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The impact of group-based Tai chi on health-status outcomes among community-dwelling older adults with hypertension

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ABSTRACT

Objectives: To test the effects of group-based Tai chi on health-status outcomes among older adults with hypertension.

Background: A high-quality study exploring the effects of Tai chi on physical and psychosocial health for older adults with hypertension is needed in China. The long-term effects of group-based Tai chi in Chinese older adults with hypertension remain unclear.

Methods: A randomized controlled trial was conducted. The group-based Tai chi training and practice were implemented in older adults over six-month.

Results: The Tai chi (TC) group showed significantly lower blood pressure and body mass index than the usual care (UC) group. The TC group participants showed greater improvements in social support, quality of life, and reduction in depressive symptoms over a six-month intervention than UC group. TC group showed significant group-by-time interactions in these variables.

Conclusion: Group-based Tai chi is effective in the enhancement of health-status outcomes for older Chinese adults with hypertension.

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Introduction

Hypertension is the most prevalent chronic disease in China; its prevalence increases from 18% to 34% in adults over 18 years during the period between 2002 and 2010.¹ There are 270 million adults diagnosed with hypertension in 2015 from Chinese Cardiovascular Diseases Report.² Hypertension is one of the common diseases in older adults. A recent report showed that the prevalence of hypertension was 59.5% in aged 50 years and older Chinese population.³ The results from the study area (Tianhe District, Guangzhou) also showed the estimated prevalence of hypertension in older adults was 66.9%.⁴ As we know, hypertension is a main factor influencing health outcomes for this population.

Performing regular physical activity is a possible approach to enhance the physical and psychological health of older adults with hypertension.⁵ A number of studies showed that Tai chi is an optimal

choice of exercise for older adults with chronic diseases.^{6–10} Tai chi, which is also called Taiji, Tai chi chuan, or Taiji quan, is a multi-component mind-body exercise grounded in the holistic model of traditional Chinese medicine.^{6,9} Tai chi adopts the Chinese philosophy of health maintenance and works on a holistic level.⁷ It is based on slow intentional movements, coordinated with breathing and imagery, that aims to relax the physical body and mind and improve health and personal development.^{7,10} A growing body of clinical research has been conducted to evaluate the effectiveness of Tai chi as an approach to promote health for older adults with chronic diseases. The results of these studies revealed Tai chi greatly improved age-related declining systems, including pulmonary and cardiovascular function, balance, and cognitive function.^{10–14} A systematic review reported that Tai chi exercise can reduce systolic blood pressure (SBP) and diastolic blood pressure (DBP) and provide psychosocial benefits for patients with cardiovascular diseases.¹³ Among patients with cardiovascular diseases, hypertensive patients also obtained favorable health outcomes by attending Tai chi exercise. For example, a study by Tsai et al. (2003) showed that a 12-week Tai chi program caused decreased blood pressure (BP), improved lipid profile, and enhanced participants' anxiety status in healthy participants with BP at high-normal or stage I hypertension.¹⁵ A community study by Sun and Buys (2015) found that 12 months

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of Tai chi helped adults with hypertension aged from 45 to 80 years to reduce their BP and body mass index (BMI), maintain normal renal function, and improve health-related quality of life (HRQoL).¹⁶ The results from Xu's (2016) study showed that hypertensive patients in a Tai chi group reported physical benefits (e.g., decreased BP, BMI, cholesterol, triglyceride), and psychosocial benefits (e.g., improved HRQoL, reduced anxiety, and depressive symptoms) compared to those in the control group.¹⁷

In China, ample studies have revealed the favorable effects of Tai chi in reducing BP and enhancing HRQoL for hypertensive patients. However, a systematic review and meta-analysis on the effects of Tai chi in adults with hypertension in China showed that most randomized controlled studies had a low quality and high risk of bias based on the evaluation criteria for Systematic Reviews of Interventions, indicating a large number of high-quality studies are needed.¹⁸ In addition, previous studies presented a wide inconsistency in design and heterogeneity in Tai chi exercise (including types of Tai chi, training sessions and practice time).^{13,14,18} For example, many studies performed short-term tai chi programs, ranging from 8 to 16 weeks, and few studies examined the long-term effects of Tai chi (e.g., more than 6 months). Tai chi practice of most studies did not meet the requirements of physical activity for hypertensive patients. The different types of Tai chi were adopted, such as Chen, Yang, Sun, and simplified Tai chi, etc.¹⁹ Although these types of Tai chi have the same principles, they all have their own characteristics in posture, form, order, and pace. Middle-aged and older participants were all included in previous studies; few studies specifically focused on older adults. Additionally, previous studies reported that group-based intervention contributed to improve participants' social support and psychological health.²⁰⁻²² The long-term effects of group-based Tai chi in older adults with hypertension remain unclear.

Therefore, this study was developed and expected to extend the previous studies in several ways. First, the group-based Tai chi practice was conducted for six months. Second, we enrolled the older adults with hypertension to attend the study. They practiced Tai chi for 3-5 times every week for at least 60 min each time, which met the requirements of physical activity from the Chinese Hypertension Management Guideline. Third, the 24-form Tai chi was adopted because it is relatively easy to learn compared to other styles for older adults. It was hypothesized that older adults with hypertension participating in group-based tai chi would achieve the following effects compared to usual care: (1) significant reduction in BP, BMI, and waist circumference; (2) significant improvement in psychosocial outcomes, including HRQoL and social support; and (3) a marked reduction in depressive symptoms.

Methodology

Study design

A randomized controlled study design was adopted. Participants in Tai chi (TC) group received Tai chi and the usual care for hypertension, whereas those in the usual care (UC) group received the hypertension usual care. This study was carried out at two community healthcare centers in the Tianhe District, Guangzhou, China, from March 2015 to November 2016. In China, the community healthcare centers are responsible for the primary healthcare of residents within its range. These centers are usually located in a residential area; thus, it is very convenient for residents to attain healthcare. The adults with chronic diseases, such as hypertension and diabetes mellitus, go to community healthcare centers to receive prescription medication and health education and to attend rehabilitation training after hospital discharge and

other healthcare services. Generally, there are no patients who are acutely ill at the community healthcare centers.

Participants

Older adults were recruited for this study if they met the following inclusion criteria: (1) 60 years of age or over; (2) diagnosed with essential hypertension by a cardiovascular physician; (3) taking antihypertensive medication; (4) living in the Tianhe District, Guangzhou; (5) and gave approval for attending the study with a willingness to adhere to six months of Tai chi. The older adults were excluded if they were: (1) individuals with musculoskeletal diseases exacerbated by physical activity; (2) secondary hypertension; and (3) participating in other physical activities. The diagnosis of participants' musculoskeletal diseases or secondary hypertension was confirmed by medical records.

Sample size, randomization and recruitment

The sample size calculation was based on the mean difference of SBP (5.01 ± 1.93) mm Hg and DBP (4.76 ± 2.24) mm Hg from a pilot study, with a power of 0.80 and a two-tailed standard test level of 0.05, 61 participants per group were necessary to achieve statistical power. A potential attrition rate of 30% was predicted;²³ therefore, we aimed at an initial recruitment target of 79 participants per group or 158 in two groups.

When the eligible participants visited the outpatient departments of the community healthcare centers, they were asked to select an opaque envelope to allocate whether they would be in the TC group or the UC group. There was one card in each envelope; the number "1" or "2" was marked on the card. Number "1" indicated that the participant was assigned to the TC group, and Number "2" implied that the participant was allocated to the UC group. All participants and healthcare professionals were masked to the group assignment.

Four nurses who worked in the outpatient departments of the community healthcare centers were invited to attend the study as research assistants. They were responsible for enlisting participants and collecting data after receiving the training. The training included an introduction of the study, inclusion/exclusion criteria, and training in the scales and methods used for data collection. Their competencies were evaluated prior to study enrollment. The recruitment strategies were used to enlist eligible participants, including: (1) referrals from physicians and nurses at the two community healthcare centers; and (2) leaflets about the study were placed in community healthcare centers and in local public places (e.g., bus stop, subway station, parks, and supermarkets).

Most participants were recruited by referral from healthcare professionals of community healthcare centers. The nurses contacted these participants and screened via face-to-face interview, telephone, or Wechat. Individuals who met the inclusion criteria were invited to join the program. The screened participants met with nurses at an appointed time at the community healthcare centers. Nurses further confirmed their eligibility, introduced the study to them in detail, obtained the informed consent form, and collected baseline data.

Interventions

Tai chi training

All participants in the TC group received group-based Tai chi training. Participants were grouped into different training groups based on their dwelling districts. Those individuals who lived near each other were allocated to the same group, making it convenient to attend the training session and group practice. There were

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