THE JOURNAL OF ALTERNATIVE AND COMPLEMENTARY MEDICINE
Volume 10, Number 4, 2004, pp. 675–680

Impact of *Qigong* Exercise on Self-Efficacy and Other Cognitive Perceptual Variables in Patients with Essential Hypertension

MYUNG-SUK LEE, R.N., Ph.D.,[1] HYUN-JA LIM, R.N., Ph.D.,[2] and MYEONG SOO LEE, Ph.D.[3,4]

ABSTRACT

Objectives: The purpose of this study was to investigate the impact of practicing *qigong* on middle-age subjects with essential hypertension. Impacts on blood pressure, reported self-efficacy, perceived benefit, and emotion were observed.

Design: Thirty-six (36) adult volunteers were assigned to either a waiting list control or a *qigong* group that practiced two 30-minute *qigong* programs per week over 8 consecutive weeks.

Results: Systolic and diastolic blood pressure was significantly reduced in members of the *qigong* group after 8 weeks of exercise. Significant improvements in self-efficacy and other cognitive perceptual efficacy variables were also documented in the *qigong* group compared to the original situation described above.

Conclusions: This pilot study demonstrates the positive effects of practicing *qigong* on controlling blood pressure and enhancing perceptions of self-efficacy.

INTRODUCTION

Essential hypertension is defined as high blood pressure (BP) with no detectable medical cause or organ pathology; it is a treatable risk factor for cardiovascular disease (Turner, 1994). Untreated hypertension increases the risk for heart failure, stroke, and renal failure (Johnston, 1991). The standard medical treatment for essential hypertension consists primarily of antihypertensive drugs. However, drug therapy has unwanted side-effects that can reduce the quality of life (Croog et al., 1986; Houston, 1989). In response to this concern, there has been increasing interest in nonpharmacologic treatment of hypertension (Frumkin et al., 1978; Joint National Commitee, 1986). Behavioral interventions such as meditation, yoga, and biofeedback have been reported to be effective in controlling high BP (Henderson et al., 1998; Schneider et al., 1995; Sundar et al., 1984). Unlike these self-help relaxation interventions, *qigong* incorporates exercises for posture, breathing, movement, and meditation.

The documented health benefits of *qigong* include the prevention and treatment of all causes of mortality including coronary artery disease and cancers (Chen and Yeung, 2002; Sancier, 1996). Although most *qigong* styles bestow some health benefits, medical *qigong* has been specifically developed for the purpose of the treatment and cure of disease. Medical *qigong* refers to the *qigong* forms used by *qi* practitioners to utilize vital energy (*qi*) in the diagnosis and treatment of various diseases. Although *qigong* is mainly a self-training method, internal *qigong* developed by individual practice is more beneficial in promoting good health through self-help.

We have reported that *qigong* is useful for the treatment of psychosomatic and stress-related disorders (Lee et al., 1998, 2000a). In preclinical and postclinical studies, *qigong* has effectively reduced blood pressure and catecholamines in patients with essential hypertensive (Lee et al., 2003). Furthermore, *qigong* has been reported to reduce sympathetic activity, and enhance parasympathetic activity (Lee et al., 2002).

[1]Department of Nursing, Mokpo Catholic University, Mokpo, Republic of Korea.
[2]Department of Nursing, Chodang University, Muan, Republic of Korea.
[3]Center for Integrative Medicine, Institute of Medical Science, Wonkwang University, Iksan, Republic of Korea.
[4]Professional Graduate School of Oriental Medicine, Wonkwang University, Iksan, Republic of Korea.

Although Sancier (1996) suggested that *qigong* has beneficial effects in patients with hypertension, other reviews have noted methodological flaws in previous studies. Mayer (1999) reviewed more than 70 studies on the effects of *qigong* on hypertension and commented that the weight of evidence of 33 studies representing 5545 subjects suggests that *qigong* has a positive effect on hypertension. However, because of methodological issues in these studies, Mayer found it difficult to determine the effectiveness of *qigong* precisely and to identify other factors that might contribute to the previously reported positive effects. Jonas and Crawford (2003) also questioned the quality of research in studies reporting a positive effect from qigong. To document the effects of *qigong* on hypertension, the previous research should be repeated and extended through more rigorously designed studies, such as randomized controlled studies and high quality replications.

The concept of self-efficacy has been used in recent years as an index of an individual's beliefs and confidence in performing certain health behaviors to manage conditions such as arthritis, back pain, fibromyalgia, and cancer (Culos-Reed and Brawley, 2000; Damush et al., 2003; Davis et al., 2000; Mcauley et al., 1995; Rhee et al., 2000; Weber et al., 2004). In addition, the process of behavior performance encompasses evaluating one's personal cognitive thought, knowledge, emotions, the social environment, and the consequences of performing the behavior (Marlatt and Murphy, 1996; Nicki et al., 1985; Strecher et al., 1986). Self-efficacious people are characterized by persistence, commitment, resourcefulness, and perseverance. The majority of studies report an increase in self-efficacy after a period of physical training (Brekke et al., 2003; McAuley et al., 1991, 1994). However, there is little reported evidence of the effects of *qigong* on self-efficacy and cognitive variables.

The primary purpose of this study was to test the hypothesis that practicing *qigong* twice each week for 8 weeks would reduce blood pressure in patients with essential hypertension. The second aim was to examine the effects of *qigong* on self-efficacy and cognitive variables.

MATERIALS AND METHODS

Participants

Sedentary and middle-aged subjects with essential hypertension were recruited through bulletin board advertising to participate in an 8-week *qigong* program as subjects for the present study. An individual was eligible to participate in the program if he/she was: (1) between 40 and 65 years of age, (2) sedentary, as defined by a lack of regular exercise during the previous 6 months, (3) exhibited resting BP in the sitting position in the range of essential hypertension (140 mm Hg $<$ systolic blood pressure [SBP] $<$ 180 mm Hg and 90 mm Hg $<$ diastolic blood pressure [DBP] $<$ 105 mm Hg) without any complication related to hypertension, and (4) not receiving any medication for hypertension. A total of 46 subjects volunteered to participate in the study. They were assigned to either a *qigong* group ($n = 22$) or a control group ($n = 24$) according to their place of residence, to avoid the contamination that could occur if subjects living close to each other discussed their participation in the study. From eight large, administratively divided provinces, we assigned them to two groups according to distance from the hospital.

Of these 46 candidates, 36 subjects participated in the study (*qigong,* $n = 17$, 52.6 ± 5.1 years of age; control, $n = 19$, 54.3 ± 5.5 years). Ten (10) subjects withdrew because of family or work situations (6), unwillingness to continue (3), or because they were going on a long business trip (1). Thus, we could not measure the blood pressure and scores for psychologic variables in these 10 subjects.

The study received institutional approval from the Human Investigation Ethics Committee and administrative approval from the Human Subjects Review Board of Wonkwang University Hospital and School of Medicine before we approached the subjects and obtained their written consent.

Measurement of blood pressure

After a 10-minute preintervention rest, blood pressure was measured by the auscultatory method with a contact microphone secured over the left brachial artery. Two assistants measured BP consecutively, twice for each subject, and the four values were averaged.

Cognitive perceptual variables

General self-efficacy. The general self-efficacy (GSE) scale aims to establish the patient's broad and stable sense of personal competence in dealing with a variety of stressful situations. The Korean translated version of this scale was originally developed by Sherer et al. (1982) as a 14-item version, but was reduced to a 10-item version for patients with hypertension in this study. We excluded four items because our pilot study showed that they were difficult for Koreans to understand and because they overlapped with other items in the Korean translation of the GSE. The answers are rated on a 10-point scale ranging from "not at all" (0) to "completely" (10). The Cronbach α value for internal consistency was 0.86 for the original version and 0.905 for our study.

Exercise self-efficacy (ESE). In this study, subjective changes in self-efficacy were assessed using an exercise self-efficacy (ESE) instrument developed for Koreans.* It con-

*Kim HJ. An Effect of Muscle Strength Training Program on Strength, Muscle Endurance, Instrumental Activities of Daily Living and Quality of Life in the Institutionalized Elderly [doctoral thesis]. Seoul, Korea: Seoul National University, 1994.

sists of 8 items and the level is rated on a 10-point scale ranging from "not at all" (0) to "completely" (10) with a high level of internal consistency (Cronbach $\alpha = 0.932$).

Perceived benefit on exercise

The Korean translated version of perceived benefit (PB) on exercise is an 11-item scale originally invented by Walker (1987) and used in Kim's thesis (1994). It uses a 5-point response format to record the subject's thoughts on the benefit of health-promoting exercise. It has good reliability and validity (Cronbach $\alpha = 0.834$).

The effect of emotional state on exercise

The scale to measure the effect of emotion on exercise (EE) consists of two items developed by Kim (1994) from a previous study; the Cronbach α was 0.69 in the study by Kim and 0.742 in this study). The scale uses a five-point response format to record the subject's emotional on the health-promoting exercise. A higher score means a stronger effect of emotional state on exercise.

Intervention

The experimental treatment was conducted using the *Shuxinpingxuegong* method developed by the Chinese practitioner Zhang Guang De. Comprising eight types of movement (Lee et al., 2003), the *Shuxinpingxuegong* method is used empirically to prevent and treat circulatory system diseases but has not been scientifically validated. To validate that this instrument was appropriate for the patients with high-blood pressure before the *qigong* exercise was conducted, a group of three sports physiology professors and two *qigong* experts helped to reconstruct this instrument as a warm-up exercise, *qigong* exercise, and cool-down exercise.

The time taken for the exercise including warm-up (5 minutes), the *qigong* exercise (20 minutes), and cool-down exercises (5 minutes) totaled approximately 30 minutes. Subjects were told to inhale when they contracted their muscles and exhale when they relaxed their muscles.

This *qigong* exercise started with a two-arm motion (stage 1) and ended with a massage-like procedure (stage 8) as follows. In these instructions to patients, the words in parentheses indicate alternative limbs, positions, or movements.

1. Standing in an upright relaxed posture, begin with the feet and knees together. Look straight ahead. Raise the arms up in front (side) to shoulder height slowly while breathing in. Lower the arms back to their original position while breathing out.
2. Turn slightly to the left (right) and lift the arms upward to the front on the left side of the body, raise both hands vertically and circle outward and step with left (right) foot. Push the trunk forward while lifting the right (left) leg and make a circle with both hands facing inward.
3. Bend both knees. Step sideways with the left (right) foot into horse-riding stance with both arms extended out in front at shoulder height. Extend the elbows out to the sides, push the palms upwards, and straighten the legs.
4. Sink down and step sideways with the left (right) foot into the horse-riding stance with arms extended out to the sides at shoulder height and smoothly shake both hands up and down approximately 5 to 8 times.
5. Massage twice every corner of the brow and over the head to the neck, maintaining contact with the face. Massage with the forefingers the inside (outside) of the ear canal cavities four times clockwise (counterclockwise)
6. Turn from the waist to the left (right) and hit the left (right) shoulder with the right (left) fist. Place the hands on the hips while looking straight ahead. Lift the left (right) foot, use the top of the left (right) foot to hit behind the knee of the right (left) leg.
7. Bend the knees and sink down. Step to the side with the left (right) foot as the arms are extended to the sides at shoulder height. Step outwards with right (left) foot. As the weight is shifted onto the right (left) leg, roll up successively the wrists, the back of the hands, the knuckles, then flick the fingers upwards and extend the arms out to the sides.
8. Turn to the left (right) and bend the knees while placing the palms onto the back (front) on either side of the spine just above (just below) the waist Shift the weight forward onto the left (right) leg and massage the palms down the back (front) of either side of the spine to the hip level. At the end of the last movement, keep the palms on the *Dantien* for 20 seconds then slowly release the hands to the sides.

Qigong exercise was performed from 3:00 PM to 5:00 PM twice per week. The exercises were performed in a quiet place under the instruction of a *qigong* expert and a researcher. The environmental temperature was maintained in the range of 18°–22°C. We did not ask subjects to perform *qigong* at home.

Wait-list control. The control group was informed that they would practice *qigong* after an 8-week baseline period. The control group completed identical assessments to *qigong* group using the same schedule. After the 8-week period, the control group was offered complimentary *qigong* on a voluntary basis.

Experimental procedures. The *qigong* exercises and all testing were conducted in a public lecture hall at the Catholic Center at Mokpo. One (1) week before the beginning of the experiment, all subjects visited the public lecture hall to become familiar with the experimental conditions and procedures. The subjects were informed that they would receive

Table 1. Changes in Blood Pressure Before and After Eight Weeks in the *Qigong* and Wait-List Control Groups

	Time	
Variable	*Pre*	*Post*
SBP (mm Hg)		
Qigong	152.0 ± 10.5	137.3 ± 7.5[a,b]
Control	150.0 ± 11.8	151.7 ± 11.3
DBP (mm Hg)		
Qigong	97.2 ± 6.5	83.6 ± 6.2[a,b]
Control	93.8 ± 6.2	96.9 ± 4.6[c]

All results are presented as mean ± SD.
Pre indicates before *qigong*; Post, after 8 weeks of *qigong*.
[a]$p < 0.001$ versus Pre.
[b]$p < 0.001$ versus control group at the Post time point.
[c]$p < 0.01$ versus Pre.
SBP, systolic blood pressure; DBP, diastolic blood pressure; SD, standard deviation.

8 weeks of *qigong,* each of which could have beneficial effects on hypertension and other symptoms. We explained the nature of *qigong* and experimental procedures separately, according to group. Subjects were asked to refrain from smoking and consuming food, coffee and tea for at least 4 hours before the assessment and to refrain from drinking alcohol for at least 24 hours before the experiment.

The measurements were performed before the onset of the study to measure baseline values and were repeated after 8 weeks to assess the effects of the intervention. The cognitive measures were performed at rest 10 minutes or more before BP was measured. Four assistants helped the subjects complete the questionnaires and measured the subjects' BPs.

Statistical analysis

Data were analyzed using SAS software (Statistical Analysis System, SAS Institute Inc., Cary, NC). Unpaired *t* tests were used to evaluate statistical differences of demographic data and comparison of group differences between the control and *qi*-training group. Paired *t* tests were used to analyze the differences between baseline and after 8-week values.

RESULTS

Changes in SBP and DBP are presented in Table 1. Mean basal values of SBP and DBP were not different between the two groups. After 8 weeks of intervention, the SBP and DBP of the *qigong* group were significantly different to the control (SBP: $p < 0.001$; DBP: $p < 0.001$). There were significant changes in SBP and DBP in the *qigong* group after 8 weeks (SBP: $p < 0.001$; DBP: $p < 0.001$). There was a significant change in DBP in the control group ($p < 0.01$).

The cognitive perceptual efficacy values of the *qigong* group and control are presented in Table 2. There were no significant differences in mean basal values of GSE, ESE, PB, and EE between the two groups. After 8 weeks of intervention, there were significant differences between variables between the *qigong* group and control in GSE ($p <$

Table 2. Changes in Cognitive Perceptual Efficacy Before and After Eight Weeks in the *Qigong* and Control Groups

	Time	
Variable	*Pre*	*Post*
General self-efficacy		
Qigong	64.0 ± 13.4	71.4 ± 15.3[a,b]
Control	70.3 ± 15.2	64.3 ± 13.5[c]
Exercise self-efficacy		
Qigong	65.0 ± 14.3	73.3 ± 14.3[a,d]
Control	59.5 ± 16.9	55.7 ± 16.8
Perceived benefit		
Qigong	3.34 ± 0.50	3.98 ± 0.44[a,b]
Control	3.76 ± 0.53	3.40 ± 0.42[c]
Emotion on exercise		
Qigong	3.16 ± 0.38	3.98 ± 0.57[a,b]
Control	3.36 ± 0.44	3.19 ± 0.65

All results are presented as mean ± SD. Pre indicates before *qigong*; Post, after 8 weeks of *qigong*.
[a]$p < 0.001$ versus Pre.
[b]$p < 0.001$ versus control group at the Post time point.
[c]$p < 0.05$ versus Pre.
[d]$p < 0.01$ versus control group at the Post time point.
SD, standard deviation.

0.01), ESE ($p < 0.05$), PB ($p < 0.01$) and EE ($p < 0.01$). There were significant increases in all cognitive perceptual efficacy variables in the *qigong* group, while there were significant decreases in GSE and PB of the control group.

Ten subjects (59%) in the *qigong* group wished to continue the exercises at home after the trial ended and we gave them a videotape of *qigong* exercise. They continued to perform self-help home *qigong* exercise for at least 2 months; we did not inquire about their continued practice after 2 months.

DISCUSSION

In this study, subjects who did *qigong* exercises twice per week for 8 weeks showed more improvement in blood pressure than the wait-list control group. Participants also reported that *qigong* influenced cognitive perceptual variables.

BP (SBP and DBP) decreased after 8 weeks of *qigong* exercise, but remained the same in the control group. These results are similar to those reported in other *qigong* studies. Many groups have assessed the effects of *qigong* on hypertensive patients and have reported that receiving *qi* positively affects BP, levels of catecholamines and cholesterol, heart rate, and other aspects of health (Agishi, 1998; Bornoroni et al., 1993; Lee et al., 2000b, 2003; Xing et al., 1993). BP has been directly linked to sympathetic nervous system (SNS) activity, and the urinary catecholamine assay has been used as an integrated measure of sympathoadrenal system activity (SSA)—a unique neuroendocrine unit comprising the sympathetic nervous system and the adrenal glands (Macdonald, 1995). Hence, lower BP levels following *qigong* exercise are compatible with the stabilization of SNS activity, because BP has been shown to be directly linked to SNS activity.

From the results obtained for the cognitive perceptual variable, it may be considered that 8 weeks of practicing *qigong* has beneficial effects on self-esteem and health. According to Bandura (who advanced the construct of perceived self-efficacy), the higher one's self-efficacy, the greater one's accomplishment, although the expectation of self-efficacy is subjective and situation-specific (Bandura, 1977, 1982, 1984, 1991). Many studies have accepted the assumptions of this theory; that is, perceived self-efficacy predicts successful individual task performance during and following treatment (Gist et al., 1991; McAuley, 1994, 1995). Increased self-efficacy was positively related to maintaining health-promoting behaviors in a previously reported longitudinal study (Brekke et al., 2003). Increases in perception of self-efficacy and other cognitive perceptual variables indicate that *qigong* may influence subjects' feelings about their health promotion and willingness to improve. *qigong* may affect health behavior that helps patients maintain self-care and ultimately enable them to continue *qigong*.

In conclusion, the results show that *qigong* reduces blood pressure levels and improves cognitive perceptual variables. These results indicate that *qigong* has stabilized the SNS in patients with essential hypertension, and improves self esteem and maintains participation in a self-care program. Finally, a *qigong* program for hypertension support effectively improved self-efficacy by enhancing participants' abilities to practice *qigong* regularly and accurately. However, we acknowledge that this was a preliminary study with several limitations, such as a small sample size and the lack of an equivalent placebo-control group to estimate an expectation effect. Further randomized studies that include more objective measures, larger sample sizes, measurements after multiple sessions, and long-term follow-up are needed to convincingly show the effects of *qigong* on well-being or other psychologic variables in patients with cardiovascular diseases.

REFERENCES

Agishi T. Effects of the external *qigong* on symptoms of arteriosclerotic obstruction in the lower extremities evaluated by modern medical technology. Artif Organs 1998;22:707–710.

Bandura A. Social Learning Theory. Prentice-Hall, Engelwood Cliffs, NJ, 1977.

Bandura A. Self-efficacy mechanism in human agency. Am Psychol 1982;37:122–147.

Bandura A. Recycling misconceptions of personal self-efficacy. Cognit Ther Res 1984;8:231–255.

Bandura A. Self-efficacy mechanism in physiological activation and health-promoting behavior. In: Madden J, ed. Neurobiology of Learning, Emotion and Affect. New York: Raven Press, 1991:229–269.

Brekke M, Hjortdahl P, Kvien TK. Changes in self-efficacy and health status over 5 years: A longitudinal observational study of 306 patients with rheumatoid arthritis. Arthritis Care Res 2003;49:342–348.

Bornoroni C, Genitoni V, Gori G, Gatti G, Dorigo AA. Treatment of 30 cases of primary hypertension by *qigong* techniques. 2nd World Conference for Academic Exchange of Medical qigong. Beijing, China, 1993;126.

Chen K, Yeung R. Exploratory studies of *qigong* therapy for cancer in China. Integr Cancer Ther 2002;1:345–370.

Croog SH, Levine S, Testa MA, Brown B, Bulpitt CJ, Jenkins CD, Klerman GL, Williams GH. The effects of antihyperten sive therapy on the quality of life. N Engl J Med 1986;314: 1657–1664.

Culos-Reed SN, Brawley LR. Fibromyalgia, physical activity, and daily functioning: The importance of efficacy and health-related quality of life. Arthritis Care Res 2000;13:343–351.

Damush TM, Weinberger M, Perkins SM, Rao JK, Tierney WM, Qi R, Clark DO. Randomized trial of a self-management program for Primary care patients with acute low back pain: Short-term effects. Arthritis Care Res 2003;13:179–186.

Davis WD, Fedor DB, Parsons CK, Herold DM. The development of self-efficacy during aviation trainin. J Organ Behav 2000;21:857–871.

Frumkin K, Nathan RJ, Prout MF, Cohen MC. Nonpharmacologic control of essential hypertension in man: A critical review of the experimental literature. Psychosom Med 1978;40:294–320.

Gist ME, Stevens CK, Bavetta AG. Effect of self-efficacy and post-training intervention on the acquisition and maintenance of complex interpersonal skills. Personnel Psychol 1991;44:837–861.

Henderson RJ, Hart MG, Lal SK, Hunyor SN. The effect of home training with direct blood pressure biofeedback of hypertensives: A placebo-controlled study. J Hypertens 1998;16:771–778.

Houston MC. New insights and new approaches for the treatment of essential hypertension: selection of therapy based on coronary heart disease risk factor analysis, hemodynamic profiles, quality of life, and subsets of hypertension. Am Heart J 1989;117:911–951.

Johnston DW. Stress management in the treatment of mild primary hypertension. Hypertension 1991;17:III63–68.

Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. Nonpharmacological approaches to the control of high blood pressure. Final report of the Subcommittee on Nonpharmacological Therapy of the 1984 Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension 1986;8:444–467.

Jonas WB, Crawford CC. Science and spiritual healing: a critical review of spiritual healing, "energy" medicine, and intentionality. Altern Ther Health Med 2003;9:56–61.

Lee MS, Jeong SM, Oh SW, Ryu H, Chung HT. Effects of Chun-DoSunBup Qi-training on psychological adjustments: A cross-sectional study. Am J Chin Med 1998;26:223–230.

Lee MS, Ryu H, Chung HT. Stress management by psychosomatic training: Effects of ChunDoSunBup Qi-training on Symptoms of Stress: A cross-sectional study. Stress Med 2000a;16: 161–166.

Lee MS, Kim BG, Huh HJ, Ryu H, Lee HS, Chung HT. Effect of Qi-training on blood pressure, heart rate and respiration rate. Clin Physiol 2000b;20:173–176.

Lee MS, Huh HJ, Kim BG, Jang HS, Ryu H, Lee HS, Chung HT. Effects of Qi-training on heart rate variability. Am J Chin Med 2002;30;463–470.

Lee MS, Lee MS, Choi ES, Chung HT. Effects of *qigong* on blood pressure, blood pressure determinants and ventilatory function in middle-aged patients with essential hypertension. Am J Chin Med 2003; 31:489–497.

Macdonald IA. Advances in our understanding of the role of the sympathetic nervous system in obesity. Int Obes Relat Metab Disord 1995;19(Suppl 7):S2–S7.

Marlatt G, Gordon J. Relapse Prevention: Maintenance Strategies in the Treatment of Addictive Behavior. Guilford Press, New York, 1995.

Mayer M. Qigong and hypertension: A critique of research. J Altern Complement Med 1999;5:371–382.

McAuley E, Courneya KS, Lettunich J. Effects of acute and long-term exercise on self-efficacy responses in sedentary, middle-aged males and females. Gerontologist 1991;31:534–542.

McAuley E, Courneya KS, Rudolph DL, Lox CL. Enhancing exercise adherence in middle-aged males and females. Prev Med 1994;23:498–506.

McAuley E, Bane SM, Mihalko S L. Exercise in middle-aged adults: Self-efficacy and self-presentational outcomes. Prev Med 1995;24:319–328.

Nicki R, Remington R, McDonald G. Self-efficacy monitoring and cigarette smoking behavior. Behav Res Ther 1985;22:477–485.

Rhee SH, Parker JC, Smarr KL, Petroski GF, Johnson JC, Hewett JE, Wright GE, Multon KD, Walker SE. Stress management in rheumatoid arthritis: What is the underlying mechanism? Arthritis Care Res 2000;13:435–442.

Sancier KM. Medical applications of qigong. Altern Ther Health Med 1996;2:40–46.

Sherer M, Maddux JE, Mercandante B, Prentice-Dunn S, Jacobs B, Rogers RW. The self-efficacy scale: Construction and validation. Psychol Rep 1982;51:663–671.

Schneider RH, Staggers F, Alxander CN, Sheppard W, Rainforth M, Kondwani K, Smith S, King CG. A randomised controlled trial of stress reduction for hypertension in older African Americans. Hypertension 1995;26:820–827.

Strecher V, DeVellis B, Becker M, Rosenstock I. The role of self-efficacy in achieving health behavior change. Health Educ Q 1986;13:73–91.

Sundar S, Agrawal SK, Singh VP, Bhattacharya SK, Udupa KN, Vaish SK. Role of yoga in management of essential hypertension. Acta Cardiol 1984;39:203–208.

Turner JR. Carsiovascular Reacrivity and Stress: Patterns of Physiological Response. New York: Plenum Press, 1994:57–67.

Walker SN, Sechrist KR, Pender NJ. The health promotion lifestyle profile: Development and psychosometic characteristics. Nurs Res 1987;36:76–81.

Weber BA, Roberts BL, Resnick M, Deimling G, Zauszniewski JA, Musil C, Yarandi HN. The effect of dyadic intervention on self-efficacy, social support, and depression for men with prostate cancer. Psychooncology 2004;13:47–60.

Xing ZH, Li W, Pi DR. Effect of *qigong* on blood pressure and life quality of essential hypertension patients. Zhongguo Zhong Xi Yi Jie He Za Zhi 1993;13:413-414, 388–389.

Address reprint requests to:
Myeong Soo Lee, PhD.
Center for Integrative Medicine
Institute of Medical Science
Wonkwang University
Shinyong-dong 344-2
Iksan 570-749
Republic of Korea

E-mail: qimed@wonkwang.ac.kr
or: integmed@chol.com

This article has been cited by:

1. Xingjiang Xiong, Wei Liu, Xiaochen Yang, Bo Feng, Jie Wang. 2014. Moxibustion for essential hypertension. *Complementary Therapies in Medicine* **22**, 187-195. [CrossRef]
2. Yvonne Terjestam, John Jouper, Caroline Johansson. 2010. Effects of Scheduled Qigong Exercise on Pupils' Well-Being, Self-Image, Distress, and Stress. *The Journal of Alternative and Complementary Medicine* **16**:9, 939-944. [Abstract] [Full Text HTML] [Full Text PDF] [Full Text PDF with Links]
3. Guo Xinfeng, Zhou Bin, Nishimura Tsutomu, Teramukai Satoshi, Fukushima Masanori. 2008. Clinical Effect of Qigong Practice on Essential Hypertension: A Meta-Analysis of Randomized Controlled Trials. *The Journal of Alternative and Complementary Medicine* **14**:1, 27-37. [Abstract] [Full Text PDF] [Full Text PDF with Links]
4. Yvonne W.Y. Chow, Hector W.H. Tsang. 2007. Biopsychosocial Effects of Qigong as a Mindful Exercise for People with Anxiety Disorders: A Speculative Review. *The Journal of Alternative and Complementary Medicine* **13**:8, 831-840. [Abstract] [Full Text PDF] [Full Text PDF with Links]