Dissemination and Benefits of a Replicable Tai Chi and Qigong Program for Older Adults

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Tai Chi and Qigong (TCQG) show promise for improving many health outcomes and are recommended for dissemination to older adults. A simplified, easy-to-replicate version of TCQG, "Tai Chi Easy," was tested using a train-the-trainer method to demonstrate feasibility of dissemination to a widespread population of older adults through community sites and achievement of perceived outcomes. Nonexpert facilitators known as "practice leaders" were trained to implement Tai Chi Easy sessions at 18 sites across the United States. Outstanding facilitator (100%) and participant (94%) adherence was achieved. With 330 completers, mean age 73 years, significant improvements were found for participants' perceived stress levels (P = .003). Sleep quality and energy/vitality were markedly improved. Eighty-nine percent enjoyed the program, 91% were committed to continue, and 67% stated that they had increased their weekly levels of physical activity. A train-the-facilitator model for Tai Chi Easy is easily disseminated to older adults and may promote a sustainable alternative exercise, yielding favorable quality of life benefits. (*Geriatr Nurs* 2010;31:272-280)

A wide range of beneficial health-related outcomes has been demonstrated in studies of Tai Chi and Qigong, with more than 66 randomized, controlled trials published, as noted in a comprehensive review of literature up through 2007.[1] Evidence is accumulating for the health benefits of these practices, including reductions in blood pressure,[2-7] improvements in mood,[8-10] balance and falls prevention,[5-7,11] and immune function.[7,12-15] These outcomes, and the particularly low-impact, gentle nature of the practice, make Tai Chi and Qigong promising, safe options for those with chronic health conditions and physical limitations, and for older adults,[16,17] a population with typically low levels of activity.[18,19]

The older population in the United States has not yet achieved the Surgeon General's and American College of Sports Medicine's[20] recommendations for 30 minutes of moderate intensity exercise per day, at least 5 days per week. Only 36% of those aged 65 and older met this guideline in 2003.[21] Healthy People 2010 goals include increasing the proportion of the population engaging in moderate activity each day, and exercise that improves muscle strength, flexibility, and endurance. Numerous studies of both Qigong and Tai Chi have examined levels of exertion and aerobic effects, indicating that these practices generally fall within the moderate-intensity level with corresponding cardiorespiratory reponses.[22,23] Both Tai Chi and Qigong have been shown to improve muscular strength, endurance, and flexibility, as well as balance and falls prevention among older adults,[1,6,24] and can be adapted for use by people with a number of health or physical limitations.[16]

Tai Chi is derived from a more ancient, larger body of knowledge, teachings, and practice called Qigong and is thus considered by many to be a form of Qigong. Given the identical theoretical roots, similar principles of practice, and parallel health-related outcomes shown for both Tai Chi and Qigong, it has been proposed that these practices should be treated as equivalent and that they can logically be considered as 2 aspects of a single body of knowledge and practice, Tai Chi/Qigong (TCQG).[1,25,26] The existing body of research suggests that TCQG may provide especially accessible exercise programming for the more frail, home or chair-bound, healthy or unhealthy elderly, and chronically ill populations.[17] Identifying forms of physical activity, mental fitness, and social interaction that are feasible for the elderly to learn and practice regularly and that satisfy the definition of

moderate-intensity exercise is an important endeavor.[17]

Despite the growing body of research regarding health benefits for older adults, little is known about how to disseminate and diffuse the benefits of TCQG efficiently to diverse populations or across widely dispersed communities of older adults. The National Council on Aging (NCOA) approached the Institute of Integral Qigong and Tai Chi (IIQTC) to conduct a demonstration project to examine the potential of disseminating TCQG to older adults, using the institute's method of teaching a form that combines Qigong with simplified Tai Chi movements in a practice called "Tai Chi Easy" (TCE). TCE has been carefully refined over decades with the intention of making it an easily accessible and replicable TCQG program, suitable to be taught by nonprofessional teachers (that is, those who have not received long and extensive professional training in the Chinese medical arts or martial arts and who were not conventional fitness trainers).

This study was designed to test the feasibility of disseminating this basic, standardized TCQG program, TCE, to a diverse and widely dispersed population of older adults delivered via nonexpert, trained practice leaders, and to evaluate several of the aspects of dissemination using selected components of the RE-AIM model (described in the following section).[27]

Methods

This descriptive dissemination study used a standardized TCQG intervention, TCE, to train nonexpert practice leaders in conducting practice sessions with a target population of adults, aged 50 and older, in community settings, such as senior citizen centers, senior residences, YMCAs, hospitals and churches.

The assessment of dissemination was guided by the RE-AIM model. RE-AIM is ideal for application in field settings because much of the data collection involves counting observable behavior (e.g., number of responses to a call for training). As a model (not a theory), RE-AIM describes the range, depth, and breadth of dissemination elements that are purported to matter; provides a guide for assessment that goes beyond laboratory and controlled field settings; and is applicable to translational research in broader community settings. Each letter stands for a dimension that addresses the potential for health behavior interventions to achieve an impact at a population level: reach (the percent and representativeness of the target population that participates in the intervention); effectiveness (the extent to which the intervention achieves its anticipated outcomes, i.e., increased levels of physical activity); adoption (the percent and representativeness of healthcare settings or providers who agree to participate); implementation (the degree to which the intervention is conducted or completed as intended); and maintenance (at the individual and system levels, the extent to which the intervention becomes a part of routine practice).[28]

We defined 4 levels of dissemination evaluation, addressing 4 of the 5 RE-AIM components as intended in the model: 1) the extent of uptake of training and follow-through among nonexpert practice leaders comprised the "adoption" component; 2) "reach" was assessed as program enrollment and adherence of participants; 3) "implementation" of classes was defined as the number of classes conducted by each facilitator; and 4) "effectiveness" was indirectly assessed, defined by measures of participants' perception of benefit. The final RE-AIM component, "maintenance," is generally assessed at the system level (i.e., the extent to which a health care system or provider continues to provide a program, or long-term effects at the individual level). The project was not funded to continue to track continuity of the program, so it was not possible to collect and report these data.

The description of the intervention and dissemination is presented in the next sections as Phases I and II to distinguish between the practice leader recruitment/training activities and the subsequent dissemination activities through conducting community classes.

Phase I: Training Nonexpert Practice Leaders

Practice Leader Recruitment. To recruit nonexpert practice leaders for this demonstration project, an announcement was circulated to a network of people who had previously indicated an interest in TCE (ranging from those who planned to eventually sign up for TCE instruction to those who were simply interested in receiving informational newsletters on the topic) and who were not trained as certified teachers, but who had an

association with facilities serving community-based populations and older adults (such as activities directors or recreation specialists). Potential practice leaders responded with varying degrees of interest. After the details of the protocol were communicated (including the exact dates of the term of the study, the training involved to become a practice leader, the requirement to have access to and assemble a group of older participants ready to commit to the necessary number of sessions, and the paperwork that would be required to track implementation and outcomes) the group of practice leaders agreeing to be participate as trainees was narrowed. The remaining volunteering practice leaders each were associated with a potential site for dissemination, including churches, community centers, retirement centers, and community adult education institutions across the United States, from New Hampshire to California.

Practice Leader Training. The current criterion for the Certified Teacher Training at the IIQTC is 200 contact hours of training (consistent with the professional member guidelines of the National Qigong Association), whereas training to become a Tai Chi Easy practice leader requires much less time (25 hours) and can be provided either in an on-site training or in distance-learning format.

Those who committed to receive the training were mailed materials with guidelines for how to best study and practice the curriculum they would be facilitating. The training consisted of studying the Tai Chi Easy Practice Leader Training Manual and practicing the methods guided by a training DVD, activities estimated to take at least 25 hours. In addition, a series of phone conference calls were initiated with practice leaders to discuss key teaching methods and allow for questions and further learning. The early calls were designed to communicate key training objectives as defined in the manual and DVD and verify that the materials were thoroughly reviewed, understood, and practiced. Later calls were implemented during the study period for troubleshooting, sharing of successful techniques for teaching, and gaining feedback from each practice leader to confirm the knowledge base of understanding to ensure quality and consistency with the intervention protocols.

Intervention. TCE combines Qigong methods with a simplified version of traditional Tai Chi, including movements (most of which are flowing arm movements coordinated with gentle weight shifting/stepping with the legs), a focus on the breath, and a meditative state during the movements. Appendix A includes a brief description of the TCE protocol. An End-User Learning Aid was made available to the practice leaders and to those who participated in the classes, consisting of graphic illustrations of the Qigong and Tai Chi practices.

Phase II: TCE Community Classes for Older Adults

Recruitment of Participants. Practice leaders worked through their respective organizations and communities to offer TCE classes. The sponsoring organization, NCOA, in accordance with protocol implementation and evaluation standard of practice, deemed this study exempt from formal board review as an evaluation of an educational program. Participants were invited to join the study and were verbally informed that participation in evaluations was voluntary and their personal data would be kept confidential and anonymous. Completion of questionnaires constituted their agreement that overall results of the study could be used and published. They were asked to complete a pre- and postprogram questionnaire reporting demographic information, previous experience with classes of TCQG, and ratings of perceptions on several outcomes.

Implementing the classes. After the practice leaders were trained, each committed to teach the 8- to 10-week series of sessions to groups of enrollees, aged 50 years and older, at their respective sites, with some practice leaders conducting multiple sessions (i.e., multiple groups comprising different participants) in 1 week, but most offering 1 session per week. The classes began in late 2002, with the last groups completing by December 2003.

Measures

Baseline Participant Data. Age and previous experience were assessed for each participant. Previous experience with Tai Chi or Qigong was examined by asking, "Have you previously taken a class or regularly practiced Qigong or Tai Chi?" (yes/no response).

Process Data Collection. To examine adoption of the TCE curriculum, data were gathered on the number of site invitations distributed for practice leader training, number of sites/practice leaders

responding to the invitation, and number of practice leaders who enrolled in and completed the training. Information regarding facilitator responses and behavior was recorded directly by the administrative office implementing the program (IIQTC). To examine reach and implementation (factors assessed at the class level) practice leaders provided records of classes taught, gathered information about participant registration (reach) and completion of classes (implementation), and were responsible for collecting individual participant demographics and questionnaires, pre- and postintervention.

Outcome Evaluation. To evaluate the effectiveness of the program, we examined perceived reduction in stress and related symptoms experienced by participants rather than objective health outcomes. The Perceived Stress Scale (PSS)[29] is commonly used in health and behavioral health contexts for examining patient-reported stress experiences and psychoneurological responses.[30-32] The internal consistency (Cronbach's alpha) of this 10-item scale has been shown to be .94[33] with strong criterion and predictive validity related to an anxiety measure (HADS-A).[29] The PSS items are statements with 5-point response scales (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often) such that the mean of the 10 PSS items reflect high levels of stress as scores approach 4. Sleep quality, pain, and perceived energy levels were each assessed with single-item measures created for the purposes of this study. Each item asked about the outcome of interest in terms of how often it was experienced in the past month, with response anchors patterned the same as for the PSS, such that low scores on the 0–4 scale indicate less pain, poorer sleep quality, and less energy. After the intervention was completed, an additional set of questions was asked to assess participants' enjoyment of the program, interest in continuing, and increase in weekly level of physical activity since the start of the program (using single item indicators with yes/no responses). Data were analyzed using SPSS 12.0.[34]

Results

Dissemination Assessment

It is estimated that 300+ potential practice leaders, or sites with potential practice leaders, received the invitation. Between 50 and 60 potential practice leader trainees responded (including site management inquiries as well as individual inquiries, some overlapping, making the exact number difficult to determine). After further communication about the degree of involvement and commitment, 18 practice leaders agreed to and completed the training. All were experienced in working with groups in some way, with professions included activities coordinators, faith-based health ministry participants, school teachers, and social service workers. Some had taught yoga or simplified forms of Tai Chi or senior exercise but none had extensive training in physical activity or Chinese medical arts. All of the 18 leaders implemented the program at their respective sites. *Adoption* of the program, then, is estimated to be 6% of the invitations and approximately 33% of those who expressed an interest as eligible, potential practice leaders.

Reach and implementation were assessed as program enrollment/adherence and number of classes taught. The nonexpert trained practice leaders recruited community-dwelling adults. Baseline data were collected on 349 individuals; age ranged from 50 to 94 and included 53 men with a mean age of 74, and 296 women with mean age 73. Nineteen class participants did not complete the final questionnaire and were counted as dropouts, indicating that 330 completed the program, or a 94.5% class and questionnaire completion rate for the program. Practice leaders reported that all of those who completed their classes also completed the questionnaire at the postintervention point; data were not collected from practice leaders on the number of sessions attended by participants or at what point participants may have dropped out, so participant "dose" is unknown.

Each practice leader implemented 1 or 2 series of 8–10 weekly sessions, 1 hour per session, average class size of 13.3. The smallest class and lowest level of site participation was with 1 facilitator teaching 1 class series with 6 students. The largest participating site included 64 participants with 3 practice leaders teaching 2 class series each. The practice group size ranged from 6 to 25 participants.

Participant Outcomes

Of 349 participants in the TCE program, 179 reported some previous practice of Qigong or Tai Chi. Previous experience and dropout status

Table 1.
Pre- and Post-Tai Chi Easy (TCE) Participant Perceptions of Results

			95% Confidence Interval	
	Mean	Pre-Post Difference	Lower	Higher
Perceived Stress*	Baseline 1.28	.796	.028	.131
$N = 300$	Post-TCE 1.21			
Sleep Quality*	Baseline 2.81	.101	.004	.198
$N = 318$	Post-TCE 2.91			
Pain	Baseline 2.11	.069	.024	.163
$N = 318$	Post-TCE 2.04			
Energy*	Baseline 2.85	.101	.017	.184
$N = 317$	Post-TCE 2.95			

Note: Perceived stress scores represent the mean of 10 items on 0–4 scale. Scores closer to 0 indicate lower stress; scores closer to 4 indicate higher stress. Sleep quality, pain, and energy were each assessed using 1-item with 0–4 response scales. Scores closer to 0 indicate low sleep quality, low level of pain, and low energy, respectively. N *does not equal 330 due to spurious missing data in pre- and post-tests.*
*P ≤ *.05.*

were evaluated for possible effects on baseline values for the outcome variables of interest using t tests. No significant differences in PSS, sleep quality, pain, or energy/vitality were found relative to having engaged in previous TCQG, nor were there significant differences between completers and dropouts.

Effectiveness of the TCE program was indirectly assessed by evaluating participants' enjoyment, intent to continue, reported change in amount of weekly exercise, and perceptions of benefits. To examine change in the outcome variables of interest among the 330 completers, baseline scores were compared to postclass scores of perceived stress, quality of sleep energy/vitality, and pain using t tests, reported in Table 1.

Stress. The 10-item PSS demonstrated strong internal consistency ($\alpha = .85$ pre- and .88 postintervention) with this population. Mean PSS scores decreased significantly from 1.28 to 1.20 pre- to postintervention ($t = 3.03$, df 299, $P = .003$), with 4 indicating higher stress on the scale of 0 to 4.

Sleep. Scores on a scale of 0 to 4, with high scores more favorable, increased for participants in TCE on "in the past month how often has your sleep been restful?" from 2.81 to 2.91 ($t = –2.04$ df 316, $P = .042$)

Pain. Pain decreased only slightly from 2.11 to 2.04, but the initial level of pain was not high (2= "sometimes" experience pain), suggesting a floor effect on this measure. Preintervention low scores were not likely to decrease much further in this group.

Energy. A single item, "has your energy and vitality been sufficient?" showed significant improvements from 2.85 to 2.95 ($t = –2.36$ df 317, $P = .019$).

Finally, assessments of participant reactions to the program (postintervention) indicate that 89% enjoyed the program, 91% were committed to continue, and 67% stated that the program increased their weekly level of physical activity.

Discussion

The goal of the NCOA initiative was to test a TCQG program that could be distributed widely, consistently, and with high levels of practice leader follow-through; result in high levels of course completion and adherence among participants; and result in participant perceptions of beneficial outcomes. In this plan for dissemination, then, the primary focus was on the simplicity (yet effectiveness) of the curriculum elements and the method of teaching this curriculum to nonexpert practice leaders who would then disseminate the TCE widely.

Sidani and Braden (1998)[35] pointed out that evaluations of programs implemented in community settings, particularly when dissemination is examined, are best accomplished through descriptive assessments, not requiring randomized controlled trials. Using the RE-AIM components relevant to this program provided a structure for thoughtfully evaluating dissemination through

the levels of implementation, from recruitment of practice leaders representing sites to the perceptions of participants' outcomes. This program using a train-the-trainer (facilitator/practice leader) method shows promise for successful dissemination through an existing network of activity directors and recreation specialists already associated with sites where older adults gather. There was an adequate response to the invitation to become a facilitator, and those who were trained remained committed and were able to recruit substantial numbers of participants at their respective sites. Most significantly, once participants joined, nearly 95% completed the program. This completion rate, given the far-reaching scope of the study geographically and the minimum amount of training required to prepare the practice leaders suggests the TCE method of teaching and dissemination, is efficient for reach and magnitude of impact.

The dissemination success is possibly attributable to the design of the TCE protocol, using a small, replicable set of simple and gentle movements that can be varied slightly from session to session to add variety. Instruction for this method of TCE provided to nonexpert practice leaders appeared to prepare them adequately to teach independently and achieve perceived benefits for participants across a number of senior citizen centers and other sites where older adults gathered across the United States. The level of change in the factors of stress, sleep quality, pain, and energy were all small, but the sample of participants were not highly compromised at baseline (with favorable or neutral scores at the start). Even these small increments of change, some even showing significant improvement, provide evidence of perception of benefit among a fairly healthy, older adult population.

The practice of TCE, using a simple and replicable format among small groups of older adults, shows promise for stress reduction and quality of life–related outcomes of sleep, and energy/vitality. Although stress is assessed as a self-report measure, this particular scale, the PSS, has been shown to be related to both psychological and physiological stress-related outcomes, indicating the potential for TCQG to show general health benefits for populations aged 50 and older and perhaps contribute to the growing body of research on the emerging area of mind-body practice. In assessing participants' interest in continuing with this method of meditative exercise, it is especially interesting to note that 89% reported that they enjoyed the practice of TCE, and 91% declared that they planned to continue the practice. Finally, given that it has been widely reported that mild to moderate exercise has significant health benefits and can reduce the risk for "all causes" of disease, it is noteworthy that 67% of participants reported that the program assisted them in being more active than usual.

Further development, implementation, and testing of this program for outcomes that parallel participant results in randomized controlled trials of TCQG, such as those that have found positive results for cardiopulmonary, physical function, balance, and psychological outcomes for older adults,[17] may provide further evidence that this model is practical and useful, and may also produce results. As a dissemination project, the enthusiastic uptake by trained practice leaders and the national reach, along with the promising participant perceptions of benefit are the greatest strengths of this study.

Limitations

In future investigations of this protocol, more rigorous, direct assessment of the full set of RE-AIM components would provide stronger evidence for effective dissemination, particularly if the continued efforts and outcomes of the trained practice leaders were tracked. Furthermore, other models that more specifically address the predictors of uptake of a program (from the community site and facilitator perspective) and change in behavior (from an individual participant perspective) would be useful for obtaining more information for translational potential. For example, key factors that have been identified in Diffusion of Innovations Theory[36] as influencing the uptake of a new practice include appeal, simplicity, trialability (ease of "trying it out"), and visible benefits (being able to see others benefit). The TCE program was designed with the intention of meeting such criteria, but direct assessments of potential participants' perceptions of these features and examination on the impact of these ratings on participation and practice would be helpful to delineate further which factors are important for the reach aspects of RE-AIM.

Implementation aspects of RE-AIM were only assessed in the simple counting of numbers of classes taught, but this component is more generally assessed as intervention fidelity (i.e., was the intervention implemented as it is supposed to be?).

Some further assessment of quality of instruction after the brief but consistent methods of training practice leaders should be included in future assessments of TCE dissemination potential. Many who are familiar with the lengthy training that is usually required for those who teach Tai Chi or Qigong might critique the training program as inadequate. We distinguish between the type of training provided to establish a network of nonexpert practice leaders and the sort of training provided to train bona fide instructors. The purpose here in dissemination via nonexpert practice leaders is largely to provide a taste of TCQG to the public, hoping that an initial experience would encourage early adopters eventually to seek more professionally trained instructors.[37] A more stringent assessment, however, to see that the curriculum is being implemented by practice leaders as taught, would provide an important evaluation of the intervention fidelity to confirm that this method "works" and that the improvements in perceived health-related outcomes are attributable to this particular teaching and dissemination method.

Further limitations of this demonstration project include the single-item indicators used to assess several of the outcome variables. Pain, sleep, and levels of energy were not measured with validated scales, but data provide a glimpse of the potential benefits, enough to affirm that the dissemination methods were of sufficient quality to obtain participant perceptions of benefit. Although without a comparison group, improvements in these factors could arguably be attributed to other causes, such as attention and positive social interaction, more rigorous research has already been done that consistently demonstrates similar benefits for Tai Chi and Qigong.[1] As an evaluation of a community-based intervention conducted in multiple implementation sites, the results were preliminary indicators of the potential for TCE to be tested more thoroughly for health benefits and as an exercise alternative for older adults.

Conclusion

This study has demonstrated that TCQG, a not well understood and sometimes esoteric practice, can be translated into practical, simple, mindful steps, "Tai Chi Easy," that retain the ancient wisdom of traditional Qigong and disseminate a beneficial program widely and for little cost. The standardized training for nonexpert practice leaders was effective as a first-level dissemination strategy within a framework of conventional health care and social service settings, resulting in enthusiastic uptake and adherence by older adults and demonstrating perceived health-related benefits.

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ACKNOWLEDGMENT
The National Council on Aging provided funds for this project.

0197-4572/$ - see front matter

doi:10.1016/j.gerinurse.2010.04.012

Appendix A

The Tai Chi Easy Protocol: Summary Description

The Tai Chi Easy (TCE) curriculum is purposefully designed to simplify the basic practice components of Tai Chi and Qigong, and present them to populations in a form that is standardized for replication and easily taught to a nationwide community of "practice leaders." The protocol is meant to be simple, nonstressful, and fun for participants to learn and practice. In the development of TCE, the traditional components of Tai Chi and Qigong were carefully catalogued into "baskets of practice" to point out that there are categories of practice modalities in this mind-body practice. These "baskets" or mind-body practice modalities include 1) gentle movement and postural adjustment (including Tai Chi and Qigong movements), 2) breathing practices, 3) self-applied massage, and 4) meditation/relaxation.

In TCE, each basket includes several practices, exercises, or techniques that can be drawn on to plan and lead classes or practice sessions. This organization system is designed to simplify teaching and ease of learning, in that a smaller or larger number of practices from any one "basket of practice" can be combined and taught in a single practice session. The baskets of practice framework was specifically designed for 2 purposes: to simplify the training for ease of replication and dissemination and to balance the goal of implementing a standardized set of practices with the flexibility of choice so as to facilitate research.

For each basket, a set of 2–3 core and another 3–4 optional practices were drawn from traditional Tai Chi and/or Qigong practices. For example, for the first basket, "movement," there is a series of Qigong movements that are very simple, repetitive, flowing arm motions practiced while shifting the weight. Also in the movement basket are several traditional Tai Chi movements, such as "Cloud Hands" and "Parting the Horses Mane," that can be taught as single movements to be repeated for simplicity. In more able populations, these can also be combined into a flowing Tai Chi series with Tai Chi walking. From this set (basket) of 8–10 simple movements, a practice leader chooses a smaller subset of these movements to teach in a class or practice session. The practice leader may then return to this limited group of movements and choose either the same or a different combination for the next session. This same procedure is used with the practices in the breathing, self-massage, and meditation baskets as well.

This "basket" model allows for variety from one session to another, which may encourage a sense of interest and diversity in participants (as opposed to boredom with a more limited and more contained program). However, the program options are not too diverse, because too many options could create confusion and stress. In the interest of rapid dissemination and long-term retention and program stability, this model is designed to reduce complexity while offering a degree of variety, both of which may lend to a dynamic, compelling, and sustainable program.

The TCE protocol suggests 55-minute classes or practice sessions, designed to be flexible to meet the needs, moods, and capacities of the learning group. A major goal in the design of the TCE protocol is to provide adaptability to a wide variety of populations. Sessions can be longer for advanced groups or be much shorter for groups that are physically or cognitively compromised.