

Using Tai Chi to Reduce Fall Risk Factors Among Older Adults: An Evaluation of a Community-Based Implementation

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Abstract

This study aimed to evaluate a community-based implementation of an evidence-based fall prevention program, in which 131 individuals participated in *Tai Chi: Moving for Better Balance*. Self-report and functional performance assessments included demographics, health and fall history, the Activities-Specific Balance Scale, the Timed Up and Go test, and the Functional Reach test. Pre-post scores were compared with the Wilcoxon signed rank test. The mostly female participants were 73 years old, on average. At baseline, 18% reported being afraid or very afraid of falling, and 18% had fallen in the past 6 months. At follow-up, there was significant improvement in Timed Up and Go ($p < .001$), Functional Reach ($p < .01$), and Activities-Specific Balance Scale scores ($p < .01$). These results demonstrate that a 12-week evidence-

Manuscript received: December 7, 2015; **final revision received:** February 12, 2017;
accepted: February 22, 2017.

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based Tai Chi program can be feasibly implemented by novice instructors, is well-received by older adults, and can effectively reduce fall risk when implemented in community settings.

Keywords

falls, exercise, evidence-based practice, program evaluation

Introduction

Falls represent a significant problem among older adults, with serious negative consequences for health, independence, and quality of life (Centers for Disease Control and Prevention [CDC], 2015). Approximately one third of adults aged 65 and older experience a fall each year. Twenty percent of those falls lead to serious injury, such as broken hip or traumatic brain injury, a rate substantially higher than for any other age group (CDC, 2015; National Center for Health Statistics, 2012). Falls account for 2.5 million emergency department visits and 700,000 hospitalizations annually for older adults, and represent about US\$34 billion each year in direct medical costs (CDC, 2015).

Because lower body weakness and balance impairments are both important risk factors for falls, strength and balance exercise is one of the most effective preventive interventions (CDC, 2015; Gillespie et al., 2012). In particular, Tai Chi has been shown to improve fall-related outcomes among older adults (Gillespie et al., 2012; Li et al., 2005; Wolf et al., 1996). Tai Chi is a Chinese martial-arts based exercise characterized by slow, fluid movements and breathing awareness that leads to improved balance, strength, and flexibility, and has been linked to a variety of health benefits (Lan, Lai, & Chen, 2002). Understanding whether such evidence-based prevention strategies can be effectively translated and disseminated widely is currently a priority for public health practice (Glasgow & Emmons, 2007).

Tai Chi: Moving for Better Balance (TCMBB) is an evidence-based fall prevention program developed for older adults by Li and colleagues (Li et al., 2005; Li, Harmer, Mack, et al., 2008). It is a 24-week program incorporating simplified versions of eight traditional Yang-style Tai Chi forms. An in-depth description of the translation of traditional Tai Chi techniques into a therapeutic program, also called *Tai Chi Quan: Moving for Better Balance*, as well as further details about the program components, can be found in Li (2014).

The initial evidence base for *TCMBB* was provided by a randomized controlled trial among adults aged 70 and older. Sixty-min sessions were held 3 times per week; after 6 months, participants experienced fewer falls, fewer injurious falls, and improved functional balance, physical performance, and fear of falling (Li et al., 2005). Subsequently translated into a community-based

intervention program to be delivered either 3 times per week or twice per week along with 45 min of at-home practice each week, it has been shown to be effective in small-scale evaluations of implementation in both community-based and clinical settings (Fink & Houston, 2014; Li et al., 2008; Li et al., 2013).

A 12-week version of *TCMBB* has also been developed, and when tested in a small community-based trial, participants demonstrated significant improvements in functional assessments of strength, mobility, and balance (Li, Harmer, Glasgow, et al., 2008). The shorter program length may be especially well-suited for community-based implementation, as it may facilitate adoption by organizations and it may be easier to recruit both participants and instructors to a shorter program.

The ability of community organizations to implement *TCMBB* also depends on the availability of instructors. With one exception (Fink & Houston, 2014), previous implementations of the program have relied on trained experienced Tai Chi instructors. The reliance on trained Tai Chi instructors may limit the ability to widely disseminate Tai Chi programs such as *TCMBB*, especially in more rural settings where individuals with previous experience as Tai Chi instructors may not be available.

The objective of this study was to examine the effectiveness of the shorter 12-week *TCMBB* program when taught by trained community members, instead of experienced instructors. This study was part of a state-level initiative in New York State (NYS), where falls are the leading cause of injury deaths, hospitalizations, and emergency department visits among older adults, and account for more than US\$1.7 billion in hospital charges and approximately US\$145 million in emergency department visit fees every year (New York State Department of Health [NYSDOH], 2013). To address this issue, the NYSDOH Bureau of Occupational Health and Injury Prevention (formerly the Bureau of Injury Prevention) participated in a demonstration project funded by the CDC in which evidence-based fall prevention programs were implemented at the local level. As part of this project, the *TCMBB* program was implemented in community settings in three counties across the state, and evaluated for its effectiveness in improving fall risk factors. This study adds to the body of translational evidence for *TCMBB* by examining the feasibility and effectiveness of the short program version when taught by novice instructors in community-based settings.

Design and Method

Program Implementation

Local health departments and/or offices for aging in three counties across the state coordinated the implementation of the *TCMBB* program in a variety of community settings. In total, nine programs were held in two senior centers,

two community/recreation centers, and two assisted living/senior housing facilities. Two individuals from each of the target counties were recruited to be trained as *TCMBB* instructors, and completed a rigorous 1-day instructor training workshop, delivered by the program developer. Half of the recruited individuals had some previous personal experience with Tai Chi, and half had no Tai Chi background. Tai Chi experience was not a prerequisite because there was limited availability of experienced Tai Chi instructors in these communities, and one of the aims of the study was to examine the use of novice instructors. During the training workshop, the participants were presented with information about the health benefits of Tai Chi and background information about the *TCMBB* program. Much of the workshop involved learning and practicing the eight-form Tai Chi movements. Because of the small number of trainees, they were able to receive significant personalized attention as they learned and practiced the proper movements. The workshop also included discussion of the protocol for teaching the *TCMBB* program, including minor modifications to fit participant needs (e.g., using a chair to maintain balance, or performing chair-based instead of standing exercises). The instructor training emphasized the importance of implementing the *TCMBB* protocol in the way that it was designed. Trainees received a training workbook that contained detailed information about the program, a program user's guide with a DVD that illustrated the forms, and three research articles documenting the effectiveness of the program.

To implement the programs, instructors were provided with an Instructor's Guide which detailed logistical requirements for the program (e.g., room size, equipment needs), the teaching protocol (number of participants per class, specific agenda for each session), and detailed evaluation instructions. The class protocol spelled out in the Instructor's Guide was faithful to the design of the *TCMBB* program. Specifically, class sizes were to be 10 to 15, and each class was to be comprised of 5 to 10 min of warm-up exercises, 35 min of Tai Chi practice, and 5 to 10 min of cool down, with breaks as needed. The eight Tai Chi forms were to be taught at an average pace of two forms per week, after which all eight forms were practiced in sequence during each class session. The program was implemented for a period of 12 weeks, with two 1-hr sessions each week; participants were also instructed to complete a 45-min practice session each week at home. Each participant received a *TCMBB* Step-by-Step Guide, which included illustrations and step-by-step instruction of each of the eight Tai Chi forms, as well as a DVD that illustrated the movement involved in each form, to facilitate at-home practice.

To maximize fidelity of implementation, site visits by project staff were held in each of the counties shortly after program implementation began, to discuss experiences with implementation and to troubleshoot any challenges.

Due to the distance where class sessions were held, it was not feasible for project staff to conduct independent observational assessments of class sessions to monitor program fidelity. As recommended by the developer of *TCMBB*, participants were considered to have completed the program with fidelity if they attended at least 75% of the scheduled class sessions (Li, Harmer, Glasgow, et al., 2008); these participants are referred to throughout this article as “program completers.”

Consent and evaluation procedures. The project was approved by the institutional review board of the University at Albany (IRB Approval #11-101). Consent information was provided to the participants both verbally and in writing, after which verbal consent was obtained from each participant. Pre–post evaluation involved a self-administered questionnaire and assessments of functional mobility and balance, which were conducted during the first and last program sessions. Participants also completed take-home calendars on which they recorded at-home Tai Chi practice and any falls that occurred, and instructors recorded class session attendance. Of the total group of 131 participants, 126 (96%) participated in the evaluation procedures, and complete pre–post data were obtained from 97 (77%) of these participants.

Measures

Demographics and health characteristics were assessed by self-report. *Health background* was assessed in terms of self-rated physical health and whether participants had ever been diagnosed with any of 12 chronic conditions.

Fall-related measures included self-reported fall history, fear of falling, and monthly falls. Participants were asked to report how many falls they experienced in the past 6 months, and for each, whether they led to injuries, and if so, whether the injuries required medical treatment. During their participation in the *TCMBB* program, participants were also asked to indicate on monthly calendars any day on which they experienced a fall, and for each, whether injuries resulted, medical treatment was sought, and the circumstances of the fall. Participants also used these monthly calendars to record the number of days they practiced Tai Chi at home.

Functional mobility and balance were measured with both functional assessments and self-report. *TCMBB* instructors (sometimes with assistance from organization staff) administered both the Timed Up and Go (TUG) test (Podsiadlo & Richardson, 1991) and the Functional Reach test (Duncan, Weiner, Chandler, & Studenski, 1990) during the first and last class sessions, after having received both in-person and training and written instructions from project personnel. The TUG is a widely used and valid measure of

functional mobility which has demonstrated sensitivity and specificity for predicting falls (Shumway-Cook, Brauer, & Woollacott, 2000). It involves timing an individual to stand up from a chair, walk 3 m, then walk back and return to a seated position. The Functional Reach test is an easily administered indicator of balance with demonstrated precision and reliability (Duncan et al., 1990). It is performed by measuring how far forward an individual can reach, with arms extended, while maintaining balance.

Perceived balance was also assessed with the Activities-Specific Balance Confidence (ABC) Scale (Powell & Myers, 1995). This 16-item scale asks respondents to rate their confidence in performing specific activities without losing their balance. Responses range from 0% confident to 100% confident that they can perform that activity without losing their balance. Activities include such things as walking around the house, walking up or down a ramp, and standing on tiptoes to reach for something. Cronbach's alpha for our sample was .96.

At baseline, participants indicated their reasons (among several choices) for taking the *TCMBB* class, and whether or not they had ever done Tai Chi before. At follow-up, several program satisfaction measures were also administered. These included overall satisfaction with the class, extent to which they understood instructions, extent to which they feel they successfully completed the majority of the movements taught, overall quality of the class, intention to continue practicing Tai Chi forms, likelihood of signing up for a follow-up class, and interest in helping to teach a similar Tai Chi class.

Sample

Interested older adults were recruited from community settings to participate in the *TCMBB* program. Recruitment activities were targeted to community-dwelling adults aged 65 and above, who could walk with ease with or without assistive devices. In keeping with their usual practice for offering programs for the community, organizations did not strictly restrict participation by age; therefore, a small number of participants younger than 65 participated. Recruitment, which consisted largely of advertisements, publicity through other programs, and word-of-mouth, was very successful, and many sites maintained waiting lists to accommodate all those interested. In total, 131 older adults participated in a *TCMBB* program.

As Table 1 indicates, our *TCMBB* participants were largely female (93%), with an average age of 73. Ages ranged from 49 to 97 years. All of the participants were White. About half had more than a high school education, and about half had incomes greater than US\$30,000 per year. At baseline, 18% reported having fallen at least once in the past 6 months, with about half of

Table 1. Baseline Demographic and Health-Related Characteristics of All Participants and of Participants Who Completed 75% of Class Sessions.

Characteristic	Baseline sample (<i>n</i> = 126) ^{a,b}		Completers (<i>n</i> = 76) ^a	
	<i>M</i> (<i>SD</i>)	<i>n</i> (%)	<i>M</i> (<i>SD</i>)	<i>n</i> (%)
Age, in years	72.85 (9.14)		72.67 (9.37)	
<60		7 (6)		5 (7)
60-69		38 (32)		19 (27)
70-79		47 (39)		28 (40)
80-89		23 (19)		16 (23)
90+		4 (3)		2 (3)
Sex				
Male		9 (7)		6 (8)
Female		114 (93)		67 (92)
Race/ethnicity				
White		114 (100)		68 (100)
Not Hispanic or Latino		96 (100)		58 (100)
Education				
Less than high school		2 (2)		1 (1)
High school		53 (44)		35 (49)
College, including community		47 (39)		25 (35)
Post college		19 (16)		11 (15)
Income, annual household, before taxes				
<US\$5,000		3 (3)		3 (6)
US\$5,000-US\$9,999		6 (7)		3 (6)
US\$10,000-US\$19,999		15 (17)		10 (21)
US\$20,000-US\$29,999		24 (27)		10 (21)
US\$30,000-US\$39,999		6 (7)		4 (9)
US\$40,000-US\$49,999		8 (9)		5 (11)
US\$50,000-US\$59,999		10 (11)		6 (13)
US\$60,000+		16 (18)		6 (13)
Chronic conditions				
Arthritis		78 (62)		42 (58)
Osteoporosis		49 (41)		28 (41)
Asthma		17 (14)		9 (12)
Cancer		25 (20)		14 (19)
Diabetes		17 (14)		9 (13)
Obesity		26 (21)		12 (17)
Fear of falling	2.38 (1.29)		2.35 (1.38)	
Not afraid at all		37 (30)		24 (33)
A little or somewhat afraid		63 (51)		33 (46)

(continued)

Table 1. (continued)

Characteristic	Baseline sample (<i>n</i> = 126) ^{a,b}		Completers (<i>n</i> = 76) ^a	
	<i>M</i> (<i>SD</i>)	<i>n</i> (%)	<i>M</i> (<i>SD</i>)	<i>n</i> (%)
Afraid or very afraid		22 (18)		15 (21)
Fall(s) in past 6 months				
Yes		23 (18)		12 (16)
With injuries and medical care		5 (21)		4 (31)
With injuries, no medical care		7 (29)		4 (31)
Number of falls in past 6 months, among those who had fallen	1.63 (0.88)		1.38 (0.65)	
1		14 (58)		9 (69)
2		6 (25)		3 (23)
3		3 (13)		1 (8)
4+		1 (4)		0 (0)
Self-rated health	3.50 (0.88)		3.67 (0.80)	
Very good or excellent		62 (49)		40 (55)
Good		51 (40)		30 (41)
Fair or poor		13 (10)		3 (4)

Note. TCMBB = Tai Chi: Moving for Better Balance.

^aNot all categories add up to 126 or 76, respectively, because of missing data for individual items.

^bOf the total group of 131 individuals who participated in a TCMBB program, 126 participated in the evaluation procedures.

those participants reporting falls involving injuries and 21% reporting receipt of medical care. Fear of falling was common, with about 20% of participants reporting being afraid or very afraid of falling, and 70% reporting being at least a little afraid of falling. Self-rated health varied, with half of participants rating their present health as very good or excellent, and about 10% rating their health as fair or poor.

Table 1 also illustrates the baseline characteristics of program completers (i.e., attended at least 75% of class sessions). There were no demographic differences between the entire group of participants and the completers. Compared with all original participants, the completers were more likely to rate their physical health more positively, but there were no differences between the groups in frequency or number of falls in the past 6 months, or in fear of falling. We also examined whether the participants who completed a follow-up questionnaire differed from the entire set of baseline participants; there were no differences except those who completed a follow-up questionnaire rated their physical health significantly better at baseline.

Table 2. Participants' Reasons for Participating in the TCMBB Program.

Reason	<i>n</i> (%)
I want to get more exercise	96 (77)
I thought it would be fun	69 (56)
I have done Tai Chi in the past and enjoyed it	25 (20)
A friend of mine is enrolled in this course and I thought I would join them	20 (16)
My health care provider recommended this class	8 (7)

Note. TCMBB = Tai Chi: Moving for Better Balance.

Analyses

Chi-square and two-tailed *t*-tests were used to detect differences in demographics, health background, and fall history between the total group of participants at baseline and completers, and between baseline participants and those who completed follow-up data collection. Differences in outcome measures between baseline and follow-up were examined with the Wilcoxon signed rank test because the outcome variables were not normally distributed. An intent to treat approach was taken, whereby baseline values were carried forward and substituted for missing values at follow-up. Analysis of outcomes was conducted for all participants and for program completers only. All analyses were conducted with SPSS, Version 23.0.

Results

As Table 2 illustrates, participants were most likely to sign up for *TCMBB* to get more exercise and to have fun. Very few reported that they took the class because of a health care provider recommendation. Most participants (76%) had never taken a Tai Chi class before.

We have attendance data for 123 of the 131 older adults who participated in the *TCMBB* program, and of those, 76 (62%) attended at least 75% of the class sessions. Mean attendance among all participants was 70% of class sessions. Among the 97 for whom we have complete pre-post data, mean attendance was 86% of class sessions and 85% of participants ($n = 83$) attended at least 75% of the class sessions. At-home practice data were submitted by 83 participants (63%). Although participants were advised to complete one 45-min practice session at home each week, the actual number of at-home practice sessions over the 12-week program period averaged 32, with a range from 0 ($n = 3$) to 84; however, the length of each of these practice sessions is unknown.

Table 3. Changes in Fall-Related Measures Among All Participants and Among Program Completers.

Outcome measure	<i>n</i> ^a (% missing)	Baseline <i>M</i> (<i>SD</i>)	12-week <i>M</i> (<i>SD</i>)	<i>Z</i>	<i>p</i> value
All participants (<i>n</i> = 126)					
Timed Up and Go (s)	117	11.62 (8.22)	11.32 (8.73)	-4.04	<.001
Functional Reach (inches)	125	8.58 (4.54)	9.41 (5.10)	-2.94	.003
ABC Scale	121	85.49 (16.11)	87.43 (14.33)	-2.94	.003
Completers (<i>n</i> = 76)					
Timed Up and Go (s)	71	9.42 (3.30)	9.07 (5.17)	-4.24	<.001
Functional Reach (inches)	72	8.68 (4.34)	9.73 (5.12)	-2.25	.03
ABC Scale	72	87.38 (13.92)	89.81 (11.20)	-2.20	.03

Note. ABC = Activities-Specific Balance Confidence.

^aNot everyone who participated in the evaluation procedures completed all of the fall-related assessments.

After the program, 73% (*n* = 92) of participants reported being somewhat or very satisfied with the class. We suspect that this may be an underestimate of satisfaction levels, and that the order of response choices in the questionnaire may have led some respondents to choose “somewhat dissatisfied” or “very dissatisfied” when they actually meant “somewhat satisfied” or “very satisfied.” We base this suspicion on the fact that among the respondents who chose either “somewhat dissatisfied” or “very dissatisfied,” all rated the quality of the class as “very good” or “excellent” and all but two said they were “somewhat” or “very” likely to take a follow-up class. Ninety percent of all participants (*n* = 113) planned to continue practicing Tai Chi at home, and three quarters (*n* = 94) were very likely to take a follow-up class, with 71% of those desiring a more advanced class, and 14% (*n* = 18) indicated they would be interested in helping to teach a class. Other elements of program satisfaction are as follows: 96% (*n* = 113) reported understanding the instructions, 78% (*n* = 98) felt they successfully completed the majority of the Tai Chi forms and movements, and 94% (*n* = 120) rated the overall quality of the class as good (27%) or excellent (67%).

Table 3 presents mean values for fall-related outcomes at baseline and follow-up among our entire evaluation sample and among the sample of 76 program completers. There were significant pre-post improvements in all outcome variables. (The same results were obtained when analyses were done without replacing missing values.) At follow-up, 14 participants (11%)

reported falling during the past 6 months, as compared with 17 (13%) at baseline. This was not a significant difference.

Discussion

These results demonstrate that the 12-week *TCMBB* program may be an especially attractive program for both older adults and community-based organizations. In our experience, the program was very well received by older adult participants, indicating that it has good potential to be a practical fall prevention strategy. Older adults, especially females, were attracted to the program, largely saw it as a fun way to get more exercise, and responded favorably to it. Satisfaction with the program was high, and most participants were interested in a continuation class. Frequency of at-home practice was also relatively high. Consistent with the findings of Manson, Tamim, and Baker (2017), our experience indicates that both the health and social benefits particularly attract older adults to Tai Chi programs. Although *TCMBB* was developed specifically for older adults due to their high fall risk, the fact that a small portion of our participants were middle-aged indicates that the program may appeal to a wider audience. Moreover, middle age might be a suitable time to begin investing in strength and balance exercise to slow age-related declines, and there is evidence that a simple Tai Chi program can lead to improved physical functioning among middle-aged women (Zacharia, Taylor, Hofford, Brittain, & Branscum, 2015).

Our experience demonstrates that the 12-week *TCMBB* is feasible for community-based organizations to successfully implement in community settings. The local health departments involved in this project had little difficulty recruiting individuals to serve as volunteer instructors, and many organizations had rooms suitable for conducting the class. Little equipment was needed for the program, although one instructor found that teaching it in a room with mirrors (like a dance studio) enhanced participants' ability to perform the movements correctly. No modifications to the design of the *TCMBB* program were necessary to translate it to the various regions or sites. Minor modifications that individual instructors chose to make included the playing of soft background music during the class and offering an optional session on a third day each week where participants could attend to do their "homework" together as a group. In our judgment, neither of these compromised the integrity of the program, and giving instructors this flexibility may serve to enhance the program. In addition, instructors found that making large posters of the Tai Chi movement illustrations and hanging these where participants could easily see them facilitated the teaching of the forms during the class.

A barrier to widespread dissemination of *TCMBB* or similar programs may be the availability of Tai Chi instructors or individuals with extensive Tai Chi expertise. This project suggests that a feasible alternative strategy may be to train motivated community volunteers to serve as instructors. Anecdotal evidence from our instructors is that the simplified forms in *TCMBB* can be fairly easily learned with a relatively brief training by those unfamiliar with Tai Chi, although a 1-day training was not enough preparation to teach the class with confidence. In fact, all of our instructors practiced the movements extensively, sometimes in pairs, before they attempted to teach them to others. (Originally, our training was designed to last 2 days, but travel difficulties due to a heavy snowstorm required us to shorten it to 1 day. Even a 2-day training would not allow the necessary practice time.) Based on our experience, an efficient way to build capacity to offer such programs might be to have new instructors work with and shadow a more experienced instructor before teaching the program independently. Anecdotally, a benefit we noticed to training individuals with no Tai Chi background is that they did not have preconceived ideas about Tai Chi.

In terms of outcomes, our results suggest that the 12-week *TCMBB* may be an effective way to reduce fall risk among older adults in community settings and they add to the literature that even short Tai Chi programs can have significant effects on physical functional performance (Zacharia et al., 2015). Our *TCMBB* participants demonstrated improvements in indicators of functional mobility and balance, and in perceived balance. The amount of change in functional mobility and balance indicators we observed was relatively small. However, the magnitude of changes we observed are consistent with that reported by Li and colleagues (Li, Harmer, Glasgow, et al., 2008a) from their community-based demonstration of the 12-week *TCMBB*. For example, our participants demonstrated an improvement in the TUG test of 0.35 s (completers) and 0.30 s (all participants), and an increase in functional reach of 1.05 inches (completers) and 0.83 inches (all participants) from baseline to follow-up. Li and colleagues reported improvements of 0.23 s and 0.83 inches, respectively (Li, Harmer, Glasgow, et al., 2008). Not surprisingly, these improvements are smaller than what has been demonstrated by the 24-week *TCMBB* program (Fink & Houston, 2014; Li et al., 2013). If participants continued to practice Tai Chi, either on their own or in a continuation class, it is reasonable to expect that further improvements in fall-related functional performance measures may occur. But these results help to establish the “minimal intensity” of *TCMBB* needed for effectiveness (Glasgow & Emmons, 2007).

The baseline TUG scores were appreciably better for program completers than for all participants (9.42 s vs. 11.62 s). Although the age distribution is

similar across these two groups, program completers also had higher self-rated health as compared with all participants. This suggests that frailer individuals and those in poorer health were more likely to drop out or to have spotty attendance. While it is understandable from a practical standpoint that frailer individuals may have had more trouble completing the program, it raises concerns, given that these individuals are likely to be more at risk of falling and may accrue larger benefits from a program such as this. It would be useful for future research to examine the differential effects of *TCMBB* or similar programs among older adults with different health characteristics, and to identify the strategies that are most successful at recruiting and retaining the individuals who would benefit the most from such preventive interventions.

Although these results are promising, some limitations must be acknowledged. Our sample was largely comprised of White females, which was a typical audience for the community organizations that were involved in this project. Therefore, we are uncertain about how well received or effective the *TCMBB* program would be to men and members of minority groups, although Fink and Houston (2014) had success in recruiting a culturally diverse audience in a metropolitan area. Because of the location and organizational capacity of the community organizations implementing *TCMBB*, the class instructors administered the functional assessments, sometimes with staff assistance. Despite providing them with training and written instructions, we were unable to assess interrater reliability, and we acknowledge that this approach may have led to both systematic bias and measurement error in the outcome measures. Thus, our results need to be interpreted in light of this limitation. In addition, we were unable to objectively assess the fidelity with which instructors adhered to the teaching protocol. Also, without a comparison group, we cannot be certain that the changes demonstrated in functional mobility and balance are attributable to the *TCMBB* program itself. However, translational research projects such as this, which are designed to evaluate the effectiveness of evidence-based interventions when implemented in real-world settings, are needed to gain practice-based evidence which can support future implementation and dissemination efforts (Green & Glasgow, 2006); as such, we used a similar evaluation design as others (Gitlin et al., 2008; Wilcox et al., 2006).

This study illustrates some of the issues and challenges inherent in evidence-based program implementation and provides some useful lessons learned. Two specific challenges, which are not unique to *TCMBB*, relate to the assessment and documentation of program fidelity and outcomes, both of which are sometimes difficult to rigorously accomplish in community-based settings with limited staff and resources. However, *TCMBB* seems to have

characteristics that reduce the barriers that can impede the effective dissemination of evidence into public health practice (Glasgow & Emmons, 2007). For example, its implementation does not place intensive resource or time demands on an organization, and our experience shows that instructors do not need extensive expertise to adequately deliver it. It is packaged and suitable for a wide variety of settings without modification, yet it specifies modifications for participants with physical constraints. The 12-week version seems particularly suitable for community-based settings, as it seems to be long enough to have demonstrable effects, yet short enough so that new participants can be accommodated without an extensive wait. Compared with the 24-week version, the 12-week time frame fits better with the drop-in structure of many community-based agency programming.

In summary, our experience suggests that *TCMBB*, when taught by trained novice instructors and implemented in community settings, appears to be effective at reducing fall risk, well received by older adults, and feasible for implementation. These results add to the growing evidence base supporting community-based fall prevention programs, and indicate that *TCMBB* can be a practical, valuable, and well-received approach to include in our arsenal of strategies for preventing falls among older adults. Furthermore, this evidence base suggests that policies that facilitate the widespread dissemination of such programs and/or that increase the accessibility and availability of such programs to older adults would contribute to reducing the impacts of falls on both individuals and the health care system.

Acknowledgments

The authors thank Michael Bauer for comments on an earlier draft of this article, and Zachary Lazovick and George Stathidis for assistance with data management. Special thanks goes to Broome County Health Department, Broome County Office for the Aging, Chautauqua County Office for the Aging, Suffolk County Department of Health Services, and all of the volunteer Tai Chi instructors for their participation in this project.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the Centers for Disease Control and Prevention, National Center for Injury Control and Prevention

(Grant # U17CE00175301-S1), and the New York State Department of Health, and Health Research, Incorporated (Contract #3769-01).

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