. *Int J Nurs Stud*, *111*, 103737. https://doi.org/10.1016/j.ijnurstu.2020.103737

Kamieniarz, A., Milert, A., Grzybowska-Ganszczyk, D., Opara, J., & Juras, G. (2021). Tai Chi and Qi Gong therapies as a complementary treatment in Parkinson's disease–a systematic review. *Complementary Therapies in Medicine*, *56*, 102589.

Kim, S. D., Allen, N. E., Canning, C. G., & Fung, V. S. (2013). Postural instability in patients with Parkinson's disease: Epidemiology, pathophysiology and management. *CNS Drugs*, *27*, 97-112.

Lam, C. L., Eileen, Y., Gandek, B., & Fong, D. Y. (2005). The SF-36 summary scales were valid, reliable, and equivalent in a Chinese population. *Journal of clinical epidemiology*, *58*(8), 815-822.

Lera, L., Fuentes-García, A., Sánchez, H., & Albala, C. (2013). Validity and reliability of the SF-36 in Chilean older adults: the ALEXANDROS study. *European journal of ageing*, *10*, 127-134.

Liu, H., & Frank, A. (2010). Tai chi as a balance improvement exercise for older adults: a systematic review. *Journal of Geriatric Physical Therapy*, *33*(3), 103-109.

Mahlknecht, P., Kiechl, S., Bloem, B. R., Willeit, J., Scherfler, C., Gasperi, A., Rungger, G., Poewe, W., & Seppi, K. (2013). Prevalence and burden of gait disorders in elderly men and women aged 60–97 years: a population-based study. *PLoS One*, *8*(7), e69627.

Miller, S. M., Hui-Lio, C., & Taylor-Piliae, R. E. (2020). Health benefits of Tai Chi exercise: a guide for nurses. *Nursing Clinics*, *55*(4), 581-600.

Motl, R. W., & McAuley, E. (2010). Physical activity, disability, and quality of life in older adults. *Physical Medicine and Rehabilitation Clinics*, *21*(2), 299-308.

Ronthal, M. (2019). Gait Disorders and Falls in the Elderly. *Med Clin North Am*, *103*(2), 203-213. https://doi.org/10.1016/j.mcna.2018.10.010

Rubino, F. A. (1993). Gait disorders in the elderly. Distinguishing between normal and dysfunctional gaits. *Postgrad Med*, *93*(6), 185-190. https://doi.org/10.1080/00325481.1993.11701693

Salmoirago-Blotcher, E., Wayne, P. M., Dunsiger, S., Krol, J., Breault, C., Bock, B. C., Wu, W. C., & Yeh, G. Y. (2017). Tai Chi Is a Promising Exercise Option for Patients With Coronary Heart Disease Declining Cardiac Rehabilitation [Journal Article; Clinical Trial Protocol]. *Journal of the American Heart Association*, *6*(10). https://doi.org/10.1161/JAHA.117.006603

Shankar, A., McMunn, A., Demakakos, P., Hamer, M., & Steptoe, A. (2017). Social isolation and loneliness: Prospective associations with functional status in older adults. *Health psychology*, *36*(2), 179.

Taylor-Piliae, R. E., & Coull, B. M. (2012). Community-based Yang-style Tai Chi is safe and feasible in chronic stroke: a pilot study. *Clinical Rehabilitation*, *26*(2), 121-131.

Wang, F. (2024). Taichi is Medicine (TIM): the Model of Taichi and Health Promotion. *Malaysian Journal of Medicine & Health Sciences*, *20*(3).