Implementing an Evidence-Based Fall Prevention Program in an Outpatient Clinical Setting

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OBJECTIVES: To investigate the dissemination potential of a Tai Ji Quan–based program, previously shown to be efficacious for reducing risk of falls in older adults, through outpatient clinical settings.

DESIGN: A single-group pre/post design in which participants attended a twice-weekly Tai Ji Quan training program for 24 weeks.

SETTING: Communities in Lane County, Oregon.

PARTICIPANTS: Independently living individuals (N = 379) aged 65 and older.

MEASUREMENTS: Using the Reach, Effectiveness, Adoption, Implementation and Maintenance framework, the primary outcome was the proportion of participating healthcare providers who made referrals. Secondary outcomes were the proportion of referred individuals agreeing to participate and enrolling in the program, and measures of program implementation, maintenance, and effectiveness (on measures of falls, balance, gait, physical performance, and balance efficacy).

RESULTS: Of the 252 providers invited to participate, 157 made referrals (62% adoption rate). Of 564 individuals referred, 379 (67% reach) enrolled in the program, which was successfully implemented in senior and community centers with good fidelity, 283 completed the program (75% retention), and 212 of these attended 75% or more of the 48 sessions. Participants reported a reduction in falls, with an incidence rate of 0.13 falls per person-month, and showed significant improvement from baseline in all outcome measures. A 3-month postintervention follow-up indicated encouraging levels of program maintenance among providers, participants, and community centers.

CONCLUSION: Healthcare providers successfully implemented a protocol to refer individuals at risk of falling to a Tai Ji Quan–based program. The evidence-based program appears readily scalable and exportable, with potential for substantial clinical and public health effect. J Am Geriatr Soc 61:2142–2149, 2013.

Key words: dissemination; RE-AIM; older adults; falls; Tai Ji Quan

Public health officials and medical authorities have increasingly recognized falls in older adults in the United States as a significant public health problem.1–5 Falls, especially injurious falls, can have serious consequences in older adults, leading to loss of functional ability, loss of independence, and early admission to nursing homes.6–8 Healthcare services and direct medical costs are subsequently affected.2 Despite the scope of this problem, older adult fall risk is not being adequately addressed in clinical practice.9 With increasing evidence that exercise-based interventions can prevent falls and reduce fall risk,10–14 efforts are needed to understand how these effective interventions can be routinely incorporated into clinical settings.

In randomized controlled trials, Tai Ji Quan, a balance training exercise based on martial arts movements, has proven effective at reducing the risk of falling in community-dwelling older adults15–17 and people with Parkinson’s disease who experience postural instability.18 Subsequently, efforts have been made to put these findings into practice. An initial translational study has shown that this evidence-based program can be effectively implemented in community settings in terms of program adopt-
tion, outreach to the target population, and efficacy,
but the extent to which referral to an evidence-based
fall prevention program can be integrated into standard
care and health services, is to be fully realized.

To bridge this research-to-clinical practice gap, the primary aim of this study was to evaluate the dissemination
talent of Tai Ji Quan: Moving for Better Balance
(formerly known as Tai Chi: Moving for Better Balance) through healthcare providers in outpatient settings. The secondary aims were to evaluate the reach of the program to older adults, community-based class implementa-
tion, effectiveness of Tai Ji Quan-based movement practice in reducing falls, and maintenance of referral (by healthcare providers) and continued (postprogram) practice (by participants). The Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework was used to evaluate the study aims. On the basis of information derived from focus groups involving target healthcare providers, it was predicted that 20% of solicited providers would refer qualified individuals to the program.

METHODS

Study Area

The study area included six of 12 incorporated cities in Lane County, Oregon (Eugene, Springfield, Junction City, Veneta, Cottage Grove, Florence). In 2011 (U.S. Census estimates), the county had a population of 353,416, of which 54,426 were aged 65 and older living in rural (Junction City, Veneta, Cottage Grove, Florence) and urban (Eugene, Springfield) communities. The study area covered 64% of the county’s older adult population. The average annual (unintentional) fall fatality rate between 2000 and 2006 in individuals aged 65 and older in the county was 45.3 per 100,000, compared with the national rate of 38.3 per 100,000. There were 11 local senior and community centers, with a reach of 5,000 to 8,000 people annually, within the study area that provided services for older adults. These centers constituted target locations for implement-
ing the program. The institutional review board of Oregon Research Institute approved the study protocol, and informed consent was obtained from all participants.

Program Adopters and Study Population

Target adopters were local healthcare providers who worked with older adults (primary care physicians and other medical specialists, including physical therapists and nurse practitioners). In 2010, information on provider names and their specialties was obtained through the Oregon Medical Association (for specialties in family medicine, internal medicine, geriatric medicine, rehabilitation medicine, and general medicine), the Oregon Physical Therapist Licensing Board, and the Oregon State Board of Nursing. Names and status of practicing providers were further verified using e-mail contacts or provider websites throughout the active project period (April 2010 to January 2012). Three hundred twenty-three providers working in 63 clinics (medical, physical therapy, occupational therapy) in the study area were identified and met the inclusion criteria: 194 medical doctors, 109 physical therapists, and 20 nurse practitioners.

The referral population was community-dwelling older adults aged 65 and older who were deemed to be at risk of falling (as judged by their healthcare providers using existing guidelines), physically mobile (could walk with or without an assistive device), without severe cognitive deficits, and referred by a healthcare provider to the program.

Recruitment Process for Participants

Referrals

A member of the investigative team contacted the admin-
istrators, managers, or providers of group-based and inde-
pendent clinics in the study area. For providers who expressed interest, a follow-up meeting was arranged at the provider’s clinic to explain the intent of the program and its recruitment and class enrollment procedures in detail. Clinicians who were not available at the group meeting were subsequently reached on an individual basis. Referral forms with eligibility guidelines and materials (program brochures, examination room flyers, prescription and recommendation pads) were provided to participating providers as an initial point of outreach to the target population and supplied throughout the project period.

Class Enrollment

Enrollment in this translational program was free to all those referred. Individuals who received a referral from their healthcare provider were asked to call the research office and were then contacted by a research assistant, who conducted a brief telephone screening (verification of age, fall history, mobility status) and scheduled an appointment for an in-office visit. At this visit, details about the program were described, and informed consent procedures and baseline assessments (health survey, balance, gait, physical performance) were conducted. Trained research assistants, who were not blinded to study condi-
tion, conducted all assessments according to established protocols.

Once sufficient referrals were received, local senior and community activity facilities were contacted to set up class logistics, followed by the implementation of the program described below.

Tai Ji Quan Program and Community Delivery

The Tai Ji Quan: Moving for Better Balance program, derived from the simplified 24-form of Tai Ji Quan, consists of an eight-form core routine with a variety of built-in practice variations and a subroutine of Tai Ji Quan minitherapeutic movements. In contrast to prior training approaches involving Tai Ji Quan in fall prevention, this program employed an enhanced proto-
col in which the Tai Ji Quan movements were transformed into therapeutic training for balance and integrated into the daily functioning and clinical rehabilitation of participants. Specifically, the program involved a set of tailored Tai Ji Quan–based activities that focused on stimulating and integrating musculoskeletal and sensory systems through self-initiated movements such as ankle sways with feet planted; weight-shifting; trunk rotation, flexion, and extension; and coordinated eyes–head–hand movements. The goals of the training were to improve postural stability and orientation, pelvic mobility and stability, control of body positioning, gait initiation and locomotion, gaze stability, and movement symmetry and coordination; to increase range of motion around the ankle joints; and to build lower-extremity strength. Chair-supported progressions, from completely seated through sit-and-stand to chair-assisted, were also included as part of the protocol.

**Protocol**

The program was delivered in two 1-hour sessions each week for 24 weeks. Each session consisted of warm-up exercises; core practices, which included a mix of practice of forms, variations of forms, and minitherapeutic movements; and brief cool-down exercises. In terms of core exercises, during the initial 2 to 3 weeks, practice time was spent on learning and drilling on two to three forms in sets of two to three, progressively increasing to three to five sets in later weeks. The protocol required that instructors complete teaching all eight forms within 10 to 14 weeks; teach each session with a mix of exercises that integrated the core components indicated above; and include movements while seated, standing, or stepping, with varying speeds, ranges of motion, sensory inputs, and bases of support. Home practice was encouraged but not monitored.

**Delivery**

Community centers were first contacted for availability. The project staff, managers, and supervisors worked together to develop an implementation plan that covered room size, number of participants, instructors, and schedule for class sessions. The first author trained class instructors during a 2-day workshop that covered background on clinical and translation research in Tai Ji Quan; an orientation to falls in older adults and postural control mechanisms; teaching and practicing core program routines, including forms, variations in forms, and minitherapeutic movements; and program instructions and implementation.

**Evaluation**

**Adoption**

This component was evaluated in two ways: the proportion of providers that program personnel approached who agreed to participate and the proportion of participating providers who made referrals during the active referral period (April 2010 to January 2012). The representativeness of specialty care categories was defined as the number of participating providers in each category as a percentage of those who were eligible to practice in the study area.

**Reach**

Reach was evaluated by dividing the number of individuals enrolled by the total number of all referrals made during the entire study period.

**Implementation**

Implementation was assessed according to the extent to which instructors successfully implemented the various prespecified program protocol components: delivered twice-weekly 60-minute sessions over a 24-week period, adhered to the teaching and training protocols (as verified using a program fidelity checklist), and achieved participation and retention rates of 75% or better. The components in adherence to the teaching and training protocols focused primarily on delivery (teaching emphases and movement execution), integration (blending of forms, variations of forms, and minitherapeutic movements), and practice time (40–45 minutes spent on core movements). The first author or an experienced peer instructor conducted in-class fidelity checks every 2 months.

**Effectiveness**

The primary endpoint was reduction in monthly falls frequency during the 24-week implementation of the program. Participants reported falls, defined as landing on the floor or the ground or falling and hitting an object such as stairs or a piece of furniture by accident, using falls calendars and research assistants verified them during a monthly telephone call. Secondary endpoints included change from baseline to 24 weeks in limits of stability (maximum excursion, movement control) measured using computerized dynamic posturography, gait measures of stride length and walking velocity measured using an instrumented walkway system, functional reach, and balance efficacy assessed using a modified Activities-specific Balance Confidence Scale, which measures confidence in one’s ability to avoid falling during the performance of activities of daily living. Trained research assistants conducted baseline and 24-week follow-up assessments in a research laboratory at the Oregon Research Institute. Participants who travelled more than 15 miles to the laboratory were paid $25 to complete the assessment.

**Maintenance**

Maintenance was defined as clinician willingness to continue to make referrals after the translational study was completed (after 24 weeks) and the percentage of participants who continued their Tai Ji Quan practice during the 12 weeks after the end of the 24-week program.

**Data Analysis**

Descriptive statistics are reported as means and standard deviations or percentages for all outcome measures, unless otherwise noted. The difference between the proportion of referrals between medical specialties was evaluated using
the independent t-test for proportions. The fall incidence rate was determined as the number of falls that occurred during the study period divided by the total follow-up time in months (person-months of follow-up). Paired t-tests were conducted to examine change in functional outcomes of participants from baseline to program termination at 24 weeks. SPSS version 18 was used for all calculations (SPSS, Inc., Chicago, IL).

RESULTS

Adoption

Of 323 eligible providers, 252 agreed to participate. Of the remaining 71 providers, 10 did not respond, and 61 could not be reached. Between March 2010 and January 2012, 157 of the participating clinicians referred individuals to the program. Thus, 78% (232/323) of clinicians approached agreed to participate in the program, and 62% (157/252) made referrals (adopted the program). Participation according to specialty and the proportion of each medical specialty that made referrals is summarized in Table 1.

Physicians (combined specialties of family medicine, internal medicine, and geriatric medicine) were significantly more likely to make referrals than physical therapists (0.69 vs 0.51, P = .004). Internal medicine practitioners had a significantly higher referral proportion than family medicine physicians (0.80 vs 0.63, P = .01). Providers practicing in urban areas (n = 121) had a higher referral rate (71%) than those practicing in rural areas (19%), regardless of specialty.

Reach

Five hundred sixty-four individuals were referred during the active referral period, 185 (33%) of whom did not enroll in the program for various reasons (could not commit to the length of the program, n = 105; class time conflict, n = 23; poor health or change in health condition, n = 16; late referral (after the active referral period) n = 25; other, n = 16). One hundred twenty-six of the unenrolled individuals (68%) were living in rural areas. Three hundred seventy-nine individuals agreed to participate in the program for various reasons (could not commit to the length of the program, n = 105; class time conflict, n = 23; poor health or change in health condition, n = 16; late referral (after the active referral period) n = 25; other, n = 16). One hundred twenty-six of the unenrolled individuals (68%) were living in rural areas. One hundred twenty-six of the unenrolled individuals (68%) were living in rural areas. One hundred twenty-six of the unenrolled individuals (68%) were living in rural areas. One hundred twenty-six of the unenrolled individuals (68%) were living in rural areas. This left 221 (58%) reporting having fallen at least once in the previous 3 months, with more than 60% of those having fallen two or more times. Two hundred ninety-eight participants (78%) reported being afraid of falling. Participants' overall physical activity levels before starting the class were below the recommended guidelines for moderate (150 min/wk) and vigorous (75 min/wk) activity.35

Table 1. Healthcare Provider Participation and Referral Status

| Specialty     | Qualified Providers, n (n = 323) | Providers Accepting, n (n = 252) | Representation to Specialty, % | Providers Making Referrals, n (n = 157) | Providers Making Referrals According to Specialty, % |
|---------------|----------------------------------|----------------------------------|--------------------------------|------------------------------------------|---------------------------------------------------|
| Family medicine | 136                              | 94                               | 69                             | 60                                       | 64                                                 |
| Internal medicine | 53                               | 44                               | 83                             | 35                                       | 80                                                 |
| Geriatric medicine | 5                                | 5                                | 100                            | 5                                        | 100                                                |
| Physical therapy | 109                              | 91                               | 83                             | 47                                       | 52                                                 |
| Nurse practitioner | 20                               | 18                               | 90                             | 10                                       | 56                                                 |

*Number of eligible providers within Lane County, Oregon.

Providers who expressed interest in participating.

*Number of accepting providers divided by number of target providers.

*Number of referring providers divided by number of accepting providers.

*Number of referring providers divided by number of accepting providers.

Table 1. Healthcare Provider Participation and Referral Status

Implementation

The 24-week program was successfully implemented in five senior centers, six community centers, one church, one dance studio, and one rehabilitation center. Each class progressed as designed, and all instructors (n = 6) successfully taught the required program routine.

Two hundred eighty-three participants completed the 24-week program, a 75% retention rate. There were no differences at baseline between those who completed the program and those who did not in gender, age (65–74 vs ≥75), health status, and risk factors of falls or fear of falling. There were also no differences between these two subgroups in falls and physical measures over the 24-week program implementation period.

The program included 48 sessions. Median class attendance, including dropout participants, was 36 sessions (range 1–48). Two hundred twelve participants (75%) attended 36 or more sessions (≥75% of the total).

Effectiveness

During the 24-week period, 119 participants (31%) reported 261 falls over 1,995 person-months of follow-up, resulting in a fall incidence rate of 0.13 falls per person-month; 63 fell once, and 56 fell two or more times. Of those reporting one or more falls at baseline (n = 221), 127 (58%) reported no falls during the study period. The average time from baseline to first fall was 0.79 months (interquartile range 1 month). Figure 1 shows fall inci-
Adverse event
Three falls were reported during warm-up sessions, but the participants sustained no injuries and continued the classes. There were no major adverse events, such as injurious falls or severe muscular pain, resulting from Tai Ji Quan exercises during any class.

Maintenance
A postprogram survey was conducted at the end of the project. Of the 157 providers who referred individuals, 121 (77%) responded, 32 did not respond (20%), three had relocated (2%), and one had retired. Of the responders, 114 (94%) planned to continue encouraging their patients to participate in Tai Ji Quan. The level of continued interest and support by participating clinicians is demonstrated by the fact that, in the first 8 months after the end of the study, 79 providers referred 179 individuals to the project for placement in a class.

A follow-up participant survey conducted 3 months after the end of the intervention found that 173 participants (61% of those who completed the program) reported continuing weekly Tai Ji Quan practice on their own (n = 20) or by attending a class (n = 153; verified by class attendance sheets), for a median of 104 minutes each week (range 15–315 minutes), which equated to the recommended 20 to 30 minutes of daily practice. All of the community centers where this program was implemented expressed strong interest in continuing to offer classes, and 1 year after the completion of the study, all were still offering the program.

DISCUSSION
During the active enrollment period, the study demonstrated a substantially better than projected adoption rate of 62% by a variety of medical providers in terms of referrals to the Tai Ji Quan program. Internal medicine physicians demonstrated the highest referral rate. Physicians generally had a higher rate than physical therapists, suggesting that, at least from this study, providers with medical degrees tend to be more likely to adopt and refer. With respect to settings of clinical practice, providers with practices in urban areas tended to have a higher referral rate than those in rural areas.

Of the 564 individuals referred, 67% were enrolled in the 24-week community-based Tai Ji Quan class. The fall profiles of the participants indicated that high-risk individuals were referred appropriately. More than half of the participants reported falling in the month before the start of the program; the majority of participants reported multiple falls (60%) and fear of falling (78%).

To maximize program dissemination potential, classes were delivered primarily through senior and community activity centers that provided senior services and could be easily accessed by community-dwelling older adults. Of the 11 centers approached, all expressed interest in offering room space (100% adoption) and willingness to assist in planning and scheduling classes. These findings are consistent with a prior community-based study.19

Table 2. Participant Characteristics at Baseline (N = 379)

| Characteristic                                      | Study Estimate |
|----------------------------------------------------|----------------|
| Female, n (%)                                      | 269 (71)       |
| Age, mean (SD)                                     | 74 ± 8         |
| Ethnicity, n (%)                                   |                |
| White                                              | 360 (95)       |
| Hispanic                                           | 6 (2)          |
| Education, n (%)                                   |                |
| High school diploma or lower                       | 224 (59)       |
| College degree or higher                           | 155 (41)       |
| Household income, $, n (%)                         |                |
| <10,000                                            | 14 (3.7)       |
| 10,000–14,999                                     | 52 (13.7)      |
| 15,000–24,999                                     | 64 (16.9)      |
| 25,000–34,999                                     | 101 (26.6)     |
| ≥35,000                                            | 148 (39.1)     |
| Body mass index, kg/m², n (%)                      |                |
| <25.0                                              | 91 (24)        |
| 25.0–29.9                                          | 135 (36)       |
| ≥30.0                                              | 153 (40)       |
| Resting blood pressure, mmHg, mean ± SD           |                |
| Systolic                                           | 134 ± 20       |
| Diastolic                                          | 77 ± 11        |
| Number of falls in past 3 months, n (%)            |                |
| 0                                                  | 158 (42)       |
| 1                                                  | 83 (22)        |
| 2                                                  | 77 (20)        |
| 3                                                  | 31 (8)         |
| ≥4                                                 | 30 (8)         |
| Afraid of falling, n (%)                           |                |
| Yes                                                | 298 (78)       |
| No                                                 | 81 (22)        |
| Health status, n (%)                               |                |
| Poor or fair                                       | 49 (13)        |
| Good                                               | 167 (44)       |
| Very good or excellent                             | 163 (43)       |
| Number of chronic medical conditions, n (%)        |                |
| 0                                                  | 24 (6)         |
| 1                                                  | 79 (21)        |
| 2                                                  | 81 (21)        |
| ≥3                                                 | 195 (52)       |
| Number of medications, n (%)                       |                |
| 0                                                  | 71 (19)        |
| 1                                                  | 116 (31)       |
| 2                                                  | 85 (22)        |
| ≥3                                                 | 107 (28)       |
| Weekly physical activity, min/wk, mean ± SD        |                |
| Moderate                                           | 141 ± 154      |
| Vigorous                                           | 22 ± 57        |
| Walking                                            | 91 ± 114       |

*Arthritis, heart disease, high blood pressure, lung disease, diabetes mellitus, osteoporosis, depression, chronic back pain, and cancer. SD = standard deviation.
Trained instructors successfully implemented the program, with good fidelity with respect to program compliance and adherence to and completion of the training protocol. As was the case in prior work,15,19 at the end of the program, participants demonstrated improved balance, gait, mobility, and falls self-efficacy and fewer falls. Despite the duration of the current study (24 weeks vs 12 weeks in a community center outreach study19), rates of class participation (75%) and program retention (75%) using the clinical referral method of recruitment were comparable with those of the community center–based promotion and public advertisement method (75% class participation, 80% class attendance). Data from 3-month follow-up in the present study indicated sustainability in that the majority of participants continued their Tai Ji Quan practice, findings consistent with those of prior studies.15,16,19,26

In the exit survey, providers indicated that they intended to continue referring patients and encouraging them to do the Tai Ji Quan exercises. The fact that this project received a significant number of referrals after the active enrollment period ended indicated good sustainability. It also suggested that, once providers are made aware of community fall prevention programs, they are likely to use these avenues to support their patients. Thus, community-based programs can become an integral component of successful clinical falls risk screening, assessment, and referral (implementation).

Table 3. Change in Outcome Measures from Baseline to 24 Weeks (N = 379)

| Outcome Measures           | Baseline  | 24 Weeks     | Mean Difference Between Baseline and 6 Months | P-Valuea |
|----------------------------|-----------|--------------|-----------------------------------------------|----------|
| Maximum excursion, %b      | 63.7 ± 18.9| 70.3 ± 15.7  | 6.7 ± 13.4                                    | ≤.001    |
| Movement control, %c       | 62.1 ± 22.7| 69.2 ± 19.8  | 7.0 ± 14.1                                    | ≤.001    |
| Stride length, cm³d        | 106.1 ± 19.3| 112.3 ± 19.9 | 6.2 ± 8.0                                     | ≤.001    |
| Walking velocity, cm/s²e   | 95.9 ± 23.5| 103.9 ± 23.2 | 8.0 ± 10.3                                    | ≤.001    |
| Functional Reach, cm³f     | 20.3 ± 6.7 | 23.4 ± 6.5   | 3.1 ± 5.0                                     | ≤.001    |
| Timed Up and Go, secondsg  | 10.0 ± 4.8 | 8.8 ± 2.1    | −1.2 ± 3.8                                    | ≤.001    |
| Chair stands, secondsh     | 14.2 ± 6.6 | 12.9 ± 6.1   | −1.2 ± 3.1                                    | ≤.001    |
| Balance efficacyi          | 3.7 ± 0.7  | 4.0 ± 0.8    | 0.3 ± 0.7                                     | ≤.001    |

Baseline values were substituted for missing values at all follow-ups.

aPaired t-tests.

bA measure of limits of stability that assesses the farthest distance displaced by a participant’s center of gravity while performing leaning and reaching tasks using computerized dynamic posturography. Values range from 0% to 100%, with higher percentages indicating better balance.
cA measure of limits of stability in which, using computerized dynamic posturography, the amount of movement in the intended direction (toward the target) is compared with the amount of extraneous movement (away from the target), defined by the ratio of (amount of intended movement−amount of extraneous movement)/amount of intended movement, expressed in percentage accuracy. The scores range from 0% to 100%, with higher percentages indicating better movement control.
dMeasures the distance between the heel points of two consecutive footprints of the same foot.
eMeasured by dividing the distance traveled by the ambulation time.
fMeasures the maximal distance a participant can reach forward beyond arm’s length while maintaining a fixed base of support in a standing position. Higher scores indicate better balance.
gMeasures the time taken to rise from a chair, walk 10 feet (3 m), return, and sit down. Lower scores indicate better mobility.
hMeasures lower extremity strength by having participants sit and stand five times as quickly possible. Lower scores indicate better strength.
iModified Activities-specific Balance Confidence (ABC) scale. Scores range from one (not confident) to five (completely confident).
A challenge to sustainability is keeping providers informed about resources, such as evidence-based classes, that are available in their community so that they can continue referring individuals. Experience with this project suggests that communicating frequently with clinicians and program implementers, offering educational outreach workshops, and even providing training in Tai Ji Quan to clinicians may facilitate the referral process. For example, offering physical and occupational therapists the opportunity to undertake the training program as part of their continuing education helped increase referrals during the study period. These clinicians also applied components of the program, for example, the minitherapeutic movements, in their clinical practice. Nevertheless, the feasibility of training clinicians to improve adoption and sustain evidence-based programs in clinical practice was not explicitly evaluated in this study, although it is important and therefore requires formal evaluation in future studies.

**Practical Implications**

This study has some clinical implications. First, with national guidelines recommending Tai Ji Quan exercises for falls prevention,1,2 results from this study suggest that it is feasible to engage healthcare providers to make recommendations for evidence-based management of falls and balance-related concerns in older adults. Second, it suggests that, in addition to using recruitment resources from the community (e.g., senior centers or aging services), involving clinicians through a simple referral system is likely to maximize older adult participation in community-based fall prevention programs. Last, Tai Ji Quan programs involve little cost (primarily instructor salary and facilities rental) and are easy to implement (i.e., they are non-equipment dependent with simple practice arrangements). A variety of funding models, including self-supporting user fees, grants, and health reimbursement programs,36,37 can be used to establish these programs in community and clinical settings. For example, in the United States, the average cost of a self-support-model Tai Ji Quan class is $3 to $5 per person per class,36,38 and the Administration on Aging has facilitated state-wide implementation of evidence-based health and prevention programs, including falls prevention,39 through grants to local area agencies on aging.

**Study Limitations**

The lack of information about the process that clinicians used to decide whether to refer a patient is a limitation of the current study. This information would be useful for determining how to increase appropriate referrals to fall prevention programs. A second limitation is that there was no mechanism in place to provide participant-specific feedback to individual referring providers, which could be useful to providers in reevaluating an individual’s fall-risk. A third limitation is the lack of a comparison group to measure effectiveness. However, it is important to note that the primary purpose of the study was to examine the dissemination potential of an evidence-based program that had demonstrated effectiveness. The results of the second-ary outcomes of falls, balance, gait, and physical function further strengthened previous findings of its effectiveness. A fourth limitation is that generalizability of the results may be limited to senior and community activity centers, which were the primary settings for classes in this study, although this program also has been successfully implemented in a variety of other community-based facilities, including YMCAs, YWCAs, and churches. Finally, research assessors were aware of participant intervention status, which was a potential source of bias in the outcome assessments, although none of the research assistants were aware of the study hypotheses, knew any of the participants’ previous measurement scores, or were involved in any data entry or analyses.

**CONCLUSION**

This study demonstrates that the evidence-based Tai Ji Quan: Moving for Better Balance community-based fall prevention program can be successfully disseminated by having clinicians refer individuals at risk of falling directly to the program. Future studies should investigate mechanisms that would enhance the connections and coordination between healthcare providers and community programs and explore the feasibility of implementing the program through healthcare systems.36,37 The plausibility of maximizing sustainability by removing barriers and providing incentives for participation within healthcare systems needs to be explored in future studies.10

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**Author Contributions:** F. Li originated the study, supervised all aspects of its implementation, performed data analysis, and wrote the article. P. Harmer assisted with the implementation, analysis, interpretation, and the writing of this article. R. Stock and K. Fitzgerald contributed to the concept and design of the research project. J. Stevens, M. Gladieux, L.-S. Chou, K. Carp, and J. Voit contributed substantively to interpretation of the study outcomes and writing and revisions of the article.

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