

The effect of Qigong on general and psychosocial health of elderly with chronic physical illnesses: a randomized clinical trial

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SUMMARY

Objectives Based on the model by Tsang *et al.* (2002) which summarized the etiological factors and consequences of depression in elderly with chronic physical illnesses, a randomized clinical trial of a special form of Qigong (The Eight Section Brocades) was conducted to assess if it improved the biopsychosocial health of participants.

Design 50 geriatric patients in sub-acute stage of chronic physical illnesses were recruited and randomly assigned into the intervention and control group. The intervention group was given a 12-week period of Qigong practice while the control group was given traditional remedial rehabilitation activities.

Results The intervention group participants expressed improvement in physical health, ADL, psychological health, social relationship, and health in general as reflected by scores of the Perceived Benefit Questionnaire and informal feedback.

Conclusion Although results are not significant in the generalization measures, it may be due to small effect size, small sample size, and short intervention period. Although not all of the hypotheses are supported, this report shows that Qigong (the Eight Section Brocades) is promising as an alternative intervention for elderly with chronic physical illness to improve their biopsychosocial health. More systematic evaluation with larger sample size and longer period of intervention is now underway in Hong Kong. Results will be reported once available. Copyright © 2003 John Wiley & Sons, Ltd.

KEY WORDS—Qigong; Chinese elderly; chronic physical illness; depression; quality of life

Community-based studies find symptoms of depression in up to 15% of the old age population (Dunitz, 1996). Although official statistics do not exist, 15% translates to 114 000 in Hong Kong. This is a substantial number which cannot be neglected by rehabilitation professionals. The prevalence of depression among the elderly with chronic physical illnesses and disabilities is even higher. Studies show that the prevalence rate of elevated depressive symptoms ran-

ged between 11 to 59% among the medically ill elderly (Koenig *et al.*, 1988; Mossey *et al.*, 1990; Katona, 1994; Reynolds, III and Kupfer, 1999). A review by Dunitz (1997) reported a range of 6% to 45% among old people in acute hospital inpatients.

In Hong Kong, the population is growing in line with the worldwide trend. The elderly population has increased from 502 400 persons in 1991 to 729 200 persons in 2000 (total population, 7 million). In 2000, the elderly constitutes over 10% of the total population. Among these elderly people the number who suffer from chronic physical and medical illnesses is also on the increase. For instance, official statistics show that the number of cancer cases among elderly people was 10 473 in the fiscal year 1999 to 2000, which occupied over 50% of all cancer cases. Meanwhile, the number of elderly people who stayed in public hospitals was 11 543 in 2000, which was

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again nearly half of all in-patients in public hospitals. Although lacking in empirical evidence, clinical experience shows that being hospitalized is common for those who suffer from different chronic illnesses (e.g. Parkinson's disease, Alzheimer's disease, cerebrovascular disease, dementia, cancer, and cardiopulmonary disease, etc.). In a local study, we found that 80% of the elderly aged 60 or over who committed suicide had severe or terminal illness and 24% had a history of psychiatric treatment that was strongly related to depression.

Although the relationship between physical problems and depression is well documented, the underlying mechanism is basically unknown. Studies show that depression among elderly has serious adverse health consequences including a drop in immune function. A theory was put forward by Tsang *et al.* (2002) summarizing the etiological factors and consequences of depression in elderly with chronic physical illnesses (Figure 1).

Literature shows that exercise has been used with success to elevate mood and improve general health of elderly. Shephard (1990) discussed the scientific basis of exercise and pointed out that advantages of exercise included improvement of health, increased opportunities for social contacts, gains in cerebral function, enhancement of mood, greater self-esteem,

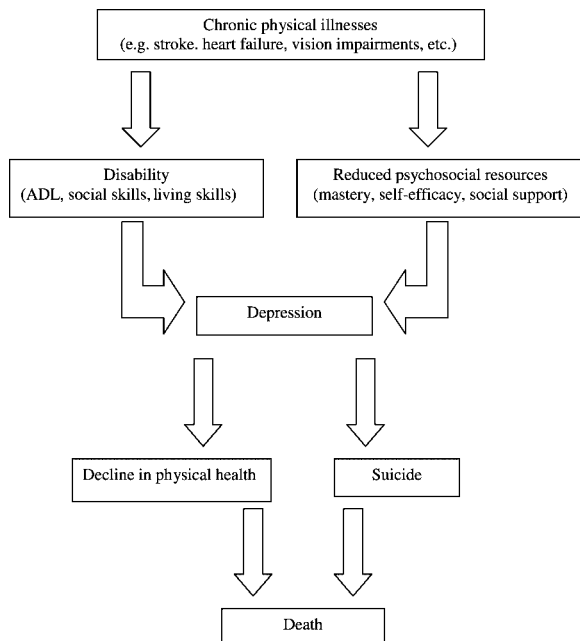


Figure 1. Etiology and consequences of depression in elderly (Tsang *et al.*, in press)

and stronger self-efficacy. Paillard and Nowak (1985) reported that an exercise program was able to increase activity tolerance, improve range of motion and mobility, and improve affect and mood in a group of 70 elderly patients. In a study using aerobic exercise as the treatment protocol among a group of 81 healthy elderly aged between 60 and 81, it was found that the treatment was successful in improving physical functions, self-rating of mood, and perceived health status (McMurdo and Burnett, 1993). However, experience showed that Chinese elderly people may not be interested in aerobic exercise with a western cultural origin. This article reported a preliminary clinical trial of Qigong, a form of Chinese therapeutics, as a psychosocial intervention to alleviate depression and thus improve psychosocial well-being among Chinese elderly with chronic physical illness.

Qigong has a long history with diverse schools in China. A more detailed description of the history and origins of Qigong can be found in Tsang *et al.* (2002). Qigong can be simple and complex. It is difficult to give a clear definition to qigong, but it is possible to identify the common features of qigong (Brown and Knoferl, 2001). There are three main features of qigong: postures and movement, state of mind, and breathing. The aim of practicing qigong is to cultivate qi to help the organism stay healthy and vital. In China, health and longevity are determined by strength, balance and cultivation of the three treasures: *jing* (essence), *qi* (energy) and *shen* (spirit). Qigong focuses on these three treasures to represent a holistic view of the human being.

Eight-Section Brocades is one of the many forms of health-promoting Chinese qigong that can easily be learnt. It is less physically and cognitively demanding when compared with Tai Chi. There is no clear evidence as to when the Eight-Section Brocades were first developed. Olson (1997) stated that it may have been created by *Tao Hung-ching*, a Taoist adept from the fifth century AD. Others think that it was created by *Chung-li Chuan*, a follower of *Tao Hung-ching*, who invented them.

The Eight-Section Brocades first appeared in *Tao Hung-ching's* record on *Cultivating Longevity*. It is thought that *Chung-li chuan*, who studied with *Tao*, had received the transmission of these eight forms and revised them as the Eight-Section Brocades. Other theories suggest that the Eight-Section Brocades is a collection of various *Daoyin* exercises. Eight-Section Brocades has two training methods: The Sitting-Style Eight-Section Brocades and the Standing-Style Eight-Section Brocades. From a clinical point of view, it means that it can be practiced by

the more vulnerable people who have poor standing balance are wheel-chair bound. The Standing-Style Eight-Section Brocades are:

1. Prop Up the Sky with Both Hands to Regulate the Triple Warmer
兩手托天理三焦
2. Draw a Bow on Both sides like Shooting a Vulture
左右開弓似射鵰
3. Raise Single Arm to Regulate Spleen and Stomach
調理脾胃須單舉
4. Look Back to Treat Five Strains and Seven Impairments
五勞七傷往後瞧
5. Sway Head and Buttocks to Expel Heart-Fire
搖頭擺尾去心火
6. Pull Toes with Both Hands to Reinforce Kidney and Waist
兩手攀足固腎腰
7. Clench Fists and Look with Eyes Wide Open to Build up Strength and Stamina
攢拳怒目增氣力
8. Rise and Fall on Tiptoes to Dispel All Diseases
背後七顛百病消

Qigong is a complete exercise for both the body and the mind. Li and Sun (1997) stated that when people practice Qigong on a regular basis, it can positively influence the breathing, heart, digestion, blood circulation, nervous system, metabolism, and keep the body's biological processes in a steady and fluid motion. Physiological studies have been conducted on Qigong practitioners. The results show that regular practice of Qigong will lead to decrease in heart rate, respiratory rate, oxygen consumption and metabolic rate. Li and Sun (1997) stated that practice of Qigong could help to prevent heart disease. It can regulate blood pressure and strengthen the heart by setting the body and mind at ease.

Although empirical evidence is not available, it has been suggested that Qigong has a similar effect to antidepressants (Yu, 1999). This may be because Qigong practice has an emphasis on breathing relaxation. When the body and mind are calm, a person's physical and mental functions are better. Correct posturing, proper movements, clearing mind of stray thoughts, and long and deep breathing, all help a person achieve a state of well-being and reduce mental and physical tension. It may further help to improve the sense of self-efficacy and mastery. It has been reported that the practice of Qigong is useful in relieving symptoms of depression and is helpful to improving for the quality of sleeping in older people (Tang and Wang, 1990; Tang, 1994).

We hypothesized in this study that Qigong would elevate the mood, improve the physical, psychological and social relationship of Chinese elderly with chronic physical illnesses as shown by our outcome and generalization measures.

METHOD

Participants

A group of 50 geriatric patients (26 males and 24 females) in sub-acute stage of Cardiovascular Accident (CVA) (31), Chronic obstructive pulmonary disease (COPD) (5), Parkinson's disease (4), rheumatoid arthritis (3), and other chronic medical conditions (7), were recruited from the geriatric day hospital of Tuen Mun Hospital and the Haven of Hope elderly home. All of the participants showed willingness to join a Qigong practice group supervised by a qualified practitioner, had good sitting balance, and a minimum shoulder forward abduction range of 50 degree in one hand as assessed by the case occupational therapist. The participants were randomly allocated into the intervention and control groups respectively. The mean age was 72.9 ($SD=9.5$) for the intervention group and 76.3 ($SD=8.4$) for the control group. The Chinese version of the Geriatric Depression Scale (GDS; Yesavage *et al.*, 1983) showed that all participants suffered to a degree from depressed mood, even though they did not carry a clinical diagnosis of depression. Comparison statistics showed that the participants in these two groups did not differ from each other significantly indicating the allocation process was genuinely random. The demographic data of the participants are summarized in Table 1.

Outcome measures

The Geriatric Depression Scale (GDS; Yesavage et al., 1983). The 30-item questionnaire with 'Yes/No' answers was adopted to assess the degree of depressed mood. This questionnaire was translated to Chinese which is now commonly used by rehabilitation professionals in Hong Kong. Local validation studies showed that it is reliable and valid (Chiu *et al.*, 1993; Wong *et al.*, 2002).

Perceived Benefit Questionnaire. A 21-item questionnaire (five-point scale with 1 indicating very negative feedback, 3 indicating neutral feedback, and 5 indicating very positive feedback) tapping their perceived improvement in physical health, activities

Table 1. Demographic characteristics of participants I

	Control (<i>n</i> = 26)	Experimental (<i>n</i> = 24)	Total (<i>n</i> = 50)	χ^2	<i>p</i> -value
Gender					
Male	17 (34.6%)	9 (65.4%)	26 (52.0%)	3.89	0.05
Female	9 (37.5%)	15 (62.5%)	24 (48.0%)		
Education				1.66	0.647
Illiterate	6 (23.1%)	7 (29.2%)	13 (26.0%)		
Primary	13 (50.0%)	14 (58.4%)	27 (54.0%)		
Secondary	5 (19.2%)	2 (8.3%)	7 (14.0%)		
Tertiary	2 (7.7%)	1 (4.1%)	3 (6.0%)		
Marital status				1.27	0.53
Single	1 (3.9%)	3 (12.5%)	4 (8.0%)		
Married—deceased	12 (46.1%)	10 (41.7%)	22 (44.0%)		
Married—alive	13 (50.0%)	11 (45.8%)	24 (48.0%)		
Diagnosis				6.58	0.16
COPD	5 (19.2%)	0 (0.0%)	5 (10.0%)		
CVA	15 (57.7%)	16 (66.6%)	31 (62.0%)		
RA	2 (7.7%)	1 (4.2%)	3 (6.0%)		
Parkinson	2 (7.7%)	2 (8.4%)	4 (8.0%)		
Others	2 (7.7%)	5 (20.8%)	7 (14.0%)		
Live with whom				0.47	0.79
Family	4 (14.4%)	5 (20.8%)	9 (18.0%)		
Spouse	2 (7.7%)	1 (4.2%)	3 (6.0%)		
Alone	20 (76.9%)	18 (75.0%)	38 (76.0%)		
Life roles				N.A.	N.A.
Retired	26 (100.0%)	24 (100.0%)	50 (100.0%)		
Financial source				3.68	0.719
Family	4 (15.4%)	4 (16.6%)	8 (16.0%)		
Savings	0 (0.0%)	1 (4.2%)	1 (2.0%)		
NDA/HDA	2 (7.7%)	2 (8.4%)	4 (8.0%)		
CSSA	7 (26.9%)	8 (33.3%)	15 (30.0%)		
Allowances	6 (23.1%)	5 (20.8%)	11 (22.0%)		
Family + saving	0 (0.0%)	1 (4.2%)	1 (2.0%)		
Family + allowance	7 (26.9%)	3 (12.5%)	10 (20.0%)		

Demographic characteristics of participants II

	Control (<i>n</i> = 26)		Experimental (<i>n</i> = 24)		<i>t</i>	<i>p</i> -value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Age	76.27	8.40	72.93	9.53	1.32	0.19
MMSE	25.54	3.62	24.75	3.86	0.75	0.46

of daily living, psychological health, social relationship, and health in general was developed for this study. Items were generated based on literature and clinical experience of researchers. This was to evaluate the perceived benefits of the completed intervention program (see Table 2). The items were finally included based on the feedback of the clients of a pilot study of similar kind. The final version was assessed for its psychometric properties in a group of 22 elderly with the same selection criteria as the present study. The coefficient alpha of the questionnaire is 0.88. Test-retest reliability as reflected by ICC is 0.91 with subscales ranging from 0.60 to 0.87.

Generalization measures

Quality of life. Participants' self-perceived quality of life was measured by the Hong Kong Chinese Version World Health Organization Quality of Life: Abbreviated Version (WHOQOL-BREF[HK]) Questionnaire. The questionnaire consists of 28 questions on a five-point scale. This indicated that the whole spectrum of the five-point scales was utilized in the reflection of quality of life of the participants (Leung *et al.*, 1997). The questions were further categorized into four domains, including physical health domain, psychological domain, social relationship domain and environment domain. The Cronbach alpha values

Table 2. Perceived benefit questionnaire

Physical health	
1.	Reduce your pain in the limbs
2.	Reduce stiffness of your limbs
3.	Increase the mobility of your limbs
4.	Make you more energetic
5.	Increase your trunk balance
Activities of daily living	
6.	Improve your ability to walk
7.	Improve your ability to get around
8.	Improve your sleep
9.	Improve your appetite
Psychological	
10.	Make you happier
11.	Help you to relax
12.	Help you to concentrate
13.	Reduce your feeling of anxiety
14.	Reduce your feeling of despair
15.	Make you more optimistic
16.	Increase your self-confidence
Social relationship	
17.	Let you make more friends
18.	Improve your relationship with your family members
19.	Make you more satisfied with your social relationship
Overall	
20.	Improve your health
21.	Improve your quality of life

of the four domains in the questionnaire ranged from 0.67 in domain 3 (social relationship) to 0.79 in domain 2 (psychological), which showed that the questionnaire had good internal consistency and ready for clinical use. The intra-class correlation coefficient of question scores between first test and re-test within one month ranged from 0.64 to 0.90 which showed that the WHOQOL-BREF(HK) Questionnaire had fair to good test-retest reliability.

Self-concept Scale (ASSEI; Tam, 1995). This 20-item scale was used to measure self-esteem of participants in different areas of their lives such as physical, social, ethical, familial, and intellectual. The ASSEI was found to be construct and content valid for the Hong Kong population.

Procedure

All intervention and control group participants in this study received basic rehabilitation activities including self-care training, remedial activities, and educational programs, etc. Participants in the intervention group, however, received one hour practice of qigong, twice a week, under the supervision of a qualified practitioner, on top of the basic rehabilitation activities. The Eight-Section Brocades described earlier were used as the intervention protocol.

They were slightly modified for practice in a sitting position for those who were wheelchair-bound or could not stand for a long time. The participants were asked to practice it daily, under the supervision of their relatives (who were also trained by the practitioner) for at least 30 minutes. The intervention lasted for 12 weeks. The control group received the same amount of traditional remedial rehabilitation activities under the supervision of qualified professionals so as to neutralize the effect of staff's additional attention during the Qigong practice.

The Geriatric Depression Scale (GDS) was administered one week before, mid-way, and one week after the intervention for both groups of participants. For the intervention group, the Perceived Benefit Questionnaire was implemented one week after the completion of the program. In addition, feedback from the participants in the intervention group was collected via discussion every two to three weeks after the beginning of the practice.

Data analyses

The demographic characteristics and scores of the participants on the outcome and generalization measures were summarized by descriptive statistics. The comparison of groups in terms of their pre-intervention demographic characteristics was performed by simple *t*-test or chi-square test. The effect of Qigong among the groups during the pre-intervention, mid-way, and post-intervention were studied by means of repeated measures ANOVA. The qualitative feedback from the participants was content analysed.

RESULTS

Outcome measures

Results based on the Perceived Benefit Questionnaire (Table 3) showed that the participants of the intervention group after the intervention program indicated improvement in physical health (19.36, $t(21) = 7.34$, $p < 0.001$), ADL (7.41, $t(21) = 6.89$, $p < 0.001$), psychological health (26.73, $t(21) = 9.22$, $p < 0.001$), social relationship (11.05, $t(21) = 4.95$, $p < 0.001$), and health in general (7.5, $t(21) = 6.65$, $p < 0.001$). Repeated Measures ANOVA of the Geriatric Depression Scale (Table 4) of these two groups is however not significant ($F(2, 39) = 2.032$, $p = 0.145$).

Feedback from participants of the intervention group

As to qualitative results, the followings are extracted feedback from randomly selected participants in the intervention group:

Table 3. Sub-scale scores of experimental group after Qigong Practice—one sample *t*-test

Sub-scales	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i> -value
Physical health	19.36	2.79	7.34	21	<0.001
ADL (General)	14.75	2.12	3.67	7	0.008
ADL (Mobility excluded)	7.41	0.96	6.89	21	<0.001
Psychological health	26.73	2.91	9.22	21	<0.001
Social relationship	11.05	1.94	4.95	21	<0.001
Others	7.50	1.06	6.65	21	<0.001

Feedback after less than six weeks of practice

Subject 1

No comment regarding psychosocial functioning.

Subject 2

'At the beginning, my affected side was painful when I raised up my upper limb. After practicing it, I felt more comfortable, relaxed, and less painful in my affected arm.'

Subject 3

'I feel more relaxed.'

Subject 4

'Before the practice, my upper limb of the affected side could only raise up a little. Now, both hands could raise above my head.'

Subject 5

No comment regarding psychosocial functioning.

Subject 6

'I have practiced it for 3 weeks. The condition is more or less the same. No obvious improvement is noted.'

Subject 7

No comment regarding psychosocial functioning.

Subject 8

'I could not sleep before started practicing Qigong. Now I sleep better.'

Feedback after more than six weeks of practice

Subject 1

'Now I can sleep well.'

Subject 2

'I feel better and more relaxed.'

Subject 3

'I feel better, more comfortable and sleep well.'

Subject 4

'I have practiced it for six weeks. My mobility of both upper and lower limbs improved. I feel relaxed and better.'

Subject 5

No comment regarding psychosocial functioning.

Subject 6

'I feel more comfortable.'

Subject 7

No comment regarding psychosocial functioning.

Subject 8

'I could not sleep before I practiced Qigong. Now I sleep much better. I feel more optimistic when I thought about my illness.'

Generalization measures

The results of the self-concept scale and quality of life measure are summarized in Tables 5 and 6. There is no significant difference in terms of time and group effects.

DISCUSSION

Results from the Perceived Benefit Questionnaire indicated very positive feedback from the participants in the intervention. Most of them felt that the practice of Qigong could improve their health in different aspects, including psychological and social. This provides the first piece of evidence that the practice

Table 4. Scores of Geriatric Depression Scale of control and experimental group at three different stages

	Pre-treatment				Midway				Post-treatment				ANOVA with repeated measure	
	Control		Experimental		Control		Experimental		Control		Experimental		<i>F</i> -ratio	<i>p</i> -value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Geriatric Depression Scale (GDS)	6.05	3.40	7.39	3.91	6.68	4.36	5.91	3.61	5.16	4.14	6.13	4.14	2.032	0.145

Table 5. Scores of self-esteem of control and experimental group at three different stages

	Pre-treatment				Midway				Post-treatment				ANOVA with repeated measure	
	Control		Experimental		Control		Experimental		Control		Experimental		F-ratio	p-value
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD		
	Personal Quality	17.80	3.76	14.70	4.37	18.05	3.44	16.22	3.29	18.45	3.66	16.70		
Family relationship	34.78	8.30	34.5	6.31	38.72	2.99	36.6	3.62	35.00	1.65	34.55	2.65	1.054	0.359
Social relationship	31.37	7.24	31.45	5.38	31.53	3.06	30.64	3.63	30.74	3.57	29.64	3.27	0.127	0.881
Daily tasks	8.90	2.10	8.78	3.01	10.65	3.12	9.87	2.44	8.20	2.02	7.74	1.57	0.247	0.782
Leisure	10.00	2.68	9.31	2.48	11.75	2.07	11.09	1.86	11.00	1.45	10.74	1.51	0.291	0.749
Material	15.33	3.46	15.26	3.84	12.94	3.04	12.70	2.44	12.50	1.38	12.91	2.17	0.235	0.792
Physical well being	12.00	3.20	11.74	3.31	13.90	2.51	13.48	2.06	14.40	1.79	13.09	1.88	1.328	0.276
Others	24.55	7.23	24.27	5.71	23.05	3.98	22.81	2.70	23.10	3.70	23.82	4.29	0.304	0.740

Table 6. Score of quality of life (WHOQOL) of control and experimental group at three different stages

	Pre-treatment				Midway				Post-treatment				ANOVA with repeated measure	
	Control		Experimental		Control		Experimental		Control		Experimental		F-ratio	p-value
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD		
	General health	6.95	1.28	6.17	1.72	7.10	1.37	7.08	0.85	7.25	1.21	6.83		
Social relationship	7.20	1.44	6.91	1.44	6.90	1.17	6.86	1.17	7.25	0.97	7.00	0.87	0.216	0.807
Physical health	15.85	2.81	16.9	2.15	17.3	3.47	15.83	2.79	17.60	2.37	15.48	2.52	4.97	0.012
Psychological	24.74	3.83	23.29	6.21	26.53	4.61	24.81	4.15	25.05	3.05	23.00	3.92	0.096	0.909
Environment	26.44	5.01	25.81	3.46	27.44	3.22	26.00	2.14	26.44	2.20	25.38	2.13	0.31	0.735

of Qigong is beneficial to depressed elderly with chronic physical illnesses. Although subjective in nature, the results reflect that the participants are optimistic that the practice of this traditional Chinese therapeutics is good to their health. This is in line with the previous literature about the benefits of Qigong (e.g. Tang and Wang, 1990). The qualitative feedback from the participants showed that six of them (75%) felt better in terms of their psychosocial functioning after the 12-week program. Before six weeks of practice, only three (37.5%) however reported improvement. At an early stage, the feedback centered around physical function such as movement of the limbs and activities of daily living. At a later stage, the feedback then shifted more to psychological aspects. The improvement included feeling more relaxed, more comfortable, better sleep, and being more optimistic. All reported improvements in psychosocial functioning are indicative of less depressed

mood and higher quality of life. As Chinese people are more conservative in terms of emotion expression, it is not surprising to see that few directly commented that they felt 'less depressed'. In addition, this is consistent with the clinical observation during their participation in the intervention program. Staff members reported that even those who were reluctant to take part in other remedial rehabilitation programs were motivated to participate in the Qigong program. Although there was no follow-up data collection for this study, staff observed that nearly 50% of the participants in the intervention group continued to practice the learned Qigong exercise up to six months after the completion of the project. This again confirms the argument (Tsang *et al.*, 2002) that culturally relevant activities have a special attraction to Chinese elderly.

Although the *F*-ratio of the Geriatric Depression Scale is not significant, this may probably be due to

small effect size in the scores between the two groups. If a larger sample size had been used, a p value less of than 0.05 may have been obtained. As to the generalization measures, we do not feel surprised at this stage of research to have obtained non-significant results. We believe that significant results would eventually be available when the intervention program was carried out over a longer period of time (i.e. six to nine months). Although the participants feel good about the program, it takes time for these benefits to be internalized into their life and their psychosocial aspects.

This preliminary report showed that Qigong (the Eight Section Brocades) is promising as an alternative psychosocial intervention for depressed elderly with chronic physical illness. This is consistent with findings from the literature that exercise is beneficial to elderly in both physical and psychosocial aspect (Shephard, 1990). Qigong has one obvious advantage over foreign exercise protocols because it is culturally relevant to Chinese elderly. Although evidence does not exist, we hypothesize that Qigong will result in better treatment compliance and hence better outcome when compared to exercise protocols with western origins such as aerobics. Studies are needed in the future to test this claim. In addition, more systematic evaluation using a larger sample and longer period of intervention is now underway in Hong Kong. Results will be reported once available.

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