

Research Article

In the Eyes of Those Who Were Randomized: Perceptions of Disadvantaged Older Adults in a Tai Chi Trial

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Abstract

Background and Objectives: Older adults living in subsidized housing have typically been excluded from exercise intervention studies. We conducted a qualitative study to explore the perceived physical, psychological, social, and economic factors that influenced participation in and adherence to a year-long Tai Chi intervention within an ongoing cluster-randomized controlled trial (RCT) for older adults living within subsidized housing facilities.

Research Design and Methods: Focus groups were held with participants of the RCT who were allocated to the trial's Tai Chi intervention. Individual phone interviews were conducted with those allocated to Tai Chi who had low adherence or who had withdrawn their participation from the study. Emergent themes were extracted using grounded-theory methods.

Results: In this qualitative study, we enrolled 41 participants who were allocated to the RCT's Tai Chi intervention: 38 completed and 3 withdrew from the study. Average Tai Chi class attendance was 64.3%. Pragmatic factors that led to higher adherence and retention included: locating classes within each facility; providing programs at no cost; and deployment of a skilled research support team. In addition, the use of an accessible, simplified Tai Chi program improved confidence, social support, self-efficacy, and self-reported improvements in physical and psychological well-being.

Discussion and Implications: Perceived physical, psychological, social benefits, and self-efficacy likely enhance adherence and retention to research-based Tai Chi interventions for older adults. Delivering an on-site, no cost, and supportive program appears critical to overcoming financial and environmental barriers to participation for those living within subsidized housing.

Keywords: Adherence, Retention, Qualitative study, Disparities (health), Subsidized housing

The number of adults aged 65 and older in the United States is expected to more than double in 2060 (Mather, Jacobsen, & Pollard, 2015). The associated increase in disease and

disability will profoundly challenge the health care system (Dall et al., 2013). In addition to increasing medical costs, many older adults simultaneously experience loss of income

and limited pensions and will thus rely on government support for housing and health care. This is expected to significantly increase the numbers of adults living at or below the poverty level (Salkin, 2009). Many of these older adults will qualify for both Medicare and Medicaid benefits, as well as Federal and State subsidized supportive housing (Segal, Rollins, Hodges, & Roozeboom, 2014). Dual-eligible beneficiaries and subsidized housing residents are generally in worse health compared with Medicare-only beneficiaries (Segal et al., 2014) and to those without any public housing experience (Parsons, Mezuk, Ratliff, & Lapane, 2011).

Given the growing demands to serve the health care needs of functionally limited subsidized housing residents, it is essential to provide low-cost and effective interventions that combat frailty, improve functional independence, and ultimately reduce health care costs. Regular exercise has been demonstrated to improve numerous physical, mental health, and functional outcomes in older adults (King & King, 2010; Kramer & Colcombe, 2018; Lachman, Lipsitz, Lubben, Castaneda-Sceppa, & Jette, 2018; Penedo & Dahn, 2005) and even reduce health care costs/utilization within this population (Weiss, Froelicher, Myers, & Heidenreich, 2004). However, numerous barriers to exercise programming have hindered widespread adoption of such programs in subsidized housing facilities, including fear of injury, lack of motivation, and poor social support at the resident-level, and limited access to training facilities, proper equipment, and fitness specialists at the facility-level (King & Sallis, 2009; Lees, Clark, Nigg, & Newman, 2005; Resnick & Spellbring, 2000; Schutzer & Graves, 2004).

Tai Chi is an increasingly popular mind-body exercise that shows promise as a cost-effective exercise program that may be particularly well-suited for integration within subsidized housing communities. Tai Chi integrates a combination of low-to-moderate weight-bearing exercises with cognitive and breath training to target both body and mind (Lan, Chen, & Lai, 2008; Li et al., 2001; Manor et al., 2014). Because of its adaptable and low impact training regimen, Tai Chi has been described as a “gateway exercise” for older and deconditioned adults, and evidence supports that it improves exercise self-efficacy in these populations (Li et al., 2001; Yeh, Chan, Wayne, & Conboy, 2016). Tai Chi has also been shown to enhance numerous physical and mental functions in older adults including balance control and mobility (Hackney & Wolf, 2014; Leung, Chan, Tsang, Tsang, & Jones, 2011; Manor et al., 2014; Wolf, Barnhart, Ellison, & Coogler, 1997), falls reduction (Li et al., 2005; Logghe et al., 2010; Taylor et al., 2012; Wu, 2002), bone, joint, and muscle strength (Hall et al., 2017; Manson, Rotondi, Jamnik, Arden, & Tamim, 2013; Wang et al., 2016; Wu, Zhao, Zhou, & Wei, 2002; Yan et al., 2013), cardiovascular conditions (Caminiti et al., 2011; Chang et al., 2008, 2010; Hartley, Flowers, Lee, Ernst, & Rees, 2014; Ng et al., 2012; Yeh, Wang, Wayne, & Phillips, 2008, 2009), cognitive performance (Kelly et al., 2014; Wayne et al., 2014; Zheng et al.,

2015), and psychological well-being (Wang et al., 2010, 2014). Preliminary studies also support the cost-effectiveness of Tai Chi programs delivered to older adults for fall prevention (Carande-Kulis, Stevens, Florence, Beattie, & Arias, 2015; Church, Goodall, Norman, & Haas, 2012; Li & Harmer, 2015).

Populations of lower-income seniors living in subsidized housing have typically been excluded from exercise intervention studies (Parsons et al., 2011; Watkins & Kligman, 1993), and very few studies to date have evaluated the clinical and cost effectiveness of Tai Chi programs delivered in such communities. Even less is known about the lived experience of participants in such trials. Qualitative data obtained from trial participants can inform perceived facilitators and barriers to short- and long-term exercise adherence, and identify relevant experiences not captured in quantitative outcome assessments (Fitzpatrick & Boulton, 1994; Pope, Ziebland, & Mays, 2000; Price, 2002). We therefore conducted a qualitative study that employed focus groups and individual phone interviews to identify perceived physical, psychological, social, and economic factors that influenced participation in and adherence to a year-long Tai Chi intervention within an ongoing cluster-randomized controlled trial (RCT) for older adults living within subsidized housing facilities.

Method

This qualitative study was conducted among participants of the Mi-WiSH (Mind Body-Wellness in Supportive Housing) RCT (NCT02346136) who were allocated to a 1-year Tai Chi training intervention. Details of the background, design, and methods for the Mi-WiSH have been previously published (Wayne et al., 2017). In brief, Mi-WiSH was a cluster randomized, attention-controlled trial of twice-weekly Tai Chi classes with interim video reinforcement compared with health promotion educational classes and monthly social calls for 1 year in low-income senior housing facilities in multiple communities within the Greater Boston area, Massachusetts, USA. Both the Mi-WiSH study and this qualitative study were approved and monitored by the Hebrew SeniorLife Institutional Review Board (IRB). All participants who were enrolled in the Mi-WiSH RCT and randomized to the Tai Chi intervention were invited to participate in this qualitative study. Those willing to attend a focus group or complete an individual phone interview provided IRB-approved oral informed consent before participating in this separate, qualitative study. We did not conduct phone interviews with three individuals who had previously withdrawn their participation from the Mi-WiSH study. In our attempts to contact these three individuals, we learned from their family members that one previous participant had moved into a nursing home and could not complete the interview, and the other two previous participants had since passed away.

Facility Identification

Eligible facilities included state- and federally-subsidized elderly/disabled housing developments that fell under Federal rules and regulations, monitored by the Department of Housing and Urban Development (Section 8 housing). Fourteen subsidized housing sites within the Greater Boston area were enrolled in two waves (eight in Wave 1 and six in Wave 2). Our qualitative study was limited to participants within the four facilities that were randomized to Tai Chi intervention within Wave 1 of the Mi-WiSH study.

Participants

Participants were included in the Mi-WiSH if they were (a) residents of subsidized senior housing in the Greater Boston, MA area, (b) 60 years of age or older, (c) able to understand and speak English, (d) willing to commit to the demands of the study, (e) able to participate safely in Tai Chi exercises at least twice a week, and (f) expected to remain in their current housing facility for at least 1 year. Participants were excluded if they were (a) unable or unwilling to provide informed consent, (b) planning to move out of the housing site during the study period, (c) experiencing unstable or terminal illness, (d) unable to maintain posture sitting or standing, or (e) currently practicing Tai Chi or other mind-body training.

Interventions

The Tai Chi intervention was adapted from the protocols used in prior trials (Manor et al., 2014; Yeh et al., 2011) but extended from 12 to 52 weeks. Qualified instructors provided 1-hr Tai Chi sessions twice a week at the assigned housing site throughout the year. In addition to the twice-weekly Tai Chi sessions, participants were asked to practice at home for a minimum of 20 min on at least three nonclass days. Every participant was given practice DVDs and a printed instruction manual with detailed images and descriptions of all exercises. Research assistants recorded class attendance and home practice before the start of every session.

Within those facilities randomized to the Tai Chi intervention, attendance was recorded during each offered Tai Chi training session. These data were used to track and calculate completion and adherence rates. *The completion rate* represents the percentage of participants who completed this 1-year program, and it was calculated as the number of completed participants divided by the number of enrolled participants. *The adherence rate* was calculated as the attendance counts divided by the total possible class sessions. *The withdrawal rate* was also assessed based on the percentage of participants who officially left the study. It was calculated as the number of withdrawal participants divided by the enrolled participants.

Focus Group and Interview Methods

Every participant enrolled in the Mi-WiSH study was informed and invited to participate in the qualitative study through letter, staff call, and teacher invitation during class. We employed focus groups for actively enrolled participants, and individual phone interviews for participants who had low adherence. We evaluated participants' perceptions of their experiences in the Mi-WiSH trial, focusing questions and discussion to inform reasons for participation and sustained engagement in the study. For those who withdrew from the study, we gathered and reported their withdrawal reasons.

Each *focus group* started with a brief introduction of the study team guiding the focus group, an explanation of the purpose of the focus group, and instructions and assurances regarding the confidentiality of their responses. All sessions were conducted in the residences where the participants lived between June 2016 and March 2017 by authors (O.-Y. Lo, L. A. Conboy). Focus groups were audio-recorded and lasted about 1 hr.

The focus groups used a semi-structured agenda that was developed to assess two key domains related to participants' perceptions of the Tai Chi program. These two domains and related questions were (a) *Participants' experience in the study*: what participants liked and disliked about their classes, reasons for attending or missing classes, barriers to practicing Tai Chi at home or in the group, suggestions for program improvements, and (b) *Participants' perceived benefits (or lack thereof) of the Tai Chi program*: changes in physical function, mood, psychological well-being, cognition, exercise self-efficacy, and social support within group.

Phone interviews were employed for residents who attended fewer than 50% of the sessions. *Phone interviews* utilized a brief (5 min) script, which asked about reasons for not attending, and inquired into ways through which we could improve the program. Interviews were audio-recorded with participants' permission and informed consent, and conducted by experienced qualitative researchers (L. A. Conboy, C. Georgetti, O.-Y. Lo, and M. M. Gagnon) between June 2016 and March 2017.

Data Analysis

We employed a thematic analysis to synthesize and better understand concepts emerging from focus groups and phone interviews (Attride-Stirling, 2016; Boyatzis, 1998). Recordings were transcribed and reviewed while re-listening to the audio to check for accuracy. Audio transcripts were read by at least two of three authors (A. Rukhadze, C. Georgetti, and L. A. Conboy). We started with two a priori themes of (a) *Participants' experience in the study*, for which we looked for codes: what participants liked and disliked about their classes, reasons for attending or missing classes, barriers to practicing Tai Chi at home or in the group, suggestions for program improvements, and

(b) the theme of *Participants' perceived benefits (or lack thereof) of the Tai Chi program*, for which we tabulated codes: changes in physical function, mood, psychological well-being, cognition, exercise self-efficacy, and social support within group. We also collected support for emergent themes which will be reported elsewhere.

With these codes in hand we then returned to the transcripts and double coded for themes independently. Coding consisted of extracting sought and emergent themes as well as condensing responses to each topic across the sample. Any disagreement in coding was addressed in discussion among the coders. We assessed the data for key content areas by finding repetition of themes and topics.

Results

Enrollment, Completion, and Adherence

A total of 41 participants were enrolled in the Mi-WiSH study within the four facilities that were randomized to receive the Tai Chi intervention within Wave 1. 38 (92.7%) completed the intervention and 3 (7.3%) withdrew from the study. Ninety-six classes were offered over the 1-year intervention and the average adherence rate was 64.3% \pm 31.7% (range = 2%–100%). Eight of these participants were considered to have low adherence defined by attending less than 50% classes (individual rates were 2%, 3%, 3%, 6%, 16%, 17%, 28%, and 47%). Thirty out of 38 participants of the Mi-WiSH Tai Chi intervention attended the focus group for this qualitative study. Additionally, seven out of eight low adherence participants (one participant could not be reached after multiple attempts) were interviewed. The reasons for the participants who had low adherence and the participants who withdrew from the study were reported in the following paragraph. Demographic characteristics of study participants are presented in [Table 1](#).

Reasons for Withdrawal and Low Attendance

Reasons for study withdrawal were obtained for all three participants of the RCT who were randomized to Tai Chi

and subsequently withdrew: one moved out of the facility and into a nursing home, one participant reported “feeling too old (99 years old) to complete the study” and then passed away, and one passed away while enrolled in the study. The above-mentioned reasons were gathered from the family members.

Participants who had low program adherence (as indicated by an adherence rate lower than 50%) were phoned and asked their views of the program and why adherence was difficult. Of the eight participants with low adherence: two reported time conflicts with medical appointments (one for physical therapy and the other for various doctor visits), one stated that participation interfered with their ability to care for their parent, one reported grieving due to the death of a spouse, one stated losing interest due to fatigue, one reported having various health conditions and often “*didn't feel up to it*,” one did not provide a specific reason, and one could not be reached after multiple attempts.

Participants Experience and Perceived Benefits

Participants in focus groups from the Tai Chi intervention expressed satisfaction with the classes they received. In general, the Tai Chi participants perceived numerous benefits from practicing Tai Chi ([Table 2](#)) and the perceived benefits are reported and discussed in detail below.

Perceived physical and psychological benefits

In response to why participated in the study, the Tai Chi participants noted their inactive and sedentary lives, stating that they had hoped the classes would be a good incentive to start moving for their physical and mental health. Situating classes within their own living facility, and offering them at no cost, were two practical aspects of the program that overcame previous barriers to engaging in exercise noted by participants. One Tai Chi participant shared, “*I think that's unbelievable that it is in the building*,” and another stated, “*I was looking into different program ... and of course, my main problem with all of it was the cost.*”

Table 1. Demographic Characteristics of Study Participants Enrolled in Tai Chi Program

	Enrolled	Completed with high adherence ($\geq 50\%$)	Completed with low adherence ($< 50\%$)	Withdrew
Number (count)	41	30	8	3
Age (Mean \pm SD, year)	78.3 \pm 10.4	77.6 \pm 10.5	79.6 \pm 9.0	83.0 \pm 15.5
Sex (male, female)	13M, 28F	8M, 22F	4M, 4F	1M, 2F
Hispanic/Latino	1	1	0	0
Race (count)				
White	34	24	7	3
Black or African American	3	3	0	0
Asian	2	1	1	0
Other (Jewish, Trinidadian)	2	2	0	0

Table 2. Participants' Experience of the Tai Chi Program**Facilitators and Barriers to Practice***Facilitators/location:*

"I don't have a car so it would be very difficult for me to get to, you know, some place like that. So to me it's like a marvelous thing and I, you know what more could you ask for."

"I think that's unbelievable and that it is in the building (residence)."

Barriers/cost:

"I was looking into different kinds of programs...to see if they had a Silver Sneaker Program. And of course, my main problem with all of it was the cost."

Perceived physical benefits*Balance:*

"I think from a practical point of view, it really helps like balancing on the subway flooring."

"Some of us take medication that affects our balance so, that's a super plus."

"It helped me a lot with balance."

"And I've found that my balance has increased tremendously ... my legs are stronger and are more able to take the inequities (uneven sidewalk)."

"I found it a good exercise, helps with my balance."

"Three months ago, I noticed a difference, in terms of positivity in my balance definitely."

"I found my balance was better. My stamina—getting up and out of chairs—moving around.... Felt stronger."

Fear of falling:

"If you compare with the last year I [Unclear] small garden outside, I was afraid they want to go on the surface, not solid. Now I just do everything smooth and nice and somehow I walk."

"Yeah I enjoy the balance, So with this Tai Chi I find I don't have that off balance too much... so that's one of the best things for me that I was not afraid I'd fall."

"I'd just like to say that the one big benefit is I am more agile or more secure as my balance is better."

"They showed us how to walk, ..., when I see uneven block or some snow or something, immediately I begin to walk this [demonstrates] and I am safe. And I learned it because of safety."

Flexibility:

"You feel are more flexible."

"Flexible, stronger."

Energy:

"Once you start doing all the movements and stuff like that, it's like you wake up, your body feels generated to go on, and then you can do something else outside."

"It gives you that boom."

Perceived Psychological Benefits*Positive psychological well-being:*

"Calm, maybe, yeah. Happy, you know." [after beginning meditation]

"It teaches you, you know, just relax and go with the flow and, you know, let it trickle down. And, you know, and I just enjoy it's really—It's very helpful, it really is, it makes you feel so much better right. I'm so happy that we got it here."

"I think it gives me, let's put it that way, more of a positive outlook that something can be done. Rather than just saying, "Oh, gosh I'm getting old and this is falling off, and that's falling down. This is wrinkling up." It's an idea that well, yeah this is happening, but I can do something about it. There's hope. There's something there that can be done to counteract that."

"When they ask me how it is, I say, "I feel great" or "I feel terrific."

Stress, depressive symptoms reduction, and emotion regulation:

"I find that during the sessions, especially the Fridays it's stress less—it doesn't seem to be stress at all. The minute I go leave class, I would like the class to be longer."

"I try to keep my temper and anger, as little as possible because I have high blood pressure also. So I have to watch myself getting angry and getting upset and having to go to the doctor and he would tell me, 'Well your pressure's high, what's going on, blah blah blah', or with any kind of depression and stuff. Now (with the Tai Chi), I don't feel that way. Before, I use to feel like I'm holding myself very tightly, but now I don't feel that way as much anymore. It helps everything possible in my life that I can think about and I'm glad for that."

"I noticed when since I've been doing the Tai Chi I used to yell at my husband all the time [Unclear] and now I just won't say anything, I'll just sort of pass ... at home it's not as stressful. So it's a lot better."

"For me Tai Chi is more for relaxed mind and relaxed muscle, so it makes me feel comfortable."

"Probably a little bit more tolerant (negative emotion)."

Mindfulness:

"I think you are calmer and you try to react to the people like if some people really irk you but you don't get as pissed off as we say. No it sort of like calms you down ... I mean so if you interact with people differently because, you know, want to make them feel more calm too."

"Doing the Tai Chi it seems to take that mind away, you know, eat this, eat that, eat this, you know." [doesn't crave sugar as like previously]

"Yeah it's a letting go process. It's a letting go of anything, the negativity in life. It's like it's not worth it anymore, you know."

Table 2. Continued**Facilitators and Barriers to Practice****Cognition:**

"It's great for you, mental thinking because you have to remember the movements and what not."

"It makes you think. And remember. You have to remember."

"I feel that my mind has changed considerably just by this process."

"I used to feel like lightheaded, I'd be going one way and then my head is going, my thoughts going that way and but my body is going that way."

Perceived Improvements in Social Support

"I have fun. We have fun. I think we have fun. There's always a little laugh and a little something funny that makes you laugh, you know? So the class is fine with me, it's fine. I just hope it doesn't end."

"You make that commitment and it's very important to me to keep that commitment to the group."

"With the other people in the group, you feel if you don't show up, you're letting them down."

"And the thing is, if somebody's sick, you wanna see if they're okay and if you can do something for them. Because it's like we try to take care of one another. And I think that's really... We've just formed a bond with all of us and it's wonderful."

Self-Efficacy

"There is, for me, a definite feeling of well-being that I didn't have before. Confidence in holding my ... My body parts are holding together without any strain. And I think that that is important for older people, it gives you confidence in moving. Otherwise you tend to tense up."

"Elderly people tend to be kind of pushed aside we're all, we're not 19, we don't have these fabulous bodies and they kind of look at us like we can't do anything, but this has really shown us." (the Tai Chi) ... gives you a little confidence. Confidence that if you, if you're in a balance situation, you can get yourself out of it."

"I think after six months, we can do exercises at home as well."

"I found my balance was better.... I was more confident."

"I think from a practical point of view, it really helps like balancing on the subway flooring."

"They showed us how to walk, put your feet first, then—when I see uneven block or some snow or something, immediately I begin to walk this [demonstrates]...."

"Some of the movements are so important and so easy ... and convenient, everywhere we can do it. Nothing can stop us, we don't have any excuse to stop."

"When you brush your teeth, you can [perform the tai chi movement] pour."

With respect to enhancing physical function, Tai Chi participants repeatedly noted improvements in balance, mobility, strength, posture, physical comfort, pain relief, and flexibility, which they indicated translated into improved function during activities of daily living. Representative focus group statements include: *"I've found my balance has increased tremendously ... my legs are stronger and are more able to [adapt to] uneven sidewalks"*; *"...it really helps like balancing on subway floors."* There was also a reported sense of enhanced energy or stamina; *"It gives you that boom."* Of note, participants in the Tai Chi group appreciated that these benefits were obtainable from a non-strenuous exercise, which suited their age. *"It was a great way to stretch your muscles without being harsh about it."*

Tai Chi participants also frequently touched on the psychological effects of practicing Tai Chi, acknowledging the mind-body connection. Many participants appreciated feelings of relaxation and positive changes in sleep patterns. One person stated, *"Tai Chi is more for relaxed mind and muscle, so it makes me feel comfortable."* Another, reflecting on the meditative aspect shared, *"Calm, maybe, yeah. Happy, you know."* Participants also spoke about the role Tai Chi played in helping them with their cognitive function: *"It's great for ... mental thinking because you have to remember the movements and what not"; "I feel*

like my mind has changed considerably just by this process." Finally, participants in the Tai Chi program reported reduced depressive symptoms, improvements in anger control and stress management, and increased general contentedness and well-being. One participant shared, *"Yeah, it's a letting go process. It's a letting go of anything, the negativity in life. It's like it's not worth it anymore, you know".*

Perceived social support

Members in the Tai Chi groups expressed new or enhanced bonds among their peers in the class. This enhanced social connectivity was emphatically summarized by one participant; *"We've just formed a bond with all of us and it's wonderful."* Additionally, many participants expressed a feeling of duty to the other members of the class to show up, the sentiment that they were all in the program together and that to not show up would be a disservice to the whole group. One participant noted, *"With the other people in the group, you feel if you don't show up, you're letting them down."*

Self-efficacy

In the Tai Chi focus groups, several of the comments reflected perceived improvements in exercise self-efficacy, not only during Tai Chi practice, but also during daily

physical activities. Testimonies of participants' newfound confidence included stories of participants' improved ability to walk, increased confidence while moving, and increased comfort while moving and staying stationary. One participant stated, "*There is for me a definite feeling of well-being that I didn't have before.... My body parts are holding together without any strain. And I think that is important for older people, it gives you confidence in moving.*"

Discussion

The results of this qualitative study provide insight into factors that promote the adherence and retention of disadvantaged older subjects in a clinical trial from the perspective of those who were randomized to Tai Chi group. Our findings suggest that once residents of senior housing are enrolled and randomized in a Tai Chi program, more than 90% complete the year-long program and, on average, attend 64% of classes. These favorably high adherence rates are discussed below in the context of Mi-WiSH study design features specifically chosen to enhance sustained engagement in this community, along with three key factors voiced by participants in focus groups: (a) perceived physical and psychological benefits, (b) improvements in perceived social support, and (c) self-efficacy.

Study Design Features to Overcome Challenges Related to Adherence and Retention

The participants in our focus groups commented on a number of study design features that may help overcome anticipated barriers to the retention of older low-income adults in exercise and health education programs. One feature was the delivery of classes on-site within each of the individual housing facilities. Among frail disadvantaged elders, limited mobility, access to affordable and reliable transportation, and weather-related issues, among others, can be significant barriers to regular attendance in exercise or health education programs (Bethancourt, Rosenberg, Beatty, & Arterburn, 2014; Freiburger, Kemmler, Siegrist, & Sieber, 2016). Situating classes in designated community rooms of each recruited facility likely contributed to our favorable adherence and retention rate. A second key factor influencing participation that was mentioned by our respondents was cost. Financial burden is a significant barrier for vulnerable populations participating in any health promotion program (UyBico, Pavel, & Gross, 2007; Withall, Jago, & Fox, 2011). Given the financial constraints of our study population, it is quite likely that absence of fees contributed to favorable adherence and retention rates (Bethancourt et al., 2014; Joseph, Ainsworth, Keller, & Dodgson, 2015). A third factor was the deployment of a highly skilled research support team that maintained frequent and regular contact with participants. Close communication with study participants has been reported as a key facilitator in other exercise trials in frail elders (Freiburger et al., 2016).

A fourth and central study feature that likely enhanced adherence and retention in the Tai Chi arm, was the nature of the Tai Chi intervention itself. As noted by multiple participants, Tai Chi was perceived as a nonthreatening, low impact, adaptable exercise well matched for older adults with limited function. The participants who attended the 12-month Tai Chi intervention have experienced many positive physical, psychological, social factors and these positive factors not only enhanced their self-efficacy with respect to their ability to perform Tai Chi, but also made them less afraid of falling and allowed them to walk and move in areas that they had come to avoid. Specific discussions for each key factors will be discussed in the following sections.

Physical and Psychological Factors

The beliefs participants develop during an intervention are critical for maintenance of the exercise regimen (Neupert, Lachman, & Whitbourne, 2009), so perceiving positive benefits is a critical factor for remaining engaged in a year-long exercise program. Perceived positive changes in physical and psychological factors was very likely a contributing factor impacting adherence in Mi-WiSH's Tai Chi program. Many participants attributed improvements in their physical well-being to the Tai Chi program. Commonly reported physical functions included improved balance, mobility, posture, pain relief, flexibility, and strength. A few participants specifically mentioned that improvement in physical function made them less afraid of falling.

Tai Chi participants also commonly reported psychological benefits from their practice. These reports included increased positive psychological well-being, reduced stress and depressive symptoms, enhanced ability to control their mind, thought, and memory. Objective outcomes observed in a large number of clinical trials of Tai Chi generally support these reported physical and psychological benefits (Li et al., 2005; Taylor et al., 2012; Wang et al., 2014; Yeh et al., 2011); however, few studies to date have rigorously evaluated the benefits of Tai Chi to frail elders living in subsidized housing facilities.

Social Factors

Tai Chi participants frequently referred to the community exercise dynamic as a facilitator to their adherence to practicing Tai Chi. When participants discussed specific aspects of the program that motivated them to attend Tai Chi classes, the most frequently mentioned factors were social factors, such as appreciation for the teachers, positively enhanced social bonds between peers, and motivation to adhere to the class schedule all together due to a sense of duty to their classmates. All Tai Chi focus groups consistently mentioned the positive feelings of social support that came from practicing Tai Chi in a group, and that the group dynamic improved overall satisfaction with the

intervention. Lack of peer support and trust have previously been identified as significant social barriers to the retention of older adults and low-income groups in clinical trials (Mody et al., 2008; Withall et al., 2011). Our data highlight the relevance of social support in motivating vulnerable populations to remain engaged in exercise programs, and the potential of Tai Chi programs to foster a socially rich environment.

Self-efficacy

Many participants felt improvements in self-efficacy and specifically commented on the adaptability and learnability of the protocol and how many of the simplified Tai Chi movements translated into everyday activities. One participant stated, “*It’s the way in which we do it, everybody [can] go in at their own pace.*” Another shared, “*some of the movements are so important and so easy ... and convenient, everywhere we can do it. Nothing can stop us, we don’t have any excuse to stop.*” Yet another shared, “*When you brush your teeth, you can [perform the tai chi movement] pour.*” Previous studies have addressed the important role of self-efficacy on the maintenance of exercise participation during and after the termination of an exercise program in older adults (McAuley, 1993; Neupert et al., 2009). Our results suggested the Tai Chi intervention enhances self-efficacy beliefs in Tai Chi exercise, other forms of exercise and daily activities in older adults living with subsidized housing, which could potentially lead to health behavior changes and maintenance (Marcus, Selby, Niaura, & Rossi, 1992; Strecher, DeVellis, Becker, & Rosenstock, 1986). Our team did not follow the participants’ perceptions after the termination of the Tai Chi intervention but future studies could investigate whether and how the self-efficacy influences the behaviors in older adults living with subsidized housing.

Conclusion

Focus groups were informative in identifying factors contributing to adherence, retention, and perceived benefits from participation in a clinical trial evaluating a year-long Tai Chi intervention for older adults living within subsidized housing facilities. Participants reported several pragmatic factors associated with high adherence and retention, including the convenient location of Tai Chi classes within their facility, the no-cost intervention, and the deployment of a highly skilled research support team that maintained frequent and regular contact with participants. Those participants with high adherence also reported high levels of social support from instructors and/or other participants within the Tai Chi group training sessions. The use of an accessible, simplified Tai Chi program was reported to be important for improved confidence, self-efficacy for exercise and daily activities, and perceived benefits to physical and psychological well-being.

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Conflict of Interest

P. M. Wayne is the founder and sole owner of the Tree of Life Tai Chi Center. P. M. Wayne’s interests were reviewed and managed by the Brigham and Women’s Hospital and Partner’s HealthCare in accordance with their conflict of interest policies. No other authors have conflict of interest to declare.

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