The Effects of Tai Chi on Sleep Quality, Well-Being and Physical Performances among Older Adults

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Abstract : The elderly face physiological decline leading to problems such as chronic illness, poor physical performance and emotional disturbance. Thepractice of Tai Chi is generally considered psychologically and physiologically beneficial for older adults but scientific reports on its benefits are still limited. This quasi-experimental study, a pre-post test with control group design investigated the effects of low intensity and short term Tai Chi practice on sleep quality, general well-being and physical performance. The subjects were purposefully selected from elders who lived in residential care facilities in accordance with the study inclusion criteria. There were 25 elders in each experimental and control group. The experimental group engaged in 22 minutes Tai Chi training at least three times a week for 12 weeks. The control group engaged in their usual activities, without Tai Chi. The Pittsberg Sleep Quality Index (PSQI) and General Well-Being Scale (GWBS) questionnaires were used to assess the subjects' sleep quality and well-being. The physical performances including 2 minutes step test, lung capacity, and sit and reach test were measured by a professional staff from a Provincial Sport Authority. These measures were taken at the first and fourteenth weeks of the study. Independent and paired t-tests were used in data analysis. The two groups had no difference in personal characteristics and baseline outcome measures. The experimental group showed significantly greater change score of the PSQI ($p<.01$) and step test ($p<.05$). The change scores of the GWBS, lung capacity, and sit and reach test between the two groups showed no differences. The results indicated that a low intensity Tai Chi exercise for 12 weeks could improve sleep quality and physical performance on balance and flexibility of legs in older adults.

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Introduction

A growing number of research suggest that exercise, physical activity and physical activity intervention benefits physical and mental health outcomes and quality of life.[1] In older adults, exercise is prescribed to delay functional decline, and improve functional impairment, mood and quality of life.[2] There are various types of exercise the elderly could perform, for example, brisk walking,

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swimming, aerobic dance, Yoga and Tai Chi. Tai Chi is a moderate exercise, originating in China and has become popular worldwide, particularly among the elderly. It is suitable for anyone who can stand and move his/her body. It is safe exercise for individuals with even severely compromised energy reserves.[3] Many studies have documented various benefits Tai Chi. Three studies[4-6] reported results of a systemic review on the benefits of Tai Chi. They noted that the controlled research confirmed therapeutic benefit of Tai Chi practice with regard to improving physiological and psychosocial functions. The physical functions include activity tolerance and cardiovascular functions, pain management, balance and risk of fall reduction, enhancing immune response, promoting sleep quality and improving flexibility, strength and kinesthetic sense. The psychosocial parameters include stress, anxiety, mood disturbance and well-being. The duration and intensity of Tai Chi training varied among these studies; the duration ranged from 6 weeks to one year, the intensity 1-3 times a week, 20-60 minutes each time and the movement 9- 108 movements.

Tai Chi is believed to increase physical health, well being and inner peace by improving the flow of chi or energy throughout the body.[7] Tai Chi has three major components, movement, meditation and deep breathing. Chen and colleagues[8] explained mechanisms of Tai Chi practice leading to positive outcomes as follows. The slow repetitive movements and changes in the center of balance with specific sequencing can heighten individuals' awareness of their bodies, gradually they become more aware of their total being, which promotes harmony within themselves. A slow, deep diaphragmatic breathing during the practice enhances proper ventilatory execution and promotes relaxation of mind and body which enhance a sense of well-being. As other aerobic exercises, Tai Chi benefits the entire body.

Tai Chi, a low impact aerobic exercise has been considered as movement as well as body and mind therapy. It should be considered a potential form of exercise for the elderly. It has many advantages as an exercise program. No special equipment is required, allowing it to be performed anywhere. It can be done alone or with others; group participation also provides opportunity for socialization. In addition, the compliance rate was high among many studies, indicating that people enjoyed the activity, and did it on their own.[4-6] A high compliance rate is crucial to establishing Tai Chi as a regular exercise.

In Thailand, Tai Chi has been widely practiced among older persons with Chinese ethnic. These Tai Chi practitioners often report better sleep and health, but no scientific investigation to confirm their experience. In USA, Li and colleagues[9] demonstrated that practicing Tai Chi three times a week at least 60 minutes each time for 24 weeks significantly improved sleep quality and daytime sleepiness among older adults in a randomized controlled trial. Taylor-Piliae et al.[10] reported change in perceived psychosocial status which assessed by Cohen's Perceived Stress Scale and Profile of Mood States, following a 60-minute Tai Chi exercise program for 12-weeks among Chinese living in USA. Choi, Moon and Song[11] documented that a 12-week, 35-minute Tai Chi exercise program significantly improved muscle strength, flexibility and mobility among older adults in Korea.

These three studies[9-11] inspired us to introduce a Tai Chi exercise program to the elderly living in residential care facilities in Thailand as the common problems among Thai elders include body and joint pain, poor sleep, and other functional physical

decline symptoms.[10] The residential care facilities were established by the Royal Thai Government to provide accommodation and living necessities to poor elders with no support from family.[12] With limited number of attendants in the residential care facilities, elderly residents receive only basic physical care.[13] Hence, it's justifiable to promote good physical and mental health to encourage the elderly to maintain their independency and sense of well-being. A Tai Chi program with intensity of 35-60 minutes each session as described in the three studies[9-11] might be too long for the Thai elderly to begin. As a result, a study to demonstrate the effect of a lower intensity of Tai Chi program on sleep quality, well-being and physical performance was therefore conducted in selected residential care facilities.

Method

This study is a quasi-experimental design with controlled group.

Setting and Sample

Two similar residential care facilities for older adults in central, Thailand were selected as the study's location. One was assigned as an experimental site and another as a control by simple drawing. The two facilities were chosen because they had adequate number of potential subjects. The number of subjects required was determined by power analysis in testing the differences between two groups on outcome variables. Given $\propto$ = .05, 1-β = .80, effect size = .8; the study required at least 25 subjects in each group.[14] The residents of the two facilities were approached to participate in the study according to the following inclusion criteria:

1) age over 60 years old

2) can communicate in Thai language

3) be able to practice Tai Chi

4) have stayed in the residential facilities for at least 1 month

5) have normal orientation to place, time and person

6) have no illnesses limiting movements, uncontrolled epilepsy and DM

7) have not engaged in Tai Chi or other exercises except stretching exercise

8) in the past month, had at least one of the following common sleep problems,[15-17] which occurred more than 2 times a week for at least one week. The problems could be:

a. shallow sleep

b. sleep less than 5 hours a night

c. awake more than twice at night

d. take more than 30 minutes to fall asleep

e. can not go back to sleep when awake at night

f. wake up too early and not refreshed

The elders who met the criteria were approached to participate in the study for a 14-week period. During the study period, the subjects were excluded from the study if they possessed any of the following exclusion criteria:

1) participated in Tai Chi practice less than 3 times a week

2) felt discomfort or had symptoms such as dizziness, palpitation, dyspnea, nausea, vomiting, fatigue and severe muscle and joint pain

3) their prescription had been changed recently

4) developed an illness or had an injury which could interfere with sleep

5) significant change in daily physical activity.

With a possibility of drop out, a common event in experimental designs, the researchers recruited more subjects than the required number. Thirty eight elders joined the experimental group and 32 participated in the control group.

Intervention

A Tai Chi training program required the subjects in the experimental group to practice Tai Chi exercise at least 3 times a week, 22 minutes each time for 12 weeks starting from the beginning of the 2nd week through the end of the 13th week of the study. This requirement followed a recommended exercise for the elderly.[18] The researcher arranged Tai Chi practice sessions at the experimental setting once a day from Monday to Friday at 2.30 pm. This schedule was chosen in order to assure that the subjects did not have a full stomach during the exercise period. The subjects could join the session on any three days of their choice among the five days provided. Each session was led by one of the researchers, for a duration of 22 minutes, comprising of 7 minutes warm up and 15 minutes of 18 basic Tai Chi movements. Video tape and music were also presented during the session. The researcher who lead and coached the participants, was trained to perform Tai Chi correctly with Tai Chi experts at the Center of Health Promotion and Rehabilitation, Faculty of Nursing, Prince of Songkla University. The subjects in the controlled group were asked to continue their usual activities throughout 14 weeks of the study.

Measurement and Procedure

An Orientation Assessment Form was used in screening the elders' orientation to place, person and time. Only the well oriented elders were further assessed.

A Sleep Screening Form was administered to the elders in the two locations to identify the residents with sleep complaints, in accordance with the inclusion criteria. Those who met the criteria were approached to participate in the study.

The Pittsburg Sleep Quality Index (PSQI),[17] was used in measuring subjective sleep quality. The PSQI comprises 7 dimensions: Overall sleep quality, sleep latency (time needed to fall asleep), sleep duration (number of sleep hours a night), sleep efficiency (total sleep time divided by time in bed), sleep disturbance, use of sleep medication and daytime dysfunction. Each dimension of the PSQI gives a score of 0-3, therefore the possible total score of the PSQI ranges from 0-21. Higher score means poorer sleep, a total score more than 5 indicates poor sleep quality. The Cronbach's alpha coefficient of the index tested in the elders was .81. The PSQI was measured twice They were asked by a research assistant to recall their sleep in the previous month at the interviews.

The General Well-Being Scale (GWBS) was modified from Dupuy's General Well-Being Schedule[19] by researchers to assess the subjects' well being. It comprises 14 items with 6 dimensions including anxiety, depression, happiness, self control, vitality and general health. Each item yields a score of 0-3. A total possible score of the GWBS ranges from 0-42, a higher score indicates higher well-being. The Cronbach's alpha coefficient of this scale was .73. The subjects completed the GWBS twice.

Measures of physical performances as expected outcome of Tai Chi practice of this study included: 2-minute step in place (number of steps), lung capacity and muscle flexibility by using sit and reach test. These measures were selected from the Simplified Physical Fitness Tests recommended by the Sports Authority of Thailand.[20]

The PSQI, GWBS and selected physical performances were measured twice during the first and 14th week of the study in both the experimental and controlled groups. The subjects were asked by

our research assistant to recall their sleep and well being in the previous month during each interview. The subjects' physical performances were tested by the staff from the Sports Authority Unit.

Subjects' Right

The researchers met the elderly at the selected residential care facilities, explained the process of the study and invited them to join the initial assessment based on the inclusion criteria. Those who met the inclusion criteria were approached to participate in the study. The researchers informed them the purposes and methods of the study. The subjects were assured that they had a right to refuse or withdraw from the study at any time and their responses as well as their identities would be kept confidentially.

Analysis

All statistical analyses were done as follows. Demographic characteristics and outcome measures of the experimental and controlled groups were compared, using independent t-test for continuous variables and the chi-square for categorical variables. Paired-t-test was used to test whether there were significant changes within each group on the outcome measures between the first and at the 14th week of the study. P value of less than .05 were considered to indicate statistical significance.

Results

Subjects' Participation

At the beginning of the study, 38 elders joined the experimental group and 32 participated in the control group. During the study 13 subjects of the experimental group dropped out: 3 quitted before practicing Tai Chi; 5 experienced dizziness; 4 could not keep up with the Tai Chi schedules, and 1 missed the outcome measurements. In the controlled group, 7 subjects dropped out: 4 had medical prescription changes and 3 missed the outcome measures. In conclusion, 25 participants of each group remained throughout the duration of the study, and only 21 in each group had their physical performances tested in the 1st and 14th week. Eight subjects were not in the residential care facilities when the staff of the Provincial Sport Center came for physical performance testing.

Subjects' Demographic and Baseline Characteristics

Table 1 presents no significant difference between the experimental and controlled groups in their demographic characteristics. Comparisons of the outcome measures at pre-intervention showed no group difference (**Table 2**).

Table 1 Attritions of the Experimental and Control Groups

variables	Experiment (n=25)		Control (n=25)		χ^2
	Number	(%)	Number	(%)	
Age (year)					1.56^{NS}
60-69	11	(44)	7	(28)	
70-79	11	(44)	13	(52)	
80 and over	3	(12)	5	(20)	
Gender					0.00^{NS}
Male	10	(40)	11	(44)	
Female	15	(60)	14	(56)	
*Literacy					4.31^{NS}
Able to read and write	23	(92)	17	(68)	
Able to read but not write	1	(4)	3	(12)	
Unable to read and write	1	(4)	5	(20)	
Has income					0.00^{NS}
Yes	14	(56)	14	(56)	
No	11	(44)	11	(44)	
*Exercise					2.26^{NS}
None	12	(48)	7	(28)	
1-2/week	1	(4)	2	(8)	
3 and more per week	12	(48)	16	(64)	
**Coffee consumption (1-2 cups/day)					0.00^{NS}
Yes	5	(20)	3	(12)	
No	20	(80)	22	(88)	

NS = Not significant

*Cells with frequency less than 5, Fisher's Exact test was used

** Cells with frequency less than 10, Yates' Correct test Chi-Square was used

Table 2 Comparison of Baseline Outcome Measures between the Experimental and Controlled Groups

Measures	Experimental (n=25)		Control (n=25)		t- value
	M	SD	M	SD	
Pittsburg Sleep Quality Index (0-21)	9.84	4.39	9.68	3.35	0.15^{NS}
General Well Being Score	29.72	5.98	28.88	5.88	0.50^{NS}
	(n=21)		(n=21)		
2 minutes step in place (number of times)	77.29	17.34	76.38	28.86	0.12^{NS}
Lung capacity (cc)	1242.86	364.10	1238.10	689.55	0.03^{NS}
Sit and reach test (inches)	15.14	5.39	11.50	8.16	1.71^{NS}

NS = Not significant

Intervention Effects on Outcome Measures

Table 3 presents changes of the outcome measures within the two groups. In the experimental group, there were significant positive changes on the PSQI ($p<.01$), GWBS ($p<.05$), step test ($p<.01$) and lung capacity ($p<.01$), no change on sit and reach test. The control had significantly positive changes on step test ($p<.01$) and lung capacity ($p<.05$) but not on the other measures. The intervention effects on outcome measures are presented by group comparisons on difference scores between the baseline and post-intervention measures. **Table 4** showed that in the 14^{th} week the experimental group had significantly greater reduction of PSQI score ($p<.001$), which indicated improved sleep quality, and increased number of steps within two minutes ($p<.05$), in comparison with the control group. There were no differences in scores of the GWBS and other tests of physical performance.

Table 3 Comparisons of the baseline and post-intervention measures within the groups

Groups/measures	1st week		14nd week		t- value
	M	SD	M	SD	
Experiment:					
Pittsburg Sleep Quality Index (0-21)	9.84	4.39	6.88	2.67	3.51**
General Well Being Score	29.72	5.98	32.48	4.45	- 2.63*
2 mins. step in place (number of times)	77.29	17.34	113.19	10.29	- 9.78**
Lung capacity (cc)	1242.86	364.10	1485.71	496.27	- 3.05**
Sit and reach test (inches)	15.14	5.39	14.88	5.33	0.36NS
Control:					
Pittsburg Sleep Quality Index (0-21)	9.68	3.35	9.68	3.99	0.00NS
General Well Being Score	28.88	5.88	30.08	9.67	- 0.88NS
2 mins. step in place (number of times)	76.38	28.86	99.76	19.85	- 4.94**
Lung capacity (cc)	1238.10	689.55	1442.86	802.23	- 2.37*
Sit and reach test (inches)	11.50	8.16	11.33	4.76	0.09NS

NS = Not significant *p<.05 **p <.01

Table 4 Group Comparisons of Change Scores of the Outcome Measures

Measures	Experimental (n=25)		Control (n=25)		t- value
	M	SD	M	SD	
Pittsburg Sleep Quality Index (0-21)	-2.96	4.22	0.00	2.42	- 3.05**
General Well Being Score	2.76	5.25	1.20	6.84	0.91NS
2 minutes step in place (number of times)	35.90	16.82	23.38	21.68	2.09*
Lung capacity (cc)	242.86	365.47	204.76	395.57	0.11NS
Sit and reach test (inches)	-0.26	3.34	-0.17	8.38	- 0.05NS

NS = Not significant * p<.05 **p <.01

Discussion

The results of this study indicates that a 12-week Tai Chi practice can improve subjective sleep quality measured by PSQI in older adults with sleep complaints. The mean PSQI in the experimental group reduced from 9.84 to 6.88, while there was no change in the controlled group resulting in greater reduction of the PSQI in the experimental group which indicated better sleep quality. Although the mean post-intervention PSQI in the experimental group remained above 5 indicating poor sleep quality,[17] the proportion of those with PSQI less than 5 increased as compared to the pre-intervention (32% vs 20%). Reduction of the PSQI score results from decreased scores of the PSQI dimensions. The mechanism underlying the effect of Tai Chi on sleep quality improvement needs further investigation. However, it could be speculated that physical as well as mental relaxation gained from Tai Chi practice enhance parasympathetic activities which promote sleep.[21] Tai Chi as other aerobic exercises, it might improve sleep by increasing demand of energy conservation and tissue restitution, and producing a significant rise in body temperature, followed by a compensatory drop in body temperature a few hours later.[22] Decreased body temperature makes individuals fall asleep easily and stay asleep. The finding of this study is congruent with two previous studies.[9,23] One[23] was a pre-post Tai Chi intervention study in 63 elderly residents living in two selected residential care facilities in Southern Thailand. It reported that the 22 minutes of Tai Chi exercise program, at least 3 days a week for consecutive 6 weeks, significantly increased subjective sleep quality (measured by the instruments the researchers modified from the PSQI). Another[9] was a randomized controlled trail to demonstrate the effects of a 24 week Tai Chi program on sleep quality measured by the PSQI. Its Tai Chi program required more intensity and longer duration of practice, one hour per session, three times per week, for 24 weeks. With more vigorous design, the latter study[9] presented stronger evidence that 24 weeks of more intensity and longer practice of Tai Chi significantly improved sleep quality among the elderly community, suffering with moderate sleep complaints. The present study suggests that a Tai Chi program with lower intensity and shorter duration, 22 minutes a session, three times a week for 12 weeks can also improve sleep quality in elders with sleep complaints.

Even though there was significant increase of the GWBS in the experimental group, not in the control, there was no difference in the change of the GWBS between the two groups. This suggests that Tai Chi practice did not significantly improve well-being, as was expected. A high level of the baseline GWBS of the subjects in the two groups might limit the effect of Tai Chi to increase the level of well-being. The GWBS of 28 (66 percentile) and over are considered as a high level of general well-being. On the other hand the GWBS might not be sensitive enough to capture small changes of subjective well-being. This result was incongruent with the studies[10-24] reporting that Tai Chi group had less mood disturbance, stress and anxiety than the compared groups. More intense and longer duration of Tai Chi practice of these three studies together with different psychological measures and settings from this study might contribute to different results.

Regarding physical performance, the Tai Chi program in this study appeared to have positive effects only on the 2 minutes step test. Both groups had significantly increased number of steps in the 14th week. However, the Tai Chi group had a greater increase in the number of steps than the control. Repeated measures of the physical performances

could contribute to better performances of the latter measurements in both groups as the subjects learned how to do the tests from the first measures.[14] Significant difference on the change score of the step test between the two groups indicated that Tai Chi had an impact on performance improvement of the experimental group's step test. It has been noted that Tai Chi promotes better balance, flexibility and mobility.[25-27] Greater improvement on the step test among the Tai Chi group could be a result of these benefits of Tai Chi.

On the 14th week of the study, both groups' lung capacity had significantly increased from the baseline. The experimental group did not show a greater increase of lung capacity than the control. Their increased lung capacity in the second measure could be resulted from the experience of the first measurement. In this case, Tai Chi appeared to have no influence on extra expansion of the lung in the experimental group. This result was not consistent with two studies.[28-29] Jong and colleagues[28] evaluated the effect of Tai Chi Qui Gong (TCQG) practice on patients' pulmonary function after lobectomy. They found that the experimental group who received a training on 10 motions of TCQG two days before surgery and practiced TCQG twice per day from the first operative day, had significant improvement in their tidal volume than the control. Rongmaung[29] reported a significant benefit of practicing selected 8 forms of Tai Chi as a breathing exercise. She noted that the elderly who performed this exercise at least three times a day for 12 weeks had higher level of force vital capacity than the control.

Regarding the sit and reach test, there was no change in both groups. This finding was not congruent with other studies.[9,25] To achieve a larger tidal volume and improvement of flexibility, the subjects might need a Tai Chi exercise program with more intensity and longer duration. In addition, each form of Tai Chi benefits certain organs or parts of the body. Different styles and forms of Tai Chi included in exercise programs would yield different outcomes. Researchers should design a Tai Chi exercise program relevant to the outcome measures of the study.

Limitation of this Study

Random assignment of the subjects to the experimental and control groups was not done in this study because of the potential risk of contaminating intervention effects. To reduce selection bias, two residential care facilities with similarities in location, facilities, and number and characteristics of residents, were chosen as the settings. The generalized nature of our findings may be limited to elderly living in residential care facilities.

Conclusion

The study results delineate a positive effect of a low intensity Tai Chi exercise program with 22 minutes a session, 3 times a week for 12 weeks on sleep quality and physical performance measured by step test. The findings assure the possibility for elders engaging in this shorter period Tai Chi exercise program. Those who have never participated in exercise would be willing to try this light and simple exercise program. Once they has accomplished this very short session and its benefits, they would look for a more intensive and longer lasting program. Investigation of Tai Chi benefits on sleep remains in the frontier as only two previous studies were found. Mechanisms to explain how Tai Chi can benefit sleep and other health outcomes need to be further explored.

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ผลการออกกำลังกายไทชีต่อคุณภาพการนอนหลับ ความผาสุก และสมรรถภาพทางกายของผู้สูงอายุ

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บทคัดย่อ : ความเสื่อมถอยทางสรีรวิทยาของผู้สูงอายุทำให้ผู้สูงอายุต้องพบกับปัญหาหลายประการ เช่น โรคเรื้อรัง สมรรถภาพทางกายถดถอย และความผิดปกติทางอารมณ์ การฝึกไทชีได้รับการยอมรับว่าเป็นประโยชน์ต่อผู้สูงอายุทั้งจิตใจและร่างกาย แต่การศึกษาวิจัยถึงผลดีของไทชียังมีจำกัด การศึกษานี้ใช้แบบวิจัยกึ่งทดลองที่มีการทดสอบก่อน-หลังและมีกลุ่มควบคุม มีวัตถุประสงค์เพื่อศึกษาผลของการฝึกไทชีที่มีความเข้มในการฝึกไม่มาก และช่วงระยะเวลาการฝึกสั้น ต่อคุณภาพการนอนหลับ ความผาสุก และสมรรถภาพทางกาย กลุ่มตัวอย่างคัดเลือกจากผู้สูงอายุที่พักอาศัยในสถานสงเคราะห์ของรัฐ ตามเกณฑ์ที่กำหนด จำนวนกลุ่มตัวอย่างในกลุ่มทดลองและกลุ่มควบคุม กลุ่มละ 25 คน กลุ่มทดลองฝึกไทชีอย่างน้อยสัปดาห์ละ 3 วัน วันละครั้ง แต่ละครั้งใช้เวลานาน 20 นาที ติดต่อกันเป็นเวลา 12 สัปดาห์ กลุ่มควบคุมมีกิจกรรมตามปกติไม่มีการฝึกไทชี เครื่องมือที่ใช้ในการเก็บข้อมูลประกอบด้วย แบบสอบถามข้อมูลทั่วไป แบบสอบถามคุณภาพการนอนหลับของพิสเบริก และแบบสอบถามความผาสุก สำหรับสมรรถภาพทางกายที่ศึกษาประกอบด้วย การยืนยกขาขึ้น-ลงกับที่เป็นเวลา 2 นาที ความจุปอด และการนั่งตัวงอ ซึ่งได้รับการทดสอบจากเจ้าหน้าที่ของการกีฬาจังหวัด กลุ่มตัวอย่างได้รับการประเมินตัวแปรผลลัพท์ดังกล่าว 2 ครั้ง คือ ในสัปดาห์แรกและสัปดาห์ที่ 14 ของการศึกษาวิเคราะห์ข้อมูลด้วยสถิติทีอิสระและทีคู่

ผลการศึกษาพบว่า กลุ่มการทดลองและกลุ่มควบคุมไม่มีความแตกต่างด้านคุณลักษณะประชากร และตัวแปรผลลัพธ์ก่อนการทดลอง ภายหลังการทดลอง กลุ่มทดลองมีการเปลี่ยนแปลงของคะแนนคุณภาพการนอนหลับ ($p<.01$) และจำนวนครั้งของการยกขาขึ้น-ลง มากกว่ากลุ่มควบคุม ($p<.05$) สำหรับค่าความเปลี่ยนแปลงของความผาสุก ความจุปอด และการนั่งตัวงอระหว่างกลุ่มทดลองและกลุ่มควบคุมไม่แตกต่างกัน ผลการวิจัยชี้ให้เห็นว่าการฝึกไทชีในระดับความเข้มต่ำเป็นเวลา 12 สัปดาห์ สามารถเพิ่มคุณภาพการนอนหลับ และยืดหยุ่นกล้ามเนื้อหลังและขาของผู้สูงอายุ

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