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A Cross-Sectional Study of Balance-Related Measures with Older Adults Who Participated in Tai Chi, Yoga, or No Exercise

R. M. Hakim, PhD, PT, NCS
E. Kotroba, MPT, DPT
J. Cours, MPT, DPT
S. Teel, MPT
P. M. Leininger, PT, PhD, OCS, CSCS

ABSTRACT. *Purpose*: This cross-sectional study compared balance-related measures in older adults who perform Tai Chi, yoga, or no exercise. *Methods*: A convenience sample of 52 healthy, older adults (>65 years old) was categorized according to their current participation in Tai Chi ($n = 21$), yoga ($n = 11$), or no exercise ($n = 20$). Each participant was measured on one occasion with the following balance-related measures: Single Limb Stance (SLS), the Multidirectional Reach Test (MDRT), the Fullerton Advanced Balance Scale (FAB), the Activities-Specific Balance Confidence Scale (ABC), and the Timed Floor Transfer (TFT). The data were examined using multiple one-way analysis of variance (ANOVA) procedures followed by Tukey's HSD post-hoc analysis. *Results*: There were no significant differences between the groups for SLS and ABC scores. The Tai Chi and yoga groups scored significantly higher on the FAB ($p = 0.001$) than the no-exercise group. The Tai Chi group scored significantly higher than both the yoga and no-exercise groups on all directions of the MDRT ($p < 0.01$), and the yoga group scored significantly higher than the

Renée M. Hakim, PhD, PT, NCS, is affiliated with the Department of Physical Therapy at the University of Scranton, Scranton, Pennsylvania.

Elizabeth Kotroba, MPT, DPT, is affiliated with Adventist Rehabilitation Hospital of Maryland, Rockville, Maryland.

Jennifer Cours, MPT, DPT, is affiliated with Community Medical Center, Scranton, Pennsylvania.

Sarah Teel, MPT, is affiliated with Peak Performance Sports and Physical Therapy, New Bern, North Carolina.

Peter M. Leininger, PT, PhD, OCS, CSCS, is affiliated with the Department of Physical Therapy at the University of Scranton, Scranton, Pennsylvania.

Address correspondence to: Dr. Renée M. Hakim, University of Scranton, 800 Linden Street, Scranton, PA, 18510, USA (E-mail: hakimr2@scranton.edu).

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no-exercise group on the MDRT left ($p = 0.004$) and MDRT right ($p = 0.008$). For the TFT, percentage rates for those able to complete the task were as follows: Tai Chi group = 76.1%, yoga group = 54.5%, and no-exercise group = 30.0%; those not tested were either unable or unwilling to perform the test. *Conclusion*: Both the Tai Chi and yoga exercise groups demonstrated better balance performance than the no-exercise group. Tai Chi and yoga are both economical and effective methods of low impact exercise that can be incorporated into a fall-prevention program for older adults in many settings.

KEYWORDS. Balance, older adults, Tai Chi, yoga

INTRODUCTION

Falls are the leading cause of injury, immobility, disability, psychosocial dysfunction, nursing home placement, and premature death in older adults (Hoyert, Kochanek, & Murphy, 1999). Each year in the United States, one in every three adults, aged 65 years or older, falls and those who fall once are two to three times as likely to fall again within a year (Hornbrook et al., 1994; Tinetti, Speechley, & Ginter, 1988). Approximately 40% of those who fall are unable to get back up without assistance (Bloch et al., 2009), which is a particular concern for older adults who live alone. Subsequently, fear of falling is prevalent among older adults and may lead to decreases in socialization, activity level, physical abilities, autonomy, and overall quality of life (Howland et al., 1998; Salkeld et al., 2000). As age increases, so does the incidence of falls and the fear of falling (Hatch, Gill-Body, & Portney, 2003). Because these statistics are so alarming, it is important to determine effective interventions for older adults who are at the risk of falling.

There is a growing body of evidence supporting the use of Tai Chi to improve balance-related measures in older adults. Tai Chi's positive impact on balance is theorized to be the result of using slow movements that require the coordination of the entire body (Jancewicz, 2001). Several investigators have found Tai Chi to be successful in improving balance (Schaller, 1996; Tse & Bailey 1992; Whitman, Li, & Devault, 2000), maintaining strength/balance gains (Wolfsen et al., 1996), decreasing fear of falling (Kutner, Barnhart, Wolf, McNeely, & Xu, 1997; Wolf, Barnhart, Ellison, Coogler, Atlanta FICSIT Group, 1997), or reducing fall risk (Lee, DuBois, Nichols, & Stanford, 2000). Wong, Lin, Chou, Tang, and Wong (2001) found that older adults, who were long-term Tai Chi practitioners ($n = 25$), demonstrated significantly greater postural control ($p < 0.05$) in more complex balance tasks, such as standing with eyes closed on an unstable surface or with visual conflict on an unstable surface, than the control group ($n = 14$) of healthy and active older adults. Tsang and Hui-Chan (2003) also found an advantage for long-term Tai Chi practitioners ($n = 21$), who demonstrated significantly greater knee joint proprioception and expanded limits of stability during weight shifting in stance ($p \leq 0.008$) compared with the age-matched, older adult controls ($n = 21$). Another study conducted by Tsang and Hui-Chan (2004) found that the older adult group practicing Tai Chi for either 4 or 8 weeks had improved vestibular ratios on sensory organization testing ($p = 0.006$) and increased maximum excursions and directional control on limits of stability tests ($p = 0.018$), when compared with the control group. With respect to falls, Wolf et al. (1997)

have reported that Tai Chi decreased the fear of falling and reduced the risk of multiple falls by 47.5% for a group of older adults ($n = 24$) when compared with the computerized balance training ($n = 24$) and educational ($n = 24$) groups of older adult participants.

Although there is evidence to support the beneficial effects of Tai Chi on fall prevention, there is very little scientific research on the effects of yoga on balance. Yoga is theorized to create balance, physically and emotionally, by using postures, or asanas, combined with breathing techniques, or pranayama (Feuerstein, 2000). Meditation and guided imagery support the physical and emotional work being done by the postures and breathing techniques (Haber, 1983). Yoga is often translated to imply the union of body, mind, and spirit (Bastille & Gill-Body, 2004). According to Taylor (2001), a regular, disciplined practice of yoga over time results in increased strength, balance, stamina, flexibility, and relaxation. Raub (2001) has reviewed the findings of clinical trials that found positive effects of yoga on asthma, hypertension, pain management, diabetes, and mood. A few studies have attempted to improve balance through the application of yoga (Dhume & Dhume, 1991; Gimbel, 1998; Ray et al., 2001); however scientific and experimental procedures in these studies were poorly controlled.

The purpose of this study is to examine balance-related measures in older adults who have participated in Tai Chi, yoga, or no exercise. This study would aid in determining if the balance performance of those who participated in yoga was similar to participants who practiced Tai Chi or those who did not exercise. In addition, balance scores for each group would be compared to the available normative data on selected outcome measures.

PARTICIPANTS

The participants used for this study were 52 older adults over the age of 65 years. This sample of convenience was comprised of volunteer participants recruited from the local yoga and Tai Chi programs and senior centers. There were 21 participants in the Tai Chi group (2 males, 19 females, average age = 74.1 years), 11 participants in the yoga group (0 males, 11 females, average age = 73.1 years), and 20 in the no-exercise group (5 males, 15 females, average age = 76.7 years). With respect to demographic variables, there were no significant differences ($p < 0.05$) between groups with respect to age, medications, fall history, number of chronic medical conditions, and activity level. There was a significant difference for education level ($p = 0.005$) between the Tai Chi group and the no-exercise group, but no difference was found for the yoga group when compared with the other two groups. Refer to Table 1 for details.

Both exercise groups included participants that were enrolled for at least 8 weeks. This 2-month inclusion criterion was chosen based on the findings of Tsang and Hui-Chan (2004), who found that an intensive Tai Chi program (1.5 hr, six times a week for 8 weeks, tested at 4 and 8 weeks) resulted in benefits that could be measured even after 4 weeks. The time frame of 8 weeks, rather than 4, was selected because our participants' programs were not as intense as the protocol described above.

All participants were independent, community-dwelling older adults with no limiting health conditions that would preclude safe participation in the tests and measures. This study was approved by the University of Scranton Physical Therapy Department Review Board for the protection of human subjects and all participants gave informed consent prior to testing.

TABLE 1. Demographic Characteristics of Older Adult Participants ($n = 52$) in a Cross-Sectional Study of Balance-Related Measures, According to Group

	Tai Chi ($n = 21$)		Yoga ($n = 11$)		No Exercise ($n = 20$)	
Age (years):	74.09	5.63	73.09	4.13	76.20	5.30
PMH (number of comorbidities)	2.80	1.53	2.81	1.47	4.30	2.00
Activity Level (days/month)	11.66	5.15	15.27	7.28	10.73	9.52
	Frequency	%	Frequency	%	Frequency	%
Gender:						
Female	19	90.50	11	100.00	15	75.00
Male	2	9.50	0	0.00	5	25.00
Marital status:						
Single	3	14.30	0	0.00	4	20.00
Married	10	47.60	2	18.20	2	10.00
Divorced	2	9.50	2	18.20	2	10.00
Widowed	6	28.60	7	63.60	11	55.00
Falls:						
<6 months	1	4.80	0	0.00	3	15.00
6 months–1 year	0	0.00	0	0.00	3	15.00
>1 year	2	9.50	2	18.20	6	30.00
Near falls:						
<6 months	3	14.30	1	9.10	5	25.00
6 months–1 year	1	4.80	0	0.00	1	5.00
>1 year	1	4.80	0	0.00	3	15.00

INSTRUMENTATION

Each participant was assessed with the following tests: Fullerton Advanced Balance Scale (FAB; Rose et al., 2006), Multidirectional Reach Test (MDRT; Newton, 2001), Timed Floor Transfer (TFT; Murphy, Olson, Protas, & Overby, 2003), and the Activities-Specific Balance Confidence Scale (ABC; Powell & Myers, 1995). One item on the FAB, the Single Limb Stance (SLS), was measured for 30 s instead of 20 s (as instructed for that item) to allow comparison with typical clinical administration of this objective measure and the published normative data (Bohannon, 2006). In addition, an intake form was completed by each participant to provide sociodemographic data, fall history, and past medical history in order to characterize our sample.

The FAB is a physical performance test that comprises challenging and dynamic standing activities to assess a range of balance ability (Boulgarides, McGinty, Willett, & Barnes, 2003; Rose, Lucchese, & Wiersma, 2006). Of the 10 physical activities performed, two are considered low functioning, six are of moderate level, and two are high-level physical activities (Rose, 2003). The FAB includes items such as walking up and down a step, walking with head turns, reaching forward for an object, turning 360°, and standing on foam with eyes closed. Refer to Table 2 for a complete list of test items and associated underlying impairments. This test required approximately 10–12 min for each participant to complete. The equipment needed included a stopwatch, pen or pencil, metronome, 12″ ruler, 6″ bench, and two airex pads (with non-slip material in-between). Rose et al. (2006) demonstrated good test–retest ($r = 0.96$), inter-rater ($r = 0.94$–0.97), and intra-rater ($r = 0.97$–1.00) reliability for the FAB. In addition,

TABLE 2. Interpretation of Individual Test Items on the Fullerton Advanced Balance Scale (FAB) with Possible Underlying Impairments [Adapted from Rose (2003)]

Item	Difficulty Indicates Possible Impairments of
1. Stand with feet together and eyes closed	1. Weak hip abductors/adductors 2. Poor center of gravity (COG) control 3. Poor use of somatosensory cues
2. Reach forward for object	1. Reduced limits of stability 2. Reduced ankle range of motion (ROM) 3. Fear of falling 4. Lower body muscle weakness
3. Turn in full circle	1. Poor dynamic COG control 2. Possible vestibular impairment (e.g., dizziness) 3. Lower body weakness
4. Step up and over	1. Poor dynamic COG control 2. Lower body weakness 3. Reduced ROM at ankle, knee, hip
5. Tandem walk	1. Poor dynamic COG control 2. Poor use of vision 3. Weak hip abductors/adductors
6. Stand on one leg	1. Poor COG control 2. Lower body muscle weakness 3. Poor use of vision
7. Stand on foam with eyes closed	1. Poor use of vestibular inputs for balance 2. Lower body muscle weakness 3. Heightened fear of falling when vision absent
8. Two-footed jump	1. Poor dynamic COG control 2. Poor upper- and lower-body coordination 3. Lower body muscle weakness
9. Walk with head turns	1. Possible vestibular impairments 2. Poor use of vision 3. Poor dynamic COG control
10. Reactive postural tests	1. Absent postural integrity (i.e., step) 2. Poor COG control 3. Lower body muscle weakness

they found a moderately high correlation (0.75) between the FAB and the Berg Balance Scale, which indicated that this new scale, i.e., FAB, was also a valid measure of balance, but still differed sufficiently from the Berg Balance Scale. The FAB was selected to avoid the previously reported ceiling effects (Bogle Thorbahn & Newton, 1996) when administering the Berg Balance Scale to community-dwelling older adults.

The MDRT was used to assess standing limits of stability in four directions. A yardstick was placed on the wall level with 90° of shoulder flexion. Each participant reached with an outstretched arm in the forward (MDRTF), backward (MDRTB), right (MDRTR), and left (MDRTL) directions as far as possible without taking a step. Reach was measured in inches by the total hand excursion along the yardstick. The MDRT was administered for three trials in each direction with the average score used for data analysis. In a study performed by Newton (2001), scores on the MDRT demonstrated significant correlations with the Berg Balance Scale [MDRTF ($r = 0.476$), MDRTB ($r = 0.356$), MDRTR ($r = 0.389$), and MDRTL ($r = 0.390$)]. Newton (2001) also found that the scores on the MDRT demonstrated significant inverse relationships with Timed

Up-and-Go (TUG) scores [MDRTF ($r = -0.442$), MDRTB ($r = -0.333$), MDRTR ($r = -0.260$), and MDRTL ($r = -0.310$)].

The TFT is a clinical test of strength, flexibility, function, and problem solving (Murphy et al., 2003). The test measures the time required for a participant to transfer from standing to the floor and then return to standing in any manner possible. Tinetti, Liu, and Claus (1993) recommended assessment of floor transfer ability because 47% (148/220) of elders who fell but were not injured demonstrated inability to get up without assistance. Murphy et al. (2003) reported that the TFT had moderately high test–retest reliability (ICC = 0.85) and appeared to be a unique indicator of fall risk because it did not correlate with any other screening variable in the study.

The ABC Scale was used to assess balance confidence (i.e., fear of falling). The ABC Scale is a 16-item questionnaire in which level of confidence in performing situation-specific activities is rated (Powell & Myers, 1995). The total ABC Scale score is the average sum of the individual item scores. Hatch et al. (2003) found the ABC Scale to have strong test–retest reliability ($r = 0.92$), and good convergent validity with the physical activity subscale of the Physical Self-Efficacy Scale ($r = 0.63$). Discriminate validity of the data obtained with the ABC Scale in an elderly population was supported by the low correlation of the ABC Scale scores with overall scores on the Positive and Negative Affectivity Scale ($r = 0.12$), which assesses emotionality (Hatch et al., 2003). Also, when compared to the Falls Efficacy Scale (FES), the ABC Scale has been shown to have better scale responsiveness when used in a group of community-dwelling older adults aged 65–95 years (Hatch et al., 2003).

PROCEDURE

During the 3-week data-collection period, testing was conducted for each group on one separate occasion. Each participant was directed to a testing station in a random order until all tests and forms were completed. For convenience purposes, data collection occurred before a regularly scheduled class for the exercise groups and before lunch for the no-exercise group.

DATA ANALYSIS

To analyze the results of this study, multiple one-way analyses of variance (ANOVA) were used. The probability level was set at a more stringent level of $p < 0.01$ to provide a more rigorous analysis based on the large number of dependent variables selected. Demographic and fall history data were assessed using ANOVA to determine group equivalence, and with a descriptive analysis to characterize the sample as presented in Table 1.

RESULTS

The FAB scores were significantly greater ($p = 0.001$) for the Tai Chi and yoga groups as compared with the no-exercise group; however, there was no significant difference between the Tai Chi group and the yoga group ($p > 0.01$). The Tai Chi group scored significantly higher than both the yoga and no-exercise groups in all directions

TABLE 3. Results of Multiple One-Way Analyses of Variance (ANOVA) Procedures Comparing Outcome Measures Between Groups of Older Adults Participating in a Cross-Sectional Study of Balance-Related Measures

Outcome Measures	Sum of Squares	*df*	Mean Square	*F*	Significance
SLS (s)	228.89	2	114.44	1.25	.293
FAB	791.55	2	395.77	7.61	.001*
MDRT (in.)					
Forward reach	48.94	2	24.47	7.29	.002*
Backward reach	34.79	2	17.39	5.39	.008*
Right reach	119.83	2	59.91	18.02	.000*
Left reach	63.54	2	31.77	9.13	.000*

*Significance at $p < 0.01$.

of the MDRT [MDRTF ($p = 0.002$); MDRTB ($p = 0.008$); MDRTR ($p < 0.001$); and MDRTL ($p < 0.001$)], and the yoga group scored significantly higher than the no-exercise group on the MDRTL ($p = 0.004$) and the MDRTR ($p = 0.008$). Refer to Table 3 for ANOVA summary details.

There were no significant differences found with the ABC scale, SLS, and the TFT test between the three groups. The average ABC scores were 76.33% for the Tai Chi group, 81.86% for the yoga group, and 73.22% for the no-exercise group. For the SLS test, averages were 10.80 s for the Tai Chi group, 10.81 s for the yoga group, and 6.5 s for the no-exercise group. Among those able to complete the task, the TFT test averages were 10.40 s for the Tai Chi group, 7.09 s for the yoga group, and 8.36 s for the no-exercise group. With respect to compliance, 76.1% of the participants from the Tai Chi group were willing/able to complete the TSF test, while 54.5% from the yoga group and 30.0% from the no-exercise group completed testing. The group mean scores

TABLE 4. Mean Scores (M) and Standard Deviations (SD) of Outcome Measures According to Group of Older Adults Participating in a Cross-Sectional Study of Balance-Related Measures

	Tai Chi ($n = 21$)		Yoga ($n = 11$)		No Exercise ($n = 20$)		Normative Data	
Outcome Measures	M	SD	M	SD	M	SD	M	SD
SLS (s) 60–99 y/o	10.80	10.52	10.81	10.20	6.50	7.93	15.7[a]	–
FAB	32.66	5.77	32.81	3.89	24.70	9.53	–	–
MDRT (in.)								
Forward reach	11.10	1.93	9.96	1.19	8.92	1.99	8.90[b]	3.40
Backward reach	6.31	2.10	4.60	1.48	4.67	1.57	4.60[b]	3.10
Right reach	9.24	1.61	7.99	1.19	5.84	2.25	6.20[b]	3.00
Left reach	8.28	1.53	8.45	1.22	6.07	2.38	6.60[b]	2.90

[a]Bohannon (2006); [b]Newton (2001).

and standard deviations are compared with the published normative data as given in Table 4.

With respect to the demographic data, although the average age of the no-exercise group was approximately 2–3 years more than the other groups, there were no statistically significant differences between groups for age ($p = 0.17$). In addition, there were no significant differences between groups for fall history at less than 6 months ($p = 0.21$), at 6 to 12 months ($p = 0.08$), and at over 12 months ($p = 0.75$). Similarly, there were no significant differences for history of near falls at less than 6 months ($p = 0.17$), at 6 to 12 months ($p = 0.74$), and at over 12 months ($p = 0.52$).

DISCUSSION

The analysis of 52 older adult participants in this study has indicated that Tai Chi and yoga practitioners demonstrated better balance ability than those in the no-exercise group. A study done by Gauchard, Gangloff, Jeandel, and Perrin (2003) reported that proprioceptive activities, such as Tai Chi and Yoga, are more beneficial to balance regulation and precision as compared to general conditioning exercises, such as jogging, cycling, and swimming. Review of the Tai Chi literature supports its effectiveness in improving balance in older adults. These findings encompassed gains in balance confidence (Mihay et al., 2003; Tsang & Hui-Chan, 2004; Wolf et al., 1997), lower extremity strength (Jacobson, Cheng, Cashel, & Guerrero, 1997; Lan, Lai, Chen, & Wong, 2000), and joint proprioception (Tsang & Hui-Chan, 2003; Xu, Li, & Chan, 2004) in relation to the inherent weight-shifting during the performance of Tai Chi. With respect to yoga, several studies have established an array of potential health benefits; however, attempts to demonstrate improved balance through the application of yoga were limited by poor methodology (Dhume & Dhume, 1991; Gimbel, 1998; Ray et al., 2001). In addition, most yoga studies did not include older adults, or address reduction of fall risk.

The balance-related measures that were selected for this study warrant further discussion. The FAB appears to be a good indicator of advanced balance ability in this population. The FAB was created for persons who have advanced balance and have a ceiling effect on the Berg Balance Scale (Rose et al., 2006). The FAB includes items such as stepping up and down, walking with head turns, reaching forward for an object, turning 360°, and standing on foam with eyes closed. These tasks simulate functional activities that may be performed by a community-dwelling person, which include walking up and down curbs/steps, walking down busy streets with many distractions (requiring head turns), reaching for objects off shelves in the store, turning around to change direction, and walking on uneven ground. The Tai Chi and yoga groups were significantly better than the no-exercise group in performing the FAB, which indicates that both types of exercises may promote more balanced performance of functional daily activities. Additionally, the FAB appears to be an effective clinical test to discriminate older adults with high-level balance performance from those who are more sedentary.

The SLS test did not have a statistically significant difference for any of the groups. All groups were approximately 5–9 s lower/worse than the average time of the normative data for ages 60–99 years (Bohannon, 2006). However, all three groups scored above the 5 s threshold that indicates reduced risk for fall-related injury (Vellas et al., 1997). Even though there was no statistical significance for the SLS scores, the Tai Chi and yoga groups performed approximately 4 s better on this test than the no-exercise group.

This may be clinically relevant because it may affect the way a person ambulates on uneven ground, stairs, and curbs. By improving SLS in this population, it may help to increase balance and decrease the likelihood of falls.

The MDRT is a standing balance test that was used to measure limits of stability in our older adult sample. Tai Chi participants demonstrated greater limits of stability than the yoga participants in all four directions, indicating greater willingness to move over their base of support while reaching. Tai Chi is a dynamic activity in which participants shift their weight and move to their limits of stability, which may enable them to perform the MDRT very efficiently. The yoga participants demonstrated greater limits of stability (to the left and right) than the no-exercise group, which may indicate that yoga alone is less dynamic than Tai Chi and may not be enough to improve multidirectional functional reaching for an elderly person living independently in the community.

The ABC Scale is a self-assessment questionnaire used to measure fear of falling. Fear of falling can directly influence the way a person moves and may impact function by causing self-limiting behaviors (Hatch et al., 2003). The normative score for the ABC Scale is 80.9% among healthy, active older adults (Powell & Myers, 1995). Lower than the average scores from the Tai Chi (76.33%) and no-exercise (73.22%) groups may be explained because of the participants' inability to understand how to complete the scale (six scales not filled out correctly) or difficulty with self-assessment (frequent questions on interpretation of items). A study by Hatch et al. (2003) found that balance performance alone is a strong determinant of balance confidence in community-dwelling older adults. Therefore, it was expected that balance confidence scores would be higher than the normative score in both exercise groups. Perhaps some of our Tai Chi participants were simply more cautious with respect to the activities addressed in the ABC Scale. Based on Bandura's theory of self-efficacy (1986), an individual's judgment, whether accurate or not, will impact the decision to engage in a particular, situation-specific activity. As a result, fear of falling, or decreased balance confidence, can lead to limitations in particular daily activities, even if the older adult has never fallen.

With respect to the TFT test, many more participants from the Tai Chi group (16 out of 21) were willing and able to perform the task than the other two groups (6/11 yoga and 6/20 no exercise). Perhaps the TFT test results differed between groups because Tai Chi promotes greater dynamic balance ability as participants constantly shift their weight over a moving base of support, similar to the demands of getting down and up from the floor. In addition, the concentric and eccentric strength requirements of this floor mobility task are more similar to the performance of Tai Chi forms than yoga, which requires more static, isometric holding, and flexibility postures. Tinetti et al. (1993) recommended the assessment of floor-transfer ability because they found that 47% (148/220) of elders who fell but were not injured reported inability to get up without help after falling. Prolonged lying time may lead to more problems and deficits than the actual fall (Bloch et al., 2009). By using the TFT test, it can be determined whether or not an older adult is able to get back up off the floor if a fall were to occur. If unable to complete this task, floor-to-stand transfer training can be incorporated to improve safety at home, particularly if the older adult lives alone.

With respect to fall prevention, both Tai Chi and yoga techniques are particularly well suited for older adults to improve or maintain balance abilities. Both types of exercises are considered low impact, require minimal to no equipment, and have increasing availability at many senior centers. In addition, both Tai Chi and yoga may be practiced from a chair in a seated position. Health care professionals, such as physical and

occupational therapists, may consider using yoga-like or Tai Chi-like activities in patients' plan of care to address balance deficits. Moreover, therapists should become aware of community-based resources to allow for referrals to these types of programs for older adults living at home.

There were several limitations of this study that should be acknowledged. First, this was a cross-sectional analysis; random assignment and experimental design were not used and causation cannot be determined. The subjects were volunteers who were categorized into groups, which may limit the generalizability of these findings. Fatigue may be a limitation because there were not consistent rest periods for each participant between testing stations. Without controlled rest periods for each participant, it is impossible to know the effect of fatigue, if any, on this study. Future research should focus on the clinical aspect of using Tai Chi and yoga as interventions to analyze the direct effects on balance. Additional testing should also be performed on the FAB to provide normative data and predictive validity for falls. The sample groups should be stratified by age to provide a better description and comparison of balance performance, particularly for the over 80-year-old adults. Lastly, research could be done to establish the optimal method for assessing balance confidence in healthy and active older adults.

CONCLUSION

Older adults who participated in Tai Chi or yoga demonstrated better balance performance than those who did not participate in any structured exercise. Tai Chi and yoga are both economical and effective methods of low-impact exercise that can be incorporated into fall prevention programs for older adults in many settings. By participating in these types of exercises, an older adult may optimize balance performance and remain more independent, leading to a better quality of life with reduced risk for falls.

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