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REVIEW

Tai Chi as a Body-Mind Exercise for Promotion of Healthy Aging in Nursing Home Residents: Appropriateness, Feasibility, and Effectiveness

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Video Abstract

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Abstract: The lack of activity, opportunity for providing input and participation in activities, and interaction with other people are the features of institutional living which reinforces dependency among nursing home residents. Residents are usually frustrated with paternalistic-type care. Arranging health-oriented meaningful activities for residents contributes to health promotion and enhancement of healthy aging. Moreover, it contributes to the cultivation of a positive meaning of life which is particularly important as residents reach the late geriatric stages of their lives. With exercise being seen as generally beneficial for health, Tai Chi as a Chinese-based exercise with a body-mind emphasis and unique characteristics becomes a particularly suitable exercise in aiding the residents in this major shift of lifestyle. This paper analyzes the appropriateness, feasibility, and effectiveness of Tai Chi in promoting healthy aging for residents. Theoretical considerations and scientific evaluations lend it appropriate, feasible, and effective in providing physiological and psychosocial health benefits to the residents. This paper recommends the use of Tai Chi to promote healthy aging in nursing home residents. With a rapidly aging population and mounting demand for residential geriatric care worldwide, this paper's timely findings should provide important implications for adopting Tai Chi to advance the quality of care delivered by nursing homes worldwide.

Keywords: Tai Chi, exercise, healthy aging, nursing homes, long-term care

Introduction

To many older adults, moving into a nursing home is a significant life event. They give up their usual lifestyle at home and spend their remaining days with other people in a new environment.[1] However, the nature of environments and opportunities offered by nursing home tend to impose a certain degree of health challenges to the nursing home residents (which the paper simply refers to as "residents") and hinder them from experiencing healthy aging.[2] An institutional approach with routinized and task-oriented care practices is adopted in order to enhance the efficiency of care delivery and meet residents' collective needs.[3] The lack of activity, opportunity for providing input and participation in activities, and interaction with other people are the features of institutional living.[4–6] These features reinforce dependency among residents. It has been reported that residents are frustrated with paternalistic-type care.[5]

Arranging health-oriented meaningful activities for residents contributes to enhancement of healthy aging and make their lives meaningful. Overall, it strengthens the residents' health, delays the deterioration in their health and disease conditions, maintains their functional independence, and enhances their overall quality of life.[3,7,8] It also establishes residents' social relationships, broadens their exposure, and facilitates them to accomplish tasks that they had no chance to do in their earlier years. It therefore contributes to the cultivation of a positive meaning of life.[5,9]

There exists a wealth of evidence on the physiological and psychosocial benefits of exercise for older people.[10–13] Despite much of the evidence on the health benefits of exercise being focused on conventional

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ones such as walking, jogging, swimming, and cycling, other complementary and alternative exercises also deserve attention. Tai Chi is a gentle and easily accessible exercise with distinct characteristics that are particularly suitable for older people. It is deemed suitable for the residents despite their vulnerability to more health problems. This paper analyzes the appropriateness, feasibility, and effectiveness of Tai Chi as an exercise for the promotion of healthy aging in residents. The paper's outline is summarized in Figure 1 herein.

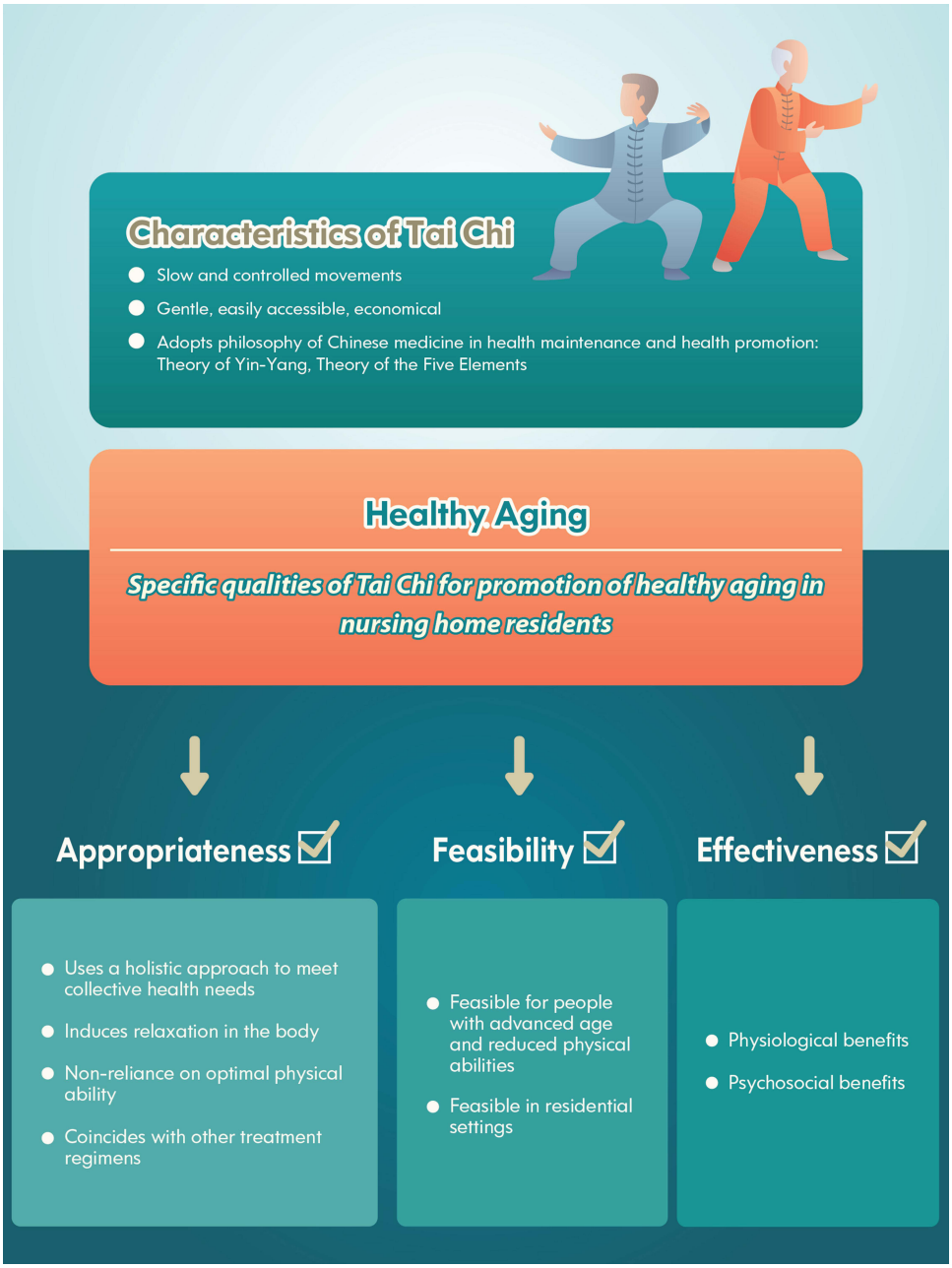

Figure 1 Tai Chi as a body-mind exercise for promotion of healthy aging in nursing home residents.

Tai Chi

Tai Chi is an ancient Chinese martial art which originated in the 13th century from a Taoist, Chang San Feng, who got the inspiration by watching a fight between a crane and a snake. The dodging movements of the snake, which overcame the fast and forceful attack of the crane, was developed into the unique characteristics of Tai Chi.[14,15]

A Body-Mind Exercise

Tai Chi is fundamentally a series of individual movements connected together in a slow, smooth, and continuous way. The movements are characterized by their graceful and dance-like features.[16] The various movements altogether incorporate elements of balance, strength, flexibility, relaxation, and body alignment.[17,18]

The characteristic of how Tai Chi movements are implemented is known as "style". Tai Chi has several styles. They are the Chen style (slow and graceful movements alternate with quick and forceful movements), Yang style (big and exaggerated movements), Wu style (small and compact movements), Sun style (smooth and fluid movements), Tai Chi Chih, and a number of other styles that are not so popular. Chen style is the oldest one, while Yang style is the most popular one both within China and throughout the world. The Wu style and Sun style are developed from Yang style. Lastly, Tai Chi Chih is the simplified and westernized form.[19,20] Despite of the diversity of Tai Chi styles, they all possess three general characteristics: (1) slow and controlled movements; (2) deep breathing; and (3) focused mind concentration.[21] Figure 2 summarizes the general characteristics of Tai Chi and highlights the specific features of each Tai Chi style.

The practitioner integrates the physical movements with deep breathing and mental concentration, thereby achieving a state of harmony between body and mind.[2] Hence, Tai Chi is a body-mind exercise.[22] The physical act of performing Tai Chi is comparable to moderate intensity exercise and the cognitive act is comparable to quiet meditation.[23–26] Although Tai Chi was primarily developed for physical fitness and self-defense purposes, it has evolved overtime to be more focused on health maintenance and is widely practiced throughout the world as an exercise both for health and rehabilitation.[24]

Underlying Philosophy Vis-À-Vis Health Maintenance and Promotion

Tai Chi works according to the Chinese Theory of *Yin-Yang* and the Theory of the Five Elements. In the Theory of *Yin-Yang*, everything in nature, including what happens within the body, is intertwined into two forces of energy, namely the *Yin* and *Yang*. These two energies are complementary polarities and are constantly fluctuating. While the *Yin* energy grows, the *Yang* decays, or otherwise. Maintaining the balance of *Yin* and *Yang* within the body is the key to health. Tai Chi is the practice of *Qi* which is an invisible life energy vital for health.[25] Practicing Tai Chi facilitates the flow of *Qi* within the body, instilling the proper balance of *Yin* and *Yang* and contributing to overall health.[25–27]

While maintaining the *Yin-Yang* balance can bring about health benefits to all the body parts, the application of the Theory of the Five Elements likewise enables one to work on the individual body system and tackle associated health problems accordingly. According to the theory, all life forms in nature, including people, as a whole and its individual body systems, are made up of five elements: metal, wood, water, fire, and earth. Understanding the five elements and their relationship to one another is useful to maintain health and cure diseases. Each Tai Chi movement is assigned with an element as well. When moving, a forward step represents metal, while a backward step represents wood. Looking left represents water, while looking right represents fire, and central equilibrium represents the earth.[27] These movements are precisely designed to encourage the flow of *Qi* and promote the correct energy balance of the internal organs.

Appropriateness of Recommending Tai Chi

Although Tai Chi works for people from all walks of life, it possesses a number of basic characteristics that make it a feasible exercise for the older people. It is a form of exercise that is gentle enough even for older people to master without much effort.[28] Tai Chi is safe because it does not carry any pharmacological side effects. It is easily accessible and economical.[29,30] People can perform it conveniently anytime and anywhere without the need for special clothing and equipment. As Tai Chi is a self-learned skill, people can continue

Figure 2 General characteristics of Tai Chi and specific features of each Tai Chi style.

practicing it individually without close supervision. These general characteristics make Tai Chi desirable for older people who may not have very stable physical or financial status.

If Tai Chi is to be considered for older residents, their specific characteristics should also be considered. The residents should be similar in the sense that they are mostly older and have reduced physical abilities than their healthy community-dwelling counterparts. They should be living in a confined environment with other residents, with schedules for daily activities. The differences lie in terms of their individual health backgrounds, which assumes that all residents have their own major or minor health problems. Thus, considering an exercise for promotion of healthy aging for them should be very well thought of. This exercise must match the practitioners and not the other way round, for their participation to be meaningful.[31]

Uses a Holistic Approach to Meet Collective Health Needs

Tai Chi works on a holistic level and recognizes the importance of promoting overall health and the maintenance of a person's wholeness.[20,27] With a better overall health status, one can better deal with any specific disease. Nevertheless, other exercises that work on a symptom-based level merely focus on a specific health problem and may ignore, or damage other bodily systems.[26] Using a holistic approach rather than a symptom-based one has two advantages: first, it can address the characteristics of the residents who, as a group, are living together with collective health needs, but may still experience different symptoms individually. Second, it is more efficient in promoting the overall health status among the residents, since the resources available for the nursing home nowadays are usually limited.

Induces Relaxation in the Body

The human body is built around two basic response systems, namely, relaxation response and stress response.[26] The former uses body energy and resources for repair, maintenance, and growth. It aims to keep the body healthy. The latter (also known as the flight or fight response), however, draws body reserves to deal with stress or life-threatening situations. Even though the stress response can produce short-term peak performance, it can increase wear and tear of the body and even reduce one's life expectancy, and thus has a negative long-term impact.

Tai Chi is one of the few exercises that initiate a relaxation response within the body. Most of the other exercises, especially those geared toward competition or reaching certain standards, emphasize exertion and strength, and induce stress response.[26] In Tai Chi, every body part is relaxed. It tones the muscle, relieves tension in various body parts, encourages the flow of *Qi* within the body, and achieves an overall balanced health status.[26,27] It does not push one into oxygen debt as most other exercises do because Tai Chi does not cause a sudden increase in body oxygen demand. Given these, Tai Chi is considered a more appropriate exercise for residents.

Non-Reliance on Optimal Physical Ability

Tai Chi invigorates rather than exhausts since it is stimulating rather than demanding.[26] Tai Chi's non-reliance on optimal physical ability to achieve the best performance level makes it particularly desirable for residents. For most sports and physical pursuits, practitioners who are around 40 years of age have passed their peak bodily performance level already. For Tai Chi, however, the best performers are frequently noticed to be those who are already 70, 80, and even 90 years of age.[26] This is because physical exercise in a general sense requires optimal physical ability such as cardiovascular fitness and muscle strength to achieve the best performance level, whereas Tai Chi only requires competence in integrating the gentle body movements, breathing, and mind concentration to bring about its essence, which is recognized as the most desirable performance status.[28] A decline in optimal physical ability after adult age does not have so much impact on Tai Chi performance. Likewise, it has been mentioned that the best Tai Chi performers are usually those of very old age.[26]

Coincides with Other Treatment Regimens

Tai Chi itself carries neither adverse consequence for practitioners nor major contraindications in practice. Though Tai Chi does not replace the treatment regimens prescribed by health care professionals, it nonetheless works in conjunction with them.[26] This makes it a desirable choice of exercise for residents as a group, especially for individual residents receiving specific treatments for their own health problems.

Feasibility of Adoption

Along with the theoretical implications, practical considerations are also of equal importance. Existing evidence supports the feasibility of adopting Tai Chi for residents.

Evidence Addressing the Concern for Residents with Advanced Age

Aging leads to decreased learning capacity, thus residents may learn Tai Chi at a slower pace. Nonetheless, positive experiences from previous studies posited that older people are still capable of learning Tai Chi despite old age. A number of studies were conducted in older participants who started learning Tai Chi at a mean age of 70 years or

older.[30,32–36] Notably, all of these studies did not report any learning problems among the older participants. Some studies could even detect significant improvements in health status among these older participants.[30,32,34,35] Although the studies had not compared participants' performance between different age groups, they provided evidence which indicates the feasibility of Tai Chi in older populations.

Evidence Addressing the Concern for Residents' Reduced Physical Abilities

Reduced physical abilities among the residents is another concern when considering Tai Chi for them. As declining physical abilities are usually the cause for residential placement,[31,37] it makes sense to assume that residents have weaker physical abilities than their community-dwelling counterparts. Although previous evidence on the health benefits of Tai Chi mostly reflected on healthy older populations, isolated studies support the feasibility of adopting Tai Chi in residents. In 2001, a randomized trial demonstrated the feasibility of running a 2-year Tai Chi program for residents living in long-term care institutions, despite higher attrition rate in this particular population being anticipated.[38] In 2010, a quasi-experimental study investigated the psychosocial effect of a 26-week Tai Chi program in residents and reported a desirable attendance rate (85.5%) and an acceptable completion rate (74.2%) for the experimental group. Moreover, significant health benefits were observed.[2] The feasibility of adopting Tai Chi for residents is backed by literature.

Evidence Addressing the Concern for Running a Tai Chi Program in Residential Settings

The exercise is commonly delivered in the form of a Tai Chi program, where there may be feasibility concerns with running a Tai Chi program within a nursing home. In short, running one requires a well-qualified instructor, physical space, careful planning, and coordination work. Since instructors are readily available in the community, it is not difficult to find a suitable one with reasonable pay. With the availability of physical space, running a Tai Chi program does not require additional space for both initiation and maintenance. Lastly, the nursing home should be able to handle the planning and coordination work of the Tai Chi program as they run different kinds of activity programs from time to time. Nevertheless, special considerations, particularly for running a Tai Chi program, should be worked out. The successful experience in previous studies supports the feasibility of running a Tai Chi program within nursing homes.[2,38]

Methods

To evaluate the health benefits of Tai Chi, a literature search was conducted using Web of Science, PubMed, MEDLINE, CINAHL, and Embase databases to identify literature until 2022. The following keywords were used: Tai Chi and its various English spellings (T'ai Chi, Tai-ji, Tai Chi Chuan, Tai Ji Quan, Taijiquan), health, physiological, psychological, social, and psychosocial. Studies were included if they (1) were published in English, (2) were published in peer-reviewed journal, (3) were presented in full version, and (4) examined the effects of Tai Chi on a health outcome. Studies were excluded if they (1) were discussion paper, and/or (2) did not focus on health outcomes. Relevant references and citations of the retrieved studies were considered to ensure comprehensive coverage. A total of 45 studies were identified for review.

Results

For the last two decades, a number of studies have investigated the health effects of Tai Chi. Most of previous studies considered healthy older adults who do not have any major health problems as research participants.[28,30,32–36,39–45] Some studies attempted to examine the topic in older people with a specific health problem such as coronary heart disease,[46] chronic obstructive pulmonary disease,[47] hip or knee osteoarthritis,[48–51] sleep complaints,[52] and depressive symptoms.[53] Additionally, other studies were conducted in nursing home residents who generally had multiple comorbidities.[2,38,46,54]

Effectiveness of Tai Chi in Promoting Health

Tai Chi is well-known for its physiological benefits. Studies reported that Tai Chi is effective in reducing blood pressure,[36,55] reducing resting heart rate,[22] reducing serum cholesterol level,[55] improving balance control,[22,36,56,57] improving flexibility,[22,29] and reducing pain for rheumatoid arthritis.[58]

Tai Chi brings psychosocial benefits as well. Studies reported that Tai Chi has a positive effect in promoting health-related quality of life,[44,54,59,60] reduction of stress,[39,41] reduction of mood disturbance,[41,61] promotion of self-esteem,[35,59] management of depression[58] and anxiety,[55] and promotion of social outcome.[41] Particularly, Tai Chi has been found to bring improvement in self-esteem and health-related quality of life in the residents.[2]

Discussion

Major issues pertaining to the interpretation of findings in the reviewed studies have been identified. They are worthwhile to be included in this discussion because they can have direct impact on the internal and external validity of study findings.

Shared Characteristics Among Past Research Investigations

Previous studies share some common features which can set a background for the interpretation of findings. First, most of the reviewed studies adopted an experimental design which is the most desirable design to evaluate a cause-and-effect relationship. In other words, these studies demonstrated the essential ability to evaluate the effect of Tai Chi on outcome variables. Second, these experimental studies generally delivered Tai Chi by a Tai Chi instructor, in the mode of a program, on a group basis, with the duration and frequency clearly stated.

Difference in Duration and Frequency of Tai Chi Training

However, previous studies lack of standardization in Tai Chi interventions. There is significant variation in terms of duration and frequency of the Tai Chi program which makes it difficult to compare results across studies and ascertain the effective dose of Tai Chi. In previous studies, the duration of the Tai Chi program ranged from five weeks[62] to 26 weeks[35,52] and the frequency of the Tai Chi program ranged from once per week,[63] twice per week,[35,48] to three times per week,[32,52] or even allowed flexible self-practice.[33,36,62,63] Basically, each Tai Chi session in these studies ranged between 45 and 60 minutes. Mastery of Tai Chi practice takes time. Existing research experience generally agrees that a Tai Chi program with a duration of at least 15 weeks and a frequency of three times per week may be a reasonable intensity to start showing improvements in health status among healthy older adults.[32,35,52,64] In contrast, a Tai Chi program with shorter duration and frequency may not be sufficient to bring health benefits to the participants.

Variations in the Style of Tai Chi Practiced

Studies also adopted different styles of Tai Chi. The Yang style was commonly adopted.[23,34,35,48,65] Other styles such as the Wu style[23,65] and Tai Chi Chih (a simplified style)[63] were adopted uncommonly. Of note, some studies did not mention the type of Tai Chi style adopted.[21,32,36] Although all the Tai Chi styles share the same essential features of having slow body movements accompanied with controlled breathing and mind concentration, each style has its own emphasis and movements.[66] In the literature, a consensus has been attained that any classical version is more effective than simplified version in bringing desirable health outcome.[67] This is mainly because the simplified movements are less exaggerated and involve less bending.[64,67]

Limitations in the Methodology

Of note, previous studies carry limitations. Some studies have small sample sizes and may not be adequately powered to detect significant effects.[63,68,69] Based on the evidence indicating that a 24-week Tai Chi program had a medium to large effect on a number of psychological outcomes,[30] and assuming a conservative estimate of medium effect of Tai Chi on various health outcomes, with a significance level of 0.05 and a power of 0.80, it is suggested to have a sample size of 64 participants in each experimental group to effectively detect any differences between the groups.[70] However, only a limited number of the reviewed studies had sample sizes meeting this requirement.[2,34,36]

Other studies fail to rigorously control the confounding factors. Even though some reviewed studies had established equivalence between experimental and control groups before the Tai Chi intervention by statistical means, the consideration was limited only to outcome measures and demographic characteristics.[32,36,52,63] However, a few studies made considerable effort to mitigate the influence of confounding variables on their results.[2,36,68] This consideration enhanced the robustness of their research design and allowed for a more rigorous evaluation of the effect of Tai Chi in those particular studies.

Despite the various methodological flaws and limitations, systematic review and meta-analysis support that Tai Chi can bring promising physiological effects, particularly on balance control and fall prevention.[71,72] Literature reviews and systematic review also conclude that Tai Chi has the potential to enhance one's psychosocial well-being, particularly to the older adults.[73,74] International definitions of healthy aging highlight its lifelong and multidimensional nature covering the physical, mental, and social well-being of aged populations.[75–79] With evidence supporting various physiological and psychosocial benefits to older practitioners, Tai Chi can be a desirable means for the promotion of healthy aging in the residents.

Conclusion

The adoption of institutional care in nursing home imposes a certain degree of health challenges to the residents, reinforces the perception that residents are passive recipients of care, and hinders them from experiencing healthy aging. Promotion of healthy aging is especially important to the residents as it enables them to maintain healthy and make their lives more meaningful. As older residents approach their lives' terminus points, having a sense of meaningful living is vitally important.

Tai Chi is a body-mind exercise that adopts the philosophy of Chinese Medicine. It is a self-learned exercise which is gentle, safe, easily accessible, and economical. These characteristics are highly relevant for the older populations as an exercise for health promotion. From the theoretical perspective, Tai Chi carries specific characteristics which make it an appropriate exercise for the residents. Existing scientific evidence also supports the feasibility and effectiveness of Tai Chi for promotion of healthy aging of the residents. With mounting demand for residential aged care worldwide, this paper is timely and its discussions provide important implications for advancing the quality of care delivered by nursing homes.

Disclosure

The authors report no conflicts of interest in this work.

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