

# Perceived Benefits of Meditative Movement in Older Adults

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Several meditative movement interventions have been designed for older adults in the community setting. Previous reviews have reported on the objective efficacy of interventions, but little has been reported on the effectiveness of such interventions. The purpose of this review is to report the perceived psychosocial benefits and health outcomes of meditative movement such as Tai chi (TC) and Qigong to inform clinicians on what interventions “work” under what conditions and for whom. Thirty seven studies were included in this review and were synthesized with three content areas: perceived improved outcomes and mediators; and perceived factors for initiating TC. The 37 studies included 1856 participants (mean age 67.76) who were mostly women ( $n = 1435$ ) and white ( $n = 808$ ). Some were Taiwanese ( $n = 117$ ), non-white ( $n = 72$ ), Chinese ( $n = 39$ ) and African American ( $n = 28$ ) and the studies were conducted in 9 countries. Clinicians can use the findings of this review to identify motivational factors for initiation and adherence and identify specific benefits from an effective TC intervention. (*Geriatr Nurs* 2010;31:37-51)

Physical activity (PA) is associated with improved health outcomes for all populations.<sup>1</sup> The rapidly increasing aging population (expected to increase by 147% from 2000 to 2050) accompanies a growing need for age-appropriate PA programs to promote successful aging with an active lifestyle.<sup>2,3</sup> Older adults face many challenges in adapting to aging and related decline in physical function; these are attributed in part to declining participation in physical activity.<sup>4</sup>

Healthy People 2010 lists PA as its number one initiative.<sup>5</sup> In 2005, however, 47% of adults aged between 65 to 74 reported no leisure time activity. Among those aged over 75 years, 60% reported no leisure time activity. Participation in PA program offerings is reported to increase

among older adults when participants enjoyed the exercise and had a choice in the selection of activity.<sup>6-8</sup>

Research reports show that PA may enhance adaptation to aging and physical function. For example, Koltyn<sup>9</sup> reported higher levels of PA associated with higher quality of life (QOL) in older women. Moderate intensity, mind-body PA (such as tai chi [TC]) has been shown to have positive effects on physiologic variables as well as selected psychologic parameters consistent with adaptation.<sup>10,11</sup> TC is described as a traditional Chinese exercise that is suitable for older people and patients with chronic disease.<sup>12</sup> It incorporates deep breathing and mental concentration during the movement to achieve harmony between body and brain. TC and a similar PA form, Qigong, have been categorized as a type of exercise referred to as meditative movement (MM).<sup>13</sup>

Despite research evidence of the efficacy of mind-body PA interventions, limited research has explored the psychosocial benefits of such interventions designed to improve physical function among older adults. Significant research, both exploratory and experimental, has evaluated the efficacy of TC interventions on health and functional outcomes in older persons.<sup>14,15</sup> Evaluation of reports that assess individual perceptions of psychosocial benefits and health outcomes of participation in MM are needed. The issue for clinicians in gerontology is to evaluate mind-body physical activity interventions for their acceptability and effectiveness in specific populations for enhancing well-being in older persons. Evaluation of such interventions includes the assessment of such exercise strategies in their effectiveness as well as their appeal in older persons. Of importance is the notion that a significant number of the efficacy outcomes in experimental designs reported psychosocial data that should be examined more closely to determine the impact of intervention effects on individual perceptions of 1) improved outcomes

**Table 1.**  
**Perceptions of Tai Chi and Qigong Practice**

Source	Sample No. of Subjects/Mean Age Sex (Male/Female) Ethnicity	Intervention description/ method description	Reported Outcomes
Barrow et al. 2007 UK	32 Older adults history chronic heart failure 68.4 years 26/6 Ethnicity Not Reported (NR)	16 weeks (55 minutes x 2 days) RCT Pre-post survey	<u>QOL:</u> Perceived physical disability (Minnesota Living with Heart Failure) improved
Beaudreau 2006 USA	12 community dwelling 65 to 88 years 1/11 White (n = 11) and African American (n = 1)	5 weeks (60 min TC plus focus group x 2 days) Focus Group	To explore initiating and maintenance of exercise and perceptions of TC: <ul style="list-style-type: none"> <li>• Wanted to improve balance, strength, coordination, or decrease pain. Compliment regular exercise program; time and location were convenient</li> <li>• Liked small group size</li> <li>• Instructor was older adult and participants felt that helped with understanding their needs</li> <li>• Taught at a slow pace and repetition was important</li> </ul>
Brismee et al. 2007 USA	22 History of knee osteoarthritis 70.8 years 3/19 Ethnicity NR	12 week TC and 6 week no training (40 minutes x 3 days/6 weeks group training and 6 weeks home training; and 6 weeks detraining) RCT Pre-post surveys	<u>QOL:</u> Physical function increased during TC with a decrease during the detraining period [Western Ontario MacMaster (WOMAC) osteoarthritis scale] Arthritic pain decreased with an increase during the detraining period (WOMAC and a 10 point visual analog pain scale)
Chen et al. 2001 Taiwan	80 (40 TC and 40 not TC) community dwelling with chronic disease 74 years 30/50 Taiwanese	Average of 15.4 years TC (at least 30 min x 2 days for 1 year) Cross-sectional Individual interviews with open ended questions TC practitioner vs no TC and no exercise past year	Explored facilitators and barriers to practice of TC among older adults: <ul style="list-style-type: none"> <li>• Reasons initiated participation included: <ul style="list-style-type: none"> <li>o Encouragement from others, perceived benefits to health, pain relief and treatment of illness, have time after retirement, graceful movements of TC, interested in TC, keep active and close to home</li> </ul> </li> <li>• Reasons for continued practice: <ul style="list-style-type: none"> <li>o Positive health outcomes, became habit, social rewards, relaxed and less moody, clear headed, filled free time.</li> </ul> </li> <li>• Barriers to practice among those who want to practice include no time, location inconvenient, and too weak to practice (n = 5)</li> <li>• Reasons never considered TC: <ul style="list-style-type: none"> <li>o Too weak to practice, memorizing movements too complicated, too old, no time, not interested, no patience to learn, too fat, do not know where to go to learn.</li> </ul> </li> </ul>

Choi et al. 2005 South Korea	29 Living in care facility, ambulatory with history of at least 1 fall risk factor 76.96 years 6/23 Ethnicity NR	12 weeks (35 min x 3 days) RCT pre-post survey	<u>Self-efficacy:</u> Falls efficacy (Falls Efficacy Scale) increased
Docker 2006 UK	7 Community dwelling older adults 52-71 years 1/6 Ethnicity NR	At least 3 months Ethnography, observation and interview Purpose to identify factors that influence their attraction to attend TC groups	<u>Reasons for initiating:</u> <ul style="list-style-type: none"> <li>• Response to physical or mental health problem</li> <li>• Wanted to keep active and do gentle exercise, suitable for older adults</li> <li>• Enjoyed being part of a group</li> <li>• Learning something new</li> </ul> <u>Perceived Benefits:</u> <ul style="list-style-type: none"> <li>• Invigorating, body feels warm, whole body work out, forget about other things, relaxing</li> <li>• Concentration improved, increased body awareness, memory in general improved, arms and ankles stronger, coordination, fitness, balance, calmness improved; general balance, posture, breathing habits, circulation, and improved suppleness.</li> <li>• Special Effects <ul style="list-style-type: none"> <li>o Involved body and mind, hidden depths, etc</li> </ul> </li> <li>• Perceived Transfers into everyday life: <ul style="list-style-type: none"> <li>o Posture improvement</li> <li>o Breathing for relaxation, coping with anxiety, strength and fitness, learning to fall more safely</li> </ul> </li> <li>• Mysticism: <ul style="list-style-type: none"> <li>o Appears to be important to the experience and awareness of the spiritual nature of TC.</li> </ul> </li> </ul>
Fransen et al. 2007 Australia	56 Older adults, history of chronic symptomatic hip or knee osteoarthritis 70.8 years 18/38 Ethnicity NR	TC for Arthritis 12 week (60 min x 2 days) RCT pre-post surveys	<u>QOL:</u> Physical health (SF-12) improved Physical function improved and arthritic pain decreased (WOMAC)
Gavin et al. 2003 Canada	158 mostly beginner exercisers at community classes 62.5 years 31/127 White (n = 149) and non-white (n = 3) Note, some did not report ethnicity	8-12 week sessions (60-90 min x 1-2 days) Descriptive Written surveys and additional telephone interviews Purpose to learn more about older adults who join beginner TC classes offered in community recreation centers and senior centers.	<u>Factors related to participation:</u> <ul style="list-style-type: none"> <li>• Written surveys <ul style="list-style-type: none"> <li>o Knew someone in class (47%), drove self to class (84%), joined for fitness, health, mental health, social, or fun; pretty sure could perform (97.5%); Concerned about taking class (30%)</li> </ul> </li> <li>• 107 exit interviews: <ul style="list-style-type: none"> <li>o TC gentle, relaxing and safer (compared to aerobics classes)</li> <li>o Many joined to benefit balance or healing effects on system</li> </ul> </li> </ul>

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Table 1. Continued

Source	Sample No. of Subjects/Mean Age Sex (Male/Female) Ethnicity	Intervention description/ method description	Reported Outcomes
Greenspan et al. 2007 USA	103 Congregate independent living, transitionally frail with at least 1 fall in past year >70 years and 50% over 80 0/103 White (n = 84) and African American (n = 19)	48 week (60 increasing to 90 min x 2 days) RCT pre-post surveys	<ul style="list-style-type: none"> <li>• Those who adhered stated TC helped relax and interesting. More agile and helped balance or pain and others felt sense of accomplishment</li> <li>• Dropouts reported TC did not meet expectations: too slow and not enough exercise, TC did not improve mobility or energy</li> <li>• TC seen as less taxing on joints and when compared to line dancing, not as social</li> <li>• Majority of participants confident they would be able to perform the movements, yet acknowledge difficulty keeping up at times.</li> </ul> <p><u>QOL:</u> Perceived health status (Sickness Impact Profile) improved in areas of body care and movement, mobility and ambulation</p>
Hackney et al. 2008 USA	13 History of Parkinson's 64.9 years 11/2 Ethnicity NR	13 weeks(60 min x 2 days and at least 20 lessons) RCT Pre-post surveys with exit interview survey scored 1-5	<p><u>Perceived Benefits:</u> Improved balance, walking, mood, and endurance. Neither agree or disagree with strength improved.</p> <p><u>Reason to maintain:</u> Enjoyed the class</p>
Hartman et al. 2000 USA	18 History of osteoarthritis 68.6 years 3/15 White (n = 17) and African American (n = 1)	12 weeks (60 min x 2 days) RCT Pre-post surveys	<p><u>QOL:</u> Satisfaction with life (Arthritis Impact Measurement Scale) improved</p> <p><u>Self-efficacy:</u> Arthritis self-efficacy (Arthritis Self-Efficacy Scale) improved</p>
Hill et al. 2005 Australia	23 no TC for 12 months community dwelling and able to walk independently outside home 71.1 years 7/16 Ethnicity NR	12 weeks (60 min x 3 days) Single group intervention with survey questions at 8 weeks	<p><u>Reasons to initiate TC:</u></p> <ul style="list-style-type: none"> <li>• Involvement in research</li> <li>• Improve aspect of health</li> <li>• Location</li> <li>• Cost</li> </ul> <p><u>Perceived Benefits:</u></p> <ul style="list-style-type: none"> <li>• Improved health status</li> <li>• Improved flexibility</li> <li>• Social/friendship aspect</li> <li>• Relaxation</li> </ul>

Irwin et al. 2008 USA	30 Healthy older adults with Pittsburg Sleep Quality Index (PSQI) $\geq$ 5 70 years 8/22 White (n = 21) and non-White (n = 9)	16 weeks (40 min x 3 days) RCT Pre-post survey scores and 25 week follow-up	<u>Perceived Benefits:</u> Pittsburg Sleep Quality Index (PSQI) reduced to less than 5 at 25 weeks global sleep score and sleep parameters of rated sleep quality, habitual sleep, sleep duration, and sleep disturbance (PSQI) improved
Irwin et al. 2007 USA	59 healthy older adults 69.6 years 18/41 White (n = 48) and non-white (n = 11)	16 weeks (40 min x 3 days) RCT pre-post survey scores and 25 week follow-up	<u>QOL:</u> Physical functioning, bodily pain, vitality and mental health improved significantly and role physical and emotional, general health, and social functioning improved slightly (SF-36)
Irwin et al. 2003 USA	18 Healthy older adults 70.9 years 6/12 White (n = 17) and non-white (n = 1)	15 week (45 min x 3 days) RCT Pre-post surveys	<u>QOL:</u> Only role-physical and physical functioning (SF-36) improved more for TC participants who reported low health function at baseline
Jouper et al. 2006 Sweden	253 members of Green Dragon association 58 years 38/215 Ethnicity NR	Average of 5 years (37 min x 4.8 days) Descriptive, mail surveys with open and closed questions	<u>Reason for initiation:</u> Curiosity, sought low-impact activity, health promotion and recuperation from illness <u>Reason for maintenance:</u> Improved psychological well-being, health preservation, recuperation from illness. <u>Outcomes:</u> General calmness and relaxed (emotionally and physically), increased mobility and smoother joints, less stress, better sleep, harmony, more energy, and improved concentration Compared to before practice, health-now was improved. Specifically, now fewer common colds and infections, breathing easier, quicker recovery, gastro-intestinal improvements, maintenance of mind-body balance. Also fewer pains, migraines and headaches, less dizziness, increased blood circulation; improved fibromyalgia, burnout, incontinence, drug abuse, allergies, medicine use, tinnitus, blood pressure, depression and recovery after cancer treatment. General feeling of improved spirit and timelessness and self-esteem. <u>Reason for not practicing daily:</u> <ul style="list-style-type: none"> <li>• Lack motivation (competing priorities)</li> <li>• Time allocation</li> <li>• Travel or work schedules</li> <li>• Finding a place to practice</li> <li>• Temporary unhealthy state</li> <li>• Instructor absent</li> </ul>
Lam et al. 2008 Australia	28 History of Type II diabetes and HbA1c $\geq$ 63.2years 15/13 Ethnicity NR	6 months (60 min x 2 days for 3 months then x1 day for 6 months) RCT Pre-post surveys	<u>QOL:</u> Role due to physical function, social function, and general health (SF-36) improved

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Table 1. Continued

Source	Sample No. of Subjects/Mean Age Sex (Male/Female) Ethnicity	Intervention description/ method description	Reported Outcomes
Li et al. 2003 USA	26 Older adults 68.88 both groups Gender and Ethnicity NR	3 months (? Min x 3 days) RCT pre-post survey	<u>QOL:</u> Physical and mental health (SF-12) improved
Li et al. 2004 USA	62 History of moderate sleep complaints and community dwelling adults 75.30 years 10/52 White (n = 58) and non-white (n = 4)	24 week (60 min x 3 days) RCT pre-post survey	<u>Outcomes:</u> Sleep duration, efficiency, sleep quality, latency, duration, and disturbances (PSQI) and Epworth Sleepiness Scale improved <u>QOL:</u> Mental and physical health (SF-12) improved
Li et al. 2005 USA	125 Sedentary 76.94 years 38/125 White (n = 112) and non-white (n = 13)	6 month (60 min x 2 days) RCT pre-post survey	<u>Self-efficacy:</u> Falls self-efficacy (Activities-Specific Balance Confidence scale) increased (as mediator) and fear of falling [Survey of Activities and Fear of Falling in the Elderly (SAFFE)] decreased
Li Harmer et al. 2001a and Li McAuley et al. 2001b and Li et al. 2002 USA	49 Sedentary and community dwelling 72.8 years 6/43 White (n = 46) and non-white (n = 3)	6 month (60 min x 2 days) RCT pre-post survey	<u>Physical Function:</u> (2001a) Physical function (SF-20) improved <u>Self-efficacy:</u> (2001b) Barrier and performance Self-efficacy (Scales) improved (2002) Self-esteem relative to physical self-esteem (Domain Specific self-esteem) and global self-esteem (Rosenberg self-esteem) improved
Li et al. 2007 USA	17 History of mild to moderate Parkinson's disease, otherwise healthy, no exercise for past 2 months and Community dwelling 72 years 7/11 White (n = 17)	5 days (90 min x 5 days) Exit survey scored on 4-point likert	<u>Exit survey:</u> Program appropriate, understood movement instructions, enjoyed program, <u>Perceived confidence</u> in ability to perform reported as easy to learn and perform, safe to perform, intend to continue <u>Perceived benefits:</u> Improved balance, functional independence, confidence, specifically walking confidence.
Li Harmer Glasgow et al. 2008 USA	140 physically mobile, cognitive function, community dwelling (6 senior centers), 71 years 20/120 White (n = 134) and non-white (n = 6)	12 week (60 min x 2 days) One group pre-post with exit survey scored on 4-point likert	<u>QOL:</u> Physical and mental score (SF-12) improved <u>Exit survey:</u> Program appropriate, understood movement instructions, enjoyed program <u>Perceived confidence</u> in ability to perform reported as easy to learn and perform, safe to perform, intend to continue <u>Perceived benefits:</u> Improved balance, functional independence, confidence, specifically walking confidence.

Li Harmer Mack et al. 2008 USA	20 community dwellers (n = 10 experienced and n = 10 novice TC practitioners) 75 years Gender and Ethnicity NR	2 weeks (? min x 2 days and encouraged to practice at home) Exit interviews scored on 0-10 scale	<p><u>Exit survey:</u> Movements appropriate, understood movement instructions, enjoyed program, easy to learn and perform, safe to perform, intend to continue, <u>Perceived confidence</u> in ability to perform reported as easy to learn and perform, safe to perform, intend to continue</p> <p><u>Perceived benefit:</u> Improved balance All indicated an intention to continue Videotape and users guide useful</p>
Sattin et al. 2005 USA	108 Transitionally frail with history of 1 or more falls in past year (55 African Americans) 70-97 years 5/103 White (n = 86) non-white (n = 22) (mostly African American)	48 weeks (60-90 min x 2 days) RCT pre-post survey	<p><u>Self-efficacy:</u> Confidence at avoiding falls indoors (Falls Efficacy Scale) and confidence in engaging in activities of daily living including those outside the home (Activities Specific Balance Confidence) both improved for whites, but not for African Americans (may be due to low percentage of African Americans)</p>
Scourfield 2006 UK	7 Community dwelling older adults who practiced TC. 73-94 years 2/5 Ethnicity NR	3 months to 3 years Individual interviews with thematic analysis	<p><u>Reasons for initiating:</u> ● To improve balance and reduce falls, reduce depression, and unable to keep up with regular TC class;</p> <p><u>Reasons to adhere:</u> ● Group practice with instructor; see other people</p> <p><u>Benefits of participation:</u> ● One felt she could get out of a chair easier, another felt he improved balance; one described becoming a tai chi person; relaxing for another person; general well-being; improved posture; able to move joints better; improved sleep</p>
Shen et al. 2008 USA	48 Diagnosis of osteoarthritis 64.4 years 6/42 Ethnicity NR	6 week (60 min x 2 days) One group pre-post surveys	<p>Participants able to have a positive attitude about aging and how they see themselves as a strategy to stay young.</p> <p><u>QOL:</u> All domains improved (WOMAC)</p> <p><u>Outcome:</u> Pain decreased (VAS)</p> <p><u>Self-efficacy:</u> Pain management, physical function and coping with symptoms (Chronic Pain Self-Efficacy Scale) improved</p>

(Continued)

Table 1. Continued

Source	Sample No. of Subjects/ Mean Age Sex (Male/Female) Ethnicity	Intervention description/ method description	Reported Outcomes
Song et al. 2007 Korea	22 History of osteoarthritis and no exercise for 1 year prior 64.8 years 0/22 Ethnicity NR	12 week (60 min x 3 days for 2 weeks then x 1 day for 10 weeks) RCT Pre-post surveys	<u>QOL:</u> Arthritic pain and stiffness (Korean-WOMAC) decreased <u>Perceived benefits:</u> Perceived benefits increased significantly <u>Self-efficacy:</u> Self-efficacy (Motivation Scale for Health Behaviors), improved but not significantly
Taggart 2001 USA	45 mostly active with 1-4 types of PA, 2 or more chronic health problems, self reported health good, community 82 years 0/45 Ethnicity NR	3 months (30 min x 2 days) Exit interviews following TC class with open ended question	<u>Exit interviews:</u> 31% self-reported health somewhat better. Open ended "Do you feel you benefitted from the t'ai chi exercise program?" Various benefits (88%); better postural control 25%); 77% of those who used walker at baseline discontinued use indoors; balance improved; more relaxed and better able to sleep at night (11%); pain associated with fibromyalgia reduced (4%), urinary incontinence improved (2%), BP, BS and cholesterol better than past 5 years (2%); and better results than pills and exercises from the doctor.
Taylor-Piliae et al. 2006 USA	39 Chinese born, living in USA with CVD risk 66 years 12/27 Chinese (n = 39)	12 week (60 min x 3 days) One group Pre-post surveys	<u>Perceived benefits:</u> Improved mood [decreased tension-anxiety, confusion, depression, anger, and fatigue and increased vigor (Profile of Mood States)]; reduced stress (Perceived Stress Scale); and improved social support [from family and significant other (Multidimensional Scale of Perceived Social Support)] <u>Self-efficacy:</u> Increased self-efficacy to overcome barriers to perform TC, confidence to perform TC (Tai Chi exercise self-efficacy) improved
Tsang et al. 2005 Hong Kong	24 healthy older adults who practiced TC and lived in community 69.3 years 12/12 Ethnicity NR	Minimum of 1.5 hours per week x 3 years Cross Sectional Surveys with scale 0-100	<u>Self-efficacy:</u> TC participants perceived more balance confidence in performing daily tasks (Activities Specific Balance Confidence Scale) than TC naïve group
Tsang H.W. et al. 2006 Hong Kong	48 history of depression and chronic illness 82.4 years 10/38 Ethnicity NR	16 weeks (30-45 min x 3 days) RCT pre-post surveys	<u>QOL:</u> Well being (Personal Well Being); and psychological and general health (General Health Questionnaire) improved

Wallsten et al. 2006 USA	41 healthy independent living in retirement community 81.2 years (both groups) 10/31 Ethnicity NR	20 weeks (60 min x 2) RCT pre-post surveys	<p><u>Self-efficacy:</u> Chinese General Self-efficacy; and self-esteem (Self-concept Scale) improved</p> <p><u>Perceived Benefits</u> Physical health, psychological health, social relationship and health in general (Perceived Benefits Questionnaire) improved</p> <p><u>Self-efficacy:</u> Confidence to perform activities of daily living (Activities Specific Balance Confidence) improved</p>
Yau & Packer 2002 Hong Kong	18 TC practitioners (8.5 years range 3-26), 3 with visible disabilities 67 years Gender and ethnicity NR	TC practitioners (8.5 years range 3-26) [most practice 60 min x 7 days (66%)] Focus group discussion with thematic analysis of results	<p><u>Reason for continued practice:</u> Participation provides meaning and a pattern to daily life ('good fit' for older adults and soft, less vigorous with gentle movements, effortless and in slow motion)</p> <p><u>Perceived benefits:</u> Promotes health and well being; source of social support and encourages inner calmness; improved physical, cognitive, and mental health Perceived relationship between TC and QOL focused on psychological, social and lifestyle benefits more than physical benefits</p>
Yeh et al. 2006 Taiwan	37 healthy older adults from senior centers 55.41 years 14/23 Taiwan (n = 37)	12 weeks (60 min x 3 days) One group pre-post surveys	<p><u>Self-efficacy:</u> Overall outcome expectations for exercise score (confidence in ability to improve function) improved</p> <p><u>Perceived Benefits:</u> Improved mood, gives a sense of accomplishment and increased mental alertness Other areas improved but not significantly: feel better physically, muscles and bones stronger, and improved endurance in performing daily activities</p>
Yeh et al. 2004 and Yeh et al. 2008 USA	15 History chronic stable heart failure 66 years 10/5 White (n = 8) and African American (n = 7)	12 weeks (60 min x 2 days) RCT pre-post surveys and baseline expectations	<p><u>QOL:</u> QOL (Minnesota Living with Heart Failure total score) improved</p> <p><u>Reasons for initiation:</u> (2004) Expected TC to be helpful prior to intervention (6.5 on VAS 0-10) All rated classes highly for enjoyment, and expressed interest in receiving additional instruction (4 on a 0-4 visual analog scale) and 14 of 15 plan to continue TC.</p>
Zhang et al. 2006 China	24 History of poor balance 70.2 years 12/12 Ethnicity NR	8 weeks (60 min x 7 days) RCT Pre-post surveys	<p><u>Self-efficacy:</u> Falls efficacy (Falls Efficacy Scale) improved</p>

2) perceived changes in mediators for engaging in TC, and 3) perceived factors for initiating and maintaining engagement in TC.

## Method

A comprehensive research literature search was conducted to explore the impact of TC on perceived improvement parameters following participation in MM interventions among older persons. Criteria for inclusion of articles included the following: 1) published in a peer-reviewed journal between 1998 and 2008; 2) cited in nursing, medical, or psychological literature; 3) included mind–body PA as primary intervention 4) participants were primarily aged >65; and 5) research methods included planned measurement of self-report psychosocial outcomes. Cumulative Index for Allied Health and Nursing (CINAHL), Psychological Literature (PsychInfo), PubMed, and Cochrane database were used for this search. Key words used included tai chi, taiji, qigong, older adults, aged, elderly; these were combined, then further narrowed with the criteria of the use of inductive methods. Tai chi, tai chi chuan, taiji, and qigong were entered in Google Scholar search engine with additional hand searches to complete the search for inclusion of articles. Further sorting measures resulted in including those studies conducted with a community-dwelling population. On the basis of the inclusion criteria, 58 of 153 studies were gathered, and descriptive results of 37 studies were used in this review. All articles reported on studies of tai chi interventions with the exception of two studies of Qigong.<sup>16,17</sup> The content analysis undertaken approximated the conventional content analysis described by Hsieh and Shannon.<sup>18</sup> The findings of studies were extracted to form a synthesis of findings and specific psychosocial outcomes using reported subjective data, and these represented initial coding categories. These statements were linked to form broad thematic categories. Emphasis was placed on understanding conceptual grouping of psychosocial intervention effects predicated on the purpose of the search and analysis: perceived improved outcomes, mediators, and acceptability in initiation and maintenance of TC physical activity methods. All authors extracted findings independently; there were only minor differences of opinion, and these were resolved through discussion.

Table 1 displays detailed findings for reported research employed in this review, with an emphasis on the description of the methods of data collection undertaken in each study. As noted, some of the RCT designs used qualitative methods to assess participants beliefs before and after the study.

## Findings

### Participant Characteristics

Included in this analysis were 1,856 participants from 37 studies (mean age = 67.76). Participants were mostly women ( $n = 1435$ ). More than 50% ( $n = 20$ ) of the studies did not report ethnicity. Of those that did, participants were mostly white ( $n = 808$ ). Minority populations reported were Taiwanese ( $n = 117$ ), nonwhite ( $n = 72$ ), Chinese ( $n = 39$ ), and African American ( $n = 28$ ). None of the studies reported inclusion of Hispanic participants. Most of the studies were conducted in community centers ( $n = 33$ ) and the remaining in specific group settings such as retirement communities ( $n = 3$ ) or qigong community ( $n = 1$ ). The studies were conducted in 9 countries: United States ( $n = 22$ ); Australia, Hong Kong, and United Kingdom, ( $n = 3$  each); South Korea and Taiwan ( $n = 2$  each); and Canada, China, and Sweden ( $n = 1$  each). One study reported that the instructor was of the same age as the participants.<sup>19</sup>

### Perceived Improved Outcomes

Most participants of the research reported in this review began TC because of perceived benefits to health and with a desire to exercise in a group setting for socialization. The desire to increase socialization was also related to why they continued to attend TC classes. Those who continued to participate were changing their attitude toward aging; several reports showed references to improved beliefs or self-concept. The perceived improvements in outcomes were reported as improved function that accompanies chronic diseases, additional benefits, and self-report ratings of QOL.

Perceived improved function and QOL related to chronic diseases were the most common reasons for initiating the TC classes. TC is a physical activity with multiple health benefits for the elderly population, including improved balance and physical health.<sup>20,21</sup> Most of the studies

reporting reasons to initiate and maintain TC used qualitative methods, and a few used quantitative methods. Reasons reported for initiating TC classes among the reviewed qualitative studies included the following: 1) improving function and strength<sup>19,22</sup>; 2) decreasing pain<sup>19,23</sup>; 3) maintaining fitness or health<sup>17,19,23,24</sup>; 4) promoting psychological well-being<sup>22,24</sup>; 5) recuperating from illness.<sup>17,23</sup> Quantitative questionnaires reported similar findings: 1) improving function and strength; 2) maintaining fitness or health<sup>25</sup>; 3) promoting psychological well-being; and 4) reducing blood pressure and helping arthritis.<sup>26</sup> In a study of TC among a population of patients with chronic heart failure ( $n = 30$ ), using a visual analog scale at baseline, both TC and control subjects expected that TC would help them recuperate from symptoms.<sup>27</sup>

The investigators of many studies interviewed participants following participation in TC interventions to report which outcomes participants believed were improved. Qualitative reports of outcomes from focus group discussions and personal interviews included the following: 1) feeling relaxed or experiencing positive mood changes<sup>17,22,24,28</sup>; 2) improved concentration and memory<sup>17,24,28</sup>; 3) feeling invigorated<sup>17,24</sup>; 4) increased fitness<sup>17,22,24,28-31</sup>; 5) reduced pain<sup>31</sup>; 6) improved sleep<sup>17,22,31</sup>; 7) global benefits<sup>28</sup>; 8) more effective than medications<sup>31</sup>; and 9) increased social support (Table 1).<sup>28</sup> Quantitative methods using pre-post comparisons or post surveys reported similar results, or the belief that TC was more effective with medication in all areas, with the exception of concentration and memory: 1) feeling relaxed or experiencing mood changes<sup>25-27,32,33</sup>; 2) feeling invigorated<sup>32</sup>; 3) increased fitness<sup>25-27,33-35</sup>; 4) reduced pain<sup>26</sup>; 5) improved sleep<sup>36,37</sup>; 6) global benefits<sup>35,38</sup>; and 7) increased social support.<sup>32,35</sup>

As people age, their QOL is determined by their ability to maintain independence and autonomy; participation in regular physical activity such as TC or QG can delay functional decline. Changes in QOL were reported in findings from quantitative surveys. Throughout the literature reviewed, various surveys were selected for use in the TC and QG studies, and included short-form (SF)-36, 20, and 12; Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC); Sickness Impact Scale; and Minnesota Living with Heart Failure. The SF-36, 20, 1, and 12 are

shorter variations of the Medical Outcomes Study questionnaire to assess QOL. The SF-36 and 12 include 2 summary measures with 4 subscales each: 1) physical health (physical functioning, role—physical, bodily pain, and general health); and 2) mental health (vitality, social functioning, role—emotional, and mental health).<sup>39,40</sup> The SF-20 represented 6 domains: physical, role and social functioning; mental health, health perceptions, and pain.<sup>41</sup> These surveys were often analyzed as a composite score and subsequently according to the domain-specific areas. Occasionally, on the basis of the desired outcomes of a study, domain-specific components were selected for sole analysis. For example, studies reported improvements in the physical health domain of the SF-12 and SF-20, respectively<sup>42,43</sup>; in other studies, both physical and mental health components of the SF-12 improved.<sup>34,37,44</sup> Improvements in QOL according to the SF-36 were reported in studies.<sup>45-47</sup>

Using the WOMAC, significant improvement in physical function and decreased arthritic pain was reported.<sup>38,42,48,49</sup> TC practitioners reported significant improvements in body care and movement, mobility, and ambulation measured by the Sickness Impact Profile.<sup>50</sup> Two pre-post studies reported improvements in the Minnesota Living with Heart Failure survey.<sup>27,51</sup> Satisfaction with life among a group of older adults with osteoarthritis,<sup>52</sup> and well-being and general health<sup>35</sup> also improved.

### Perceived Improved Mediators

Another reported common thread for participating in TC classes was the availability or enhancement of social support. Previous studies have reported the importance of social support and exercise maintenance among older adults.<sup>53-55</sup> All of the qualitative studies made some reference to social support in their discussion of why individuals joined TC classes. In the Beaudreau<sup>19</sup> study, all of the participants ( $N = 12$ ) reported that they practiced TC at the senior centers because they liked the social atmosphere. Whereas Docker<sup>24</sup> reported other reasons for initiating TC, being part of a group was important once they joined the class ( $N = 7$ ). Scourfield<sup>22</sup> reported that the TC provided a holistic experience that provided a comfortable environment that was social in nature and that the participants enjoyed that

atmosphere ( $N = 7$ ). Participants in the Chen, Snyder, and Krichbaum<sup>23</sup> study ( $N = 80$ ) reported increased participation in social events as a result of practicing TC. Two studies addressed social aspects of participation in written surveys. Gavin and Meyers<sup>26</sup> reported that knowing someone in class was a common reason for joining, and the social aspects were important for the continued participation ( $N = 107$ ). Yet another study reported that social and friendship aspect of the class was beneficial.<sup>25</sup>

In studies in which self-efficacy was considered, 95% ( $n = 19$ ) found participants had an improvement in self-efficacy. Improved self-efficacy and confidence in ability to perform exercises was reported using both qualitative and quantitative methods during interviews,<sup>24,26</sup> written exit surveys,<sup>26,29,30,34</sup> and pre-post surveys<sup>32,35,38,56,57</sup> following 5 days of intense practice, at least 3 months of TC, and 6-month TC interventions. One study specifically reported improved arthritis self-efficacy<sup>52</sup> and another chronic pain management.<sup>49</sup> Reports of significantly improved falls efficacy or confidence in ability to perform activities of daily living (ADLs) without falling were measured by the Activities—Specific Balance Confidence scale.<sup>16,58-60</sup> Fear of falling while performing ADLs and instrumental ADLs<sup>58</sup> and confidence in avoiding falls also improved following a TC intervention.<sup>27,59,61,62</sup> Participants also reported improved barrier and performance self-efficacy<sup>32,56</sup> and self-esteem.<sup>17,35,63</sup> Chen, Snyder, and Krichbaum supported the importance of confidence to exercise and reported that participants who did not want to practice TC believed they were too weak to practice and that memorization of the movements would be too hard.<sup>23</sup>

### Perceived Factors for Initiating TC

The most frequently used designs that evaluated initiation and maintenance of TC used a variety of methods, such as: 1) ethnography, focus group discussion<sup>19,28</sup>; 2) personal interviews<sup>22,23</sup>; 3) participant observation combined with personal interviews<sup>24</sup>; 4) quantitative surveys combined with personal interviews<sup>26</sup>; and 5) surveys.<sup>17,27,33</sup> The overall goal of these studies was to understand why older adults initiate and continue to practice TC from the participant's perspective.

The perceived belief that exercise would improve chronic disease was often reported as a reason to initiate TC classes (see Perceived Outcomes section). One study of TC practitioners with more than 5 years of practice ( $n = 253$ ) reported that maintaining health and recuperating from illness was important for both initiating and maintaining TC practice.<sup>17</sup> The intervention setting was an important factor for older persons engaging in TC; it provided more specific information to what was appealing and was just as important as the content of a course. For example, Beaudreau<sup>19</sup> reported that participants particularly liked instructors whom they believed to be close in age to them. They found this reassuring and felt that was why the instructor knew how to meet the needs of older adults by presenting the content in small segments and with repetition. Another study reported that TC was a good fit for older adults because the movements are soft and gentle.<sup>28</sup> Participants with Parkinson's disease ( $n = 13$ ) simply enjoyed the class.<sup>33</sup> Gavin and Meyers<sup>26</sup> found the instructor to be important in the process as well. Reported characteristics of a good instructor included that the instructor was reassuring and repeated movements. However, participants in Gavin and Meyers study reported that the instructor went too fast and tried to squeeze too much into one hour.

Spirituality, another important reflection of self, is different from religion and is important in the context of the MM approach to PA.<sup>64</sup> One participant reported a "wholesome" feeling from practicing TC that was believed to be related to a spiritual meaning to the practice.<sup>24</sup> Another study reported improved spirit and timelessness.<sup>17</sup>

Perceived safety was critical to the initiation and maintenance of an exercise intervention for older adults in the research reviewed for this report. Several articles provided subjective reports of safety. Some were reported during open-ended interviews,<sup>24,26</sup> and others were self-report responses in exit surveys.<sup>29,30,34</sup>

### Discussion

Previous research has emphasized the importance of self-efficacy expectation and outcome expectations on performance of PA,<sup>65</sup> as well as the impact of social support from friends.<sup>66</sup> These represent the psychosocial influence related to

initiating and maintaining PA for older adults. The findings in this review contribute to further research design in identifying 1) factors related to initiation and adherence of MM and 2) participant-specific benefits resulting from an effective intervention (i.e., QOL, perceived safety, self-efficacy). Improved psychosocial benefits contribute to the application of research findings that identify benefits and barriers to a mind–body exercise program for older persons. Such programs can be tailored to individuals, for example, to those who need more confidence in their ability to exercise or perceive they can or will only engage in safe exercise.

First, this review shows that the persons benefiting from TC interventions include both men and women, a significant number of minorities, and individuals from a wide range of community and group settings. These findings are consistent with the known benefits of TC among older adults measured by functional outcomes.<sup>14,21</sup> Because of the significant evidence that TC strategies improve perceived functional outcomes that range from attitudes toward exercise to QOL outcomes including pain reduction and improved psychological well-being, it is a strategy that may be an important recommendation by clinicians to improve activity in diverse older persons.

Second, this review showed that older persons who might benefit from TC strategies might include persons who are looking for an exercise that is easy to perform, as evidenced by the many studies reporting increased confidence (self-efficacy) in subjects' perceived capabilities to exercise. MM strategies with repetitive movement can be tailored to enhance exercise confidence in older persons. It is noteworthy that a positive attitude toward aging, while remaining physically active, was consistent with increasing perceived function resulting from TC strategies in older adults.

Attitude toward aging was a salient perception related to why the individuals continued to practice TC. Docker<sup>24</sup> wrote that older adults may have a particular view on aging that was expressed through TC. Yau and Parker<sup>28</sup> added that TC provided meaning and pattern to daily life. The participants in the Chen, Snyder, and Krichbaum<sup>23</sup> study reported a desire to stay active as a reason for joining TC classes. Scourfield<sup>22</sup> described older adults as being on the cusp between independence and dependency, with their TC practice was a method of retaining independence.

How older adults feel about themselves is an important component to aging. For example, confidence in performing exercises and walking is important to increasing physical activity. Self-efficacy is the confidence a person feels in performing a behavior or overcoming associated behaviors.<sup>67</sup> Many of the studies evaluated self-efficacy, and the positive results may be due to the self-selection of those who agreed to participate in the classes and actually attended them. Additional findings outlined the perceptions of improved confidence in ability to perform ADLs and reduced fear of falling as a result of participation in TC.

Last, increasing levels of PA among older persons, particularly more frail older persons, can be enhanced by tailoring TC strategies to include an emphasis on health benefits of participation, class design, and instructors characteristics, as well as monitoring or reassuring participants of safety measures employed in TC classes. Group classes in the community were important for social support and modeling behavior. Participant preferences for instructors were often discussed; these included being familiar with working with older adults, presenting content in small segments, reassuring participants, repeating content, and being of the same age as the participants. Modeling behavior is another important component. Measures to promote participation may be improved by emphasizing the known and perceived benefits of participation in TC class.

## Strengths and Limitations

Several strengths of this review have been identified. Designs were well balanced with representation of both sexes. There is a global representation of a significant number of minorities from a wide range of community and group settings. This review identified several key strategies for designing MM exercise programs in the community setting. Many of the reports, both qualitative and quantitative, resulted in specific strategies that can target initiating and maintaining MM in older persons.

A few limitations have been identified. Where ethnically diverse populations were represented, none of the studies reported inclusion of Hispanic men and women, which limits generalizability to this minority group. The thoroughness of the unique findings of psychosocial benefit

excluded the core value of MM and spirituality; oddly enough, there was a paucity of studies that included this spiritual exploration of the MM intervention.

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