



한국계-미국인 여성을 위한 16주간의 자조 타이치 효과

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The Effect of Self-help Tai Chi Over 16 Weeks in Community Program for Older Adults Korean American Women

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Purpose: The purpose of this study was to examine the effects of a 16-week Self-help Tai Chi for Arthritis (SHTC) combined with health education for Korean American older women. **Methods:** This research was a designed quasi-experimental pre-posttest. Forty one women aged 55~79 were recruited 20 in SHTC group 21 in control group and, but twelve in SHTC group and thirteen in control group were left after 16 weeks. SHTC group was educated for 1 hour health education and 1hour TCA, once a week during 16 wks. Measurements for comparison were taken three times, at baseline, 8 wks and 16wks. The effect were evaluated with self-efficacy, shoulder flexibility, back flexibility, both hand grip strength and standing balance with closed eyes. **Results:** All variables except for left hand grip strength at baseline had significant homogeneity between both groups. After 16 weeks intervention, there was a significant interaction effect of time and group on right hand grip strength by repeated measure of ANOVA ($F=3.398, p=.044$). No significant interaction effects were found on self-efficacy, shoulder and back flexibility, left hand grip strength and standing balance with closed eyes. **Conclusion:** I can suggest this self-help Tai Chi program may be effective partially, but further research is needed to establish the best times and periods to intervene for a better effect.

Key Words : Self-help group, Tai Chi

INTRODUCTION

The Self-help program for arthritis patients was developed in the Korean Society of Muscle and Joint in 1994 and have continued to be used for patients with arthritis all over the countries. This program was designed to educate for the participants to gain the ability and confidence on their own health management. The program was consisted of understanding the arthritis, healthy behavior,

and exercises to enhance the muscle strength and joint flexibility, such as Arirang dancing, and a contract to practice for 6 weeks. Self-help means to manage the health for oneself with self-efficacy. There were many articles to test the effect of that program in Korea (Lee et al, 2002; Lee, K. , et al. , 2007).

Tai Chi exercise is an ancient Chinese martial art and has drawn more attention for health benefits. Tai Chi for arthritis is a program composed by Dr. Paul Lam and his

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colleges. Lam suggested that Tai Chi help people improve their health, help people with arthritis, diabetes or other chronic conditions improve their particular conditions and quality of their lives, and help people develop patience, tranquility and inner balance. Some of scientific studies have proved it's effectiveness and safety (www.taichiforarthritis.com). Tai Chi has an effect to reduce pain and stiffness, to uplift the spirit, increase sense of tranquility, improve muscle strength and joint flexibility, and enjoyment of practice (Paul, 2006; Yau, 2008). Also Tai Chi showed to be effective to chronic pain of older adults (Adler, Good, Roberts, & Snyder, 2000), and improvement in mood state and reduction in perceived stress (Taylor-Piliae, Haskell, Stotts, & Froelicher, 2006). Also Tai Chi have been educated for older people to prevent falling down because of effectiveness to standing balance (Li, Xu, & Hong, 2008; www.mayoclinic.com/health/taichi).

Among major types of Tai Chi forms, Sun-style Tai Chi was for the first time introduced to Korea by Korean Society of Muscle and Joint Health in 2002, many researchers have involved to test the effect of Tai Chi, supporting its benefits of enhancing muscle strength, flexibility, and physical fitness (Choi, Lee, Lee, & Eun, 2005; Lee, Lee, & Song, 2005; Song, Lee, & Lee, 2002), less joint pain and stiffness, perceived more better health benefits (Song, Lee, Lam, & Bae, 2003, 2007). Lee (2006) compared the physical condition among self-help group, Tai Chi group and aquatic group and Tai Chi group was significantly different from than self-help group and aquatic group, it seems that Tai Chi exercise may be more suitable in osteoarthritis patient.

Two other programs for arthritis patients have been tested for the effect on the health separately, some researchers have tried to integrate these programs. The self-help program for people with arthritis increased the self-efficacy and enhanced the muscle strength and joint flexibility, but it didn't ensure long term effects (Lee, et al, 2003). Also Lam referred Tai Chi exercise was so easy to learn, but was not familiar for Korean to remember the order and motions (Lee et al. 2008).

Kang, et al (2006) developed the integrated 6 week self-help program with Tai Chi and compared the self-help Tai Chi group with the Tai Chi group, there were no significant differences between two groups because of small group size and short period to intervene. In a research about self-help program, Tai Chi exercise and self-help Tai Chi program for arthritis patients, there had no significant differences in fatigue, pain, and difficulties of daily activities among three groups (Choi et al, 2007).

Then the 8-week self-help Tai Chi for arthritis program was partially satisfactory and effective to increase physical condition and self-efficacy (Lee, E. H. et al., 2007; Choi et al., 2008).

These results seemed to be dependent on the subject, intervention period and times, and measurement tool. The periods of Tai Chi program had studied were various from 6 weeks to 16 weeks, or even 12 months (Lee & Kim, 2008). Most of the results showed more effective at 8-week program than 6-week. Also most of Tai Chi program was consisted of 8 motions or 12 motions of Tai Chi (Choi et al., 2008), the program over 12 motions was not found to study. Eventually Tai Chi exercise seemed to be too hard to teach over 12 motions within 8 weeks. But Tai Chi for arthritis exercise was already developed with 28 motions by Lam, therefore the 28 motions Tai Chi program was needed to study for the effect if the teaching period could be extended to 16 weeks.

Korean-American older women have experienced some difficulties to access health policy. Even though they had emigrated long time ago, most of them could not use the community center and public health center in U.S. due to language barriers. Usually they would just get the health information only from the internet, Korean newspaper or Korean T.V. (Jang, Kim, Chiriboga, & King-Kallimanis, 2007). So, health education program for Korean American older women should be different from Korean's program because Korean-American's needs for health information, social conditions, and health policy in America were different from Korean.

Thus, this research was aimed to develop a 16-week program, 28 extended motions of self-help Tai Chi with the health education for Korean-Americans older women and to compare the effect on self-efficacy and joint flexibility, hand grip strength, and standing balance with closed eyes between groups.

METHODS

1. Design and Subjects

An quasi-experimental design with control group was planned with pretest and post-test. Forty-one subjects (SHTC group 20, control group 21, aged over 55 years) were recruited through advertising flyers in the church at Los Angeles county in U.S.. They signed up with an agreement to a 16-week intervention program and measurements. Some of them had some physical disorders, but they could walk and exercise. The participants were able to attend the program and to learn exercise on every

Saturday morning were assigned in the intervention group, and the participants were able to measure physical condition on given days were assigned in the control group. So, group assignment was done conveniently according to participant's condition, not randomly.

2. Research Procedures

Research were conducted through 4 phases as follows.

Phase 1: development of Self-Help Tai Chi programs with health education; SHTC-I (8-week, 12-Tai Chi motions) and SHTC-II (8-week, 28-Tai Chi motions), participant recruitment, and preparation for research variables to be measured and evaluated.

Phase 2: convenient grouping and pretest (baseline) on physical conditions.

Phase 3: a 8-week SHTC-I and first post-test at the end of 8-week in order to examine the effect of SHTC-I.

Phase 4: another 8-week SHTC-II and second post-test at the end of 16-week in order to compare the short and long term effects.

3. Program Development and Intervention

The Self-help Tai Chi program with health education was developed for Korean-American older women using Korean language and consisted of two parts, health education with self-help managements and Tai Chi for arthritis (Table 1).

The Health education program and contents was combined with two parts. One part was the program developed by Korean Society of Muscle and Joint based on self-help theory and social support theory, that was consisted of Arirang dance and exercises for muscle strength and flexibility, and contracts about practice. The other part was consisted of chronic diseases prevalent in older age such as arthritis and hypertension, and general health information including nutrition, dental care, proper medical and herbal drug use. A Medical doctor, dentist, pharmacologist and nutritionist, and herbal doctor invited by a researcher, and researcher taught for 1 hour on every week during 16 weeks.

Tai Chi for arthritis (TCA) developed by Lam and his colleges was taught for one hour by a researcher. TCA I was consisted of 12 motions and TCA II was extended to 28 motions. The process of exercise was started with warm-up exercise and connected to Tai Chi motions, and finally finished with cool-down exercise. The researcher taught Tai Chi using the teaching methodology, 'watch me, follow me and show me', by Dr. Paul Lam (2006).

Table 1. Program and Course of the Self-Help Tai Chi with Health Education

Week	Health education	Tai Chi exercise
1	Orientation Pre-test	
2	Understanding of arthritis	Warm & cool down exercise
3	Muscle strength exercise on standing pose	Tai Chi 1-6
4	Joint flexibility exercise	Tai Chi 1-9
5	Hypertension	repeat 1-9
6	First Aids	Tai Chi 1-12
7	Arirang dance	repeat 1-12
8	Midterm ceremony - Competitive performance Post-test I	
9	Dental care	Tai Chi 1-18
10	Drug and medication	Tai Chi 1-22
11	Muscle strength exercise on lying pose	repeat 1-22
12	Joint flexibility exercise	Tai Chi 1-25
13	Health behavior	Tai Chi 1-28
14	Health in complementary- alternative therapeutics	repeat 1-28
15	Nutrition & diet	repeat 1-28
16	Completion ceremony - Competitive performance - Certificate from the Korean Society of Muscle and Joint Post-test II	

The researcher also encouraged to keep exercises by positive praise and concerning.

This program was provided during 16 weeks from February to June, 2008. Health education class opened for both group and announced the course every week, Tai Chi program did not open for the control group. All intervention group member attended the health program on every week, but most of the control group member did not attend on every week.

To prevent dropout rate, the researcher provided the education program schedule, encouraged to attend the program, and provided some gifts for both group every time the measurements were take. However, although such an effort, eight subjects each group dropped out and 12 in the experimental group, and 13 in the control group were measured in the final test after 16 weeks.

4. Measurements and Data Collection

To exam effects of the self-help Tai Chi program with health education, self-efficacy and shoulder joint flexibility, back flexibility, hand grip strength, and standing balance with closed eyes was measured. Two research aids helped the measurements to enhance the validity and they didn't know that the participants had been assigned in the SHTC group or control group, because the measurements for both group were conducted in same time and place. All physical measurements were used be best of two attempts was recorded.

Self-efficacy was measured using the self-efficacy scale modified by Kim (1994) which was developed originally by Lorig, Chastastain, Ung, Shoor and Holman (1989, in cited Kim, 1994). The scale was included 14 items with VAS from 0 to 100, with alpha coefficients .928 at pretest, .918 at 8-week test, and .938 at 16-week test.

Flexibility of the shoulder joint was measured as below. At first participant's left shoulder was measured by standing with their right arm straight up, then bending their elbow so their hand hung behind their head, and next keeping their upper arm stationary, resting their palm between their shoulder blades, and finally reaching around behind their back with their left arm so the palm is facing out and trying to touch the fingers of both hands together. The measurement was repeated and reversed with the opposite shoulder.

Back Flexibility means sit-and-reach and measured using sit & reaches box. The most logical measure was to use the level of the feet as recording zero, so that any measure that did not reach the toes was negative and any reach past the toes was positive.

Hand grip power was measured grip and forearm muscle strength by Hand Dynamometer T-18 Creative Health Products. The participants hold the dynamometer in the hand, with the arm at right angles and the elbow by the side of the body. The handle of the dynamometer was adjusted if required - the base should rest on first metacarpal (heel of palm), while the handle should rest on middle of four fingers. When ready the participants squeeze the dynamometer with maximum isometric effort, which was maintained for about 5 seconds. Any other body movements was not allowed.

Standing balance means ability to balance with one-leg standing with both eyes closed. The participants stood on one leg for as long as possible. The participant was given a few minutes to practice the balance before starting the test. The timing stop of when the elevated foot touches the ground or the person hops or otherwise loses their

balance position. Repeat the test on the other leg.

5. Data Analysis

All of the statistical analyses were performed using the SPSS 17.0 for windows. Chi-square tests and t-tests were used to compare the differences in variables at baseline and repeated measures of ANOVA were utilized to identify the effects of interaction by time and group on outcome variables.

RESULTS

A total of 41 subjects (intervention 20, control 21) were recruited, but 8 subjects in the intervention group and 8 subjects in the control group were drop out prior to the 16 weeks follow up and data for these 16 subjects were not included in the final analysis.

1. Homogeneity tests on demographic characteristics and the outcome variables at the pretest.

The characteristics of subjects were shown as table 2 and 3.

There were no significant differences in both groups about age, household members, current disease, and current regular exercise. The mean age of subjects was 65.8 years in the SHTC group and 63.1 years in the control group with the range 55 to 79. They were all Catholic and most of them lived with family members. Three subjects of SHTC group and four subjects of control group had arthritis, and four subjects of SHTC group and three subjects of control group had got 2 and more diseases.

In the regular exercise, there were no significant differences in both groups. Even though the control group was larger than SHTC groups. Seven subjects (53.8%) in the control group exercised regular every week, and only 2 (16.7%) in the SHTC group,

Mean score of self-efficacy was 80.8 in SHTC group and 79.5 in control group, and mean score of health perception was 69.2 in SHTC group and 67.7 in control group. There were no group differences in self-efficacy and health perception. There was a significant difference in the left hand grip strength only ($t=-2.14, p=.042$), but not in shoulder and back flexibility, and balance with closed eyes.

2. Effect of SHTC on self-efficacy and physical strength

Table 4 showed the results of repeated measured ANOVA among pretest, 8-week posttest and 16-week posttest. There was a significant interaction effect of time and group in the right hand grip strength ($p=.044$), but other physical variables including self-efficacy did not

Table 2. Homogeneity Tests on Demographic Characteristics

(N=25)

Characteristics	Categories	Self-help Tai Chi group (n=12)	Control group (n=13)	χ^2 or t	p
		n (%) or M±SD	n (%) or M±SD		
Age (year)		65.8±6.6	63.1±7.9	0.940	.357
Health perception		69.2±13.1	67.7±18.7	0.226	.823
Self-efficacy		80.8±14.2	79.5±20.6	0.186	.854
Age group (year)	55~59	2 (16.7)	6 (46.2)	3.766	.288
	60~64	4 (33.3)	1 (7.7)		
	65~69	3 (25.0)	3 (23.1)		
	≥70	3 (25.0)	3 (23.1)		
Household members	Spouse	5 (41.7)	3 (23.1)	1.963	.580
	Children	2 (16.7)	4 (23.1)		
	Spouse+children	3 (25.5)	5 (38.5)		
	Single	2 (16.7)	1 (7.7)		
Current disease	None	2 (16.7)	4 (30.8)	1.915	.751
	Arthritis	3 (25.0)	4 (30.8)		
	D.M.	1 (8.3)	0 (0.0)		
	Hypertension	3 (16.7)	2 (15.4)		
	Complicated	4 (33.3)	3 (23.1)		
Current regular exercise	Yes	2 (16.7)	7 (53.8)	3.744	.063
	No	10 (83.3)	6 (46.2)		

Table 3. Homogeneity Tests on Outcome Variables at Pretest

(N=25)

Variables	Group	M±SD	t	p
Rt. Shoulder flexibility	Self-help Tai Chi group (n=12)	-5.8±6.2	-0.149	.883
	Control group (n=13)	-5.3±9.7		
Lt. Shoulder flexibility	Self-help Tai Chi group (n=12)	-12.0±7.5	-1.291	.209
	Control group (n=13)	-7.7±9.5		
Back flexibility	Self-help Tai Chi group (n=12)	30.9±7.6	-0.368	.716
	Control group (n=13)	31.9±6.5		
Rt. hand grip	Self-help Tai Chi group (n=12)	20.9±4.2	-1.901	.069
	Control group (n=13)	24.6±5.7		
Lt. hand grip	Self-help Tai Chi group (n=12)	18.8±3.7	-2.146	.042
	Control group (n=13)	22.8±5.6		
Rt. balance	Self-help Tai Chi group (n=12)	5.4±4.1	-0.764	.453
	Control group (n=13)	7.3±7.6		
Lt. balance	Self-help Tai Chi group (n=12)	5.8±5.3	-0.482	.634
	Control group (n=13)	7.2±8.8		

show any interaction effects.

Also there was no group effect in all variable between both groups. There were significant time effect in right shoulder flexibility ($p=.028$), back flexibility ($p=.006$), right hand grip strength ($p=.014$), and left hand grip strength ($p=.044$) in the SHTC group, but no time effect in all variables except left balance in the control group.

DISCUSSION

This Self-help Tai Chi with health education program was consisted of 28 Tai Chi motions that was extended to 12 motions of Tai Chi for arthritis and self-help management based on self-efficacy theory and health education for elderly, and opened during 16 weeks. The measurement was done three times at pretest, posttest after 8

Table 4. Effect of Self-help Tai Chi Program on Self-efficacy and Physical Strength

Variables	Group	Pretest	8 wks	16 wks	Time	Group	Time * Group
		M±SD	M±SD	M±SD	F (p)	F (p)	F (p)
Self-efficacy	SHTC (n=12)	80.8±14.2	81.2±13.1	85.5±13.6	1.228 (.333)	0.009 (.926)	0.733 (.487)
	Cont. (n=13)	79.5±20.6	79.9±14.9	81.9±16.5	0.792 (.467)		
Rt. shoulder flexibility	SHTC (n=12)	-5.8±6.2	-4.0±4.4	-3.3±5.0	4.228 (.028)	0.116 (.737)	2.851 (.070)
	Cont. (n=13)	-5.3±9.7	-1.4±8.3	-6.0±8.7	0.044 (.839)		
Lt. shoulder flexibility	SHTC (n=12)	-12.0±7.4	-11.1±8.7	-8.9±5.5	3.149 (.063)	1.203 (.286)	0.526 (.595)
	Cont. (n=13)	-7.7±9.5	-6.8±10.7	-7.3±8.2	0.079 (.924)		
Back flexibility	SHTC (n=12)	30.9±7.6	34.3±7.7	35.0±7.4	6.555 (.006)	0.310 (.584)	1.413 (.256)
	Cont. (n=13)	31.9±6.5	33.2±6.1	33.3±7.7	1.672 (.219)		
Rt. hand grip	SHTC (n=12)	20.9±4.2	23.9±3.6	24.7±2.7	5.258 (.014)	0.164 (.690)	3.398 (.044)
	Cont. (n=13)	24.6±5.7	24.4±7.1	23.7±5.7	0.388 (.685)		
Lt. hand grip	SHTC (n=12)	18.8±3.7	22.3±3.1	22.2±2.5	4.358 (.044)	1.821 (.193)	2.904 (.067)
	Cont. (n=13)	22.8±5.6	23.7±4.6	23.0±4.6	0.269 (.767)		
Rt. balance	SHTC (n=12)	5.4±4.1	6.5±5.7	7.0±4.8	0.434 (.653)	0.854 (.367)	0.018 (.983)
	Cont. (n=13)	7.3±7.6	5.4±2.8	6.5±4.5	0.433 (.656)		
Lt. balance	SHTC (n=12)	5.8±5.3	4.9±4.2	11.9±12.0	3.289 (.056)	1.971 (.176)	0.953 (.395)
	Cont. (n=13)	7.2±8.8	3.7±1.2	6.7±4.0	4.293 (.032)		

SHTC=self-help Tai Chi group; Cont.=control group.

weeks and 16 weeks. As the result, there was significant interaction effect of time and group in the right hand grip strength but other variables did not show the significant effect, also no significant group differences in all variables including self-efficacy, even though all physical variables except balance in the experimental group showed the improvement after 8 weeks and maintained after 16 weeks.

This program was developed using self-help program, but self-efficacy was not improved. Although SHTC group showed the increase from 80.8 to 85.5, and the control group did from 79.5 to 81.9, there was no significant difference, and this result was similar to result of Choi et al. (2007). Reason would be that the mean score of self-efficacy at pretest for both group was 80 out of 100 indicating very high level of self-efficacy.

While some research showed that Tai Chi exercise improved physical conditions (Chang, 2008; Hyun, 2006; Lee, 2006; Lee, E. H. et al., 2007; Song et al., 2002; Taylor-Piliae et al., 2006), other research did not show significant differences in some physical measurements between the experimental group and control group (Lee & Suh, 2003; Woo et al., 2007).

As the result of the joint flexibility on the effect of Tai Chi exercise, most of research showed the increased flexibility (Baek, 2004; Choi et al., 2008; Lee & Lee, 2002; Lee et al., 2007; Song et al., 2002; Taylor-Piliae et al., 2006)

because most of Tai Chi motions emphasized smooth shoulder exercise and range of motion. In this research, right shoulder flexibility was improved from -5.8 cm at pre test to -3.9 cm at 8 week posttest, and -3.3 cm at 16 week posttest in the SHTC group over time ($p=.028$). Left shoulder flexibility was not changed significantly in both groups. This result was similar to Lee and Lim's study (2009), the reason might be the participants' old age.

Also back flexibility was improved from 30 cm at pre test to 34cm at 8-week posttest, and 35 cm at 16-week posttest in the SHTC group over time ($p=.006$).

Tai Chi exercise seemed to enhance muscle strength including hand grip power (Chang, 2008; Choi et al., 2008; Lee et al., 2005; Lee, E. H. et al, 2007.; Song et al., 2002). In this research, right hand grip strength showed significant time and group interaction effect ($p=.044$). Left hand grip strength did not found significant time and group interaction effect, but there was time effect in the SHTC group over time ($p=.044$). Tai Chi was taught hand motions likely to catch a ball, this motion could be helpful to hand muscle power. So, these changes were detected in the SHTC group only.

Especially Tai Chi exercise emphasized the standing balance and body stance, so Tai Chi have been teaching for elderly without arthritis to prevent falling accident (Lee et al., 2004). But the result of the balance with closed

eyes was not consistent, either. Some research reported significant effectiveness (Lee & Jeong, 2006; Lee & Lim, 2009; Li et al., 2008; Park, 2006; Taylor-Piliae et al., 2006), but there were no significant effect in other research (Choi et al., 2008; Lee, E. H., et al., 2007;). One study (Lee, Suh, Lee, Eun, & Choi, 2004) analyzed the effectiveness of Tai Chi exercise for improving balance. They concluded Tai Chi exercise was more effective than other studies for walking balance, but the reports on the outcome were inconsistent with wide variations in the choice of balance measures. However, this study did not find a significant time and group interaction effect. The reason might be the problems of measurement. To measure the standing balance, the participant should stand on one leg for as long as possible, so the time was dependent on attention on measurement. It was hard work for elderly to concentrate from any noise and situation, also, the research aids was not easy to handle the stopwatch accurately.

Lee and Kim (2008) reported the physical, psychosocial and physiological effects of Tai Chi exercise in elderly using systematic review of 37 articles, Tai Chi exercise was more effective in walking and mobility related variables, also they found the inconsistency in the balance, muscle strength, flexibility, and cardiovascular function related measure. Even though the effect of Tai Chi was more positive, the result was inconsistent according to design, Tai Chi style, measurements including the instrument and measuring methods (Choi et al., 2005).

Fifty percentage of the subjects in both group were older than 65 age in this research, but they perceived they were good health and self-efficacy, and they did not have any difficulties on activities daily living. They didn't participate in the entire program due to several reason, although so many researcher's efforts to reduce to drop out. Moreover the control group members maintained their daily activities and exercises including golf and physical fitness, the results of experimental group compared with control group could not be unexpected result even though 16 weeks's exercises.

Therefore, even though there were limitations to this research, the small size of the participants, convenient assignments and high dropout rate, Self-help Tai Chi with health education over 16 weeks seemed to be effective partially especially for hand grip strength.

CONCLUSION

A health educational program for Korean-American older women was developed and opened over 16 weeks. This program was consisted of 28 motions of Tai Chi for

arthritis and health education to give participants diverse health information, and teaching method to increase self-efficacy based on self-help program for arthritis.

The results of the analysis compared with the control group did not show full satisfactory results. Right hand grip strength improved more in self-help Tai Chi group over time than that in control group. Although the subjects had participated in this program and practiced Tai Chi during 16 week, the result showed a one day per week program was not enough to learn Tai Chi and to maintain changes.

We, as nurses, have to develop and open educational programs with variety according to peoples' interest, because people have unique and multiple motivations. I suggest attention to community engagement and a re-design of the program for health promotion and more exercises.

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