Psychophysiological outcomes of health qigong for chronic conditions: A systematic review

BOBBY H.P. NG AND HECTOR W.H. TSANG
Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hung Hom, Hong Kong

Abstract
We aimed to unravel the clinical benefits and the plausible underlying psychophysiological mechanism based on available randomized controlled trials (RCTs). Meta-analysis of 26 RCTs shortlisted from electronic databases from 1997 to 2006 shows that qigong had some effects on increasing the numbers of white blood cells and lymphocytes, stroke volume, peak early transmitral filling velocity, peak late transmitral filling velocity, forced vital capacity, and forced expiratory volume, and, conversely, lowering of total cholesterol, systolic blood pressure, diastolic blood pressure, and depressive mood scores. Explanatory pathways may pertain to stress reduction via nervous, endocrine, and immune systems. Limitations on methodology are discussed and directions for further studies are suggested. Because of its safety, minimal cost, and clinical benefit, health qigong can be advocated as an adjunctive exercise therapy for older people with chronic conditions.

Descriptors: Health qigong, Chronic diseases, Systematic review, Psychophysiological pathways

Chronic conditions are illnesses or impairments that cannot be cured and have a pattern of recurrence or deterioration (O’Halloran, Miller, & Britt, 2004). Among the aging population, common chronic conditions such as heart diseases, hypertension, and chronic pain usually produce sequelae that have an adverse impact on an individual’s ability for daily function and quality of life and pose a major challenge to the health industry in the 21st century (National Academy on an Aging Society, 1999). Nowadays most people suffering from chronic conditions apply complementary and alternative medicine (CAM). Surveys conducted in the United States and Australia found that around 60% of adults, especially the elderly group, employed at least one form of CAM for managing their chronic conditions as a supplement to the mainstream Western medical interventions (Barnes, Powell-Griner, McFann, & Nahin, 2004; Zhang, Xue, Lin, & Story, 2007). Qigong is one of the CAM modalities they usually employ (Chui, Donoghue, & Chenoweth, 2005; Goldstein et al., 2005; Jones et al., 2007).

In the regimen of Traditional Chinese Medicine (TCM), qigong has long been regarded as a form of “mind-body” intervention, which simultaneously exercises the “mind” and the “body” for treating various chronic diseases and promoting healthy life (Tsang, Cheung, & Lak, 2002). “Qi” literally refers to vital energy within the body. Free flow of “Qi” within the meridian system is essential for good health whereas blockage would result in illness. “Gong” means training and practice. Consistent practice of qigong provides energy for the free flow of “Qi.” When the internal “Qi” is strengthened or balanced, it improves health and wards off or slows down the progress of diseases. Although the physical property of “Qi” is still a subject of debate, Wang (2002) postulated that “Qi” might be a form of vibration energy derived from rhythmic body movements, which is usually identified at acupressure points. This form of vibration energy was proposed to work in resonance with the heartbeats for the promotion of blood circulation, which was an essential factor for good health. This also explained partially the close relationship between “Qi” and “blood” within the TCM context. In China, it is estimated that over 100 million people practice health qigong (Chen, Mackenzie, & Hou, 2006). Qigong consists of a constellation of various styles of practice. It may be divided into “static” and “dynamic” forms (Tsang et al., 2002). The “static” form is purely meditative in nature without an obvious movement component. An example would be Zen meditation. On the other hand, the “dynamic” form refers to the collection of a variety of qigong styles that involve an obvious movement or exercise element. In this review, we confine the review to health qigong (HQG), which is dynamic in nature and may be defined as a form of self-training mind–body exercise and a culturally relevant sport activity. Because the purpose of HQG is health nourishment and prevention of disease, it may also be called “preventive-health” qigong or “health-nourishing” qigong. This is in contrast to “medical qigong,” which has healing as the essential purpose. Another difference is that medical qigong involves a TCM doctor to emit “Qi” to heal the patients (General Administration of Sport of China, 2007). This, however, does not happen in HQG. The practice of HQG is based on the principle of integrating and harmonizing one’s mind, breath, posture, and movement. In modern terms, its practice puts emphasis on focusing attention with the use of visualization and/or autosuggestion, coordinating breathing with movement, aligning proper posture, especially the spine, interlacing muscle contraction and relaxation in a rhythmic sequence, and recruiting movements or...
muscle activities not commonly used in daily activities (Xiang, 2006). The distinctive feature lies in the integration of all these aspects into a single practice, which makes it distinctive from other forms of aerobic and/or stretching exercise.

Psychophysiological research has offered a growing body of evidence supporting the connection between the mind and the body, which forms the scientific basis of various mind–body interventions in treating and managing chronic conditions (Webster, Tonelli, & Sternberg, 2002). Since the 1990s there have been descriptive reviews that summarize scientific studies on HQQ and discuss its clinical benefits for various chronic conditions (Chen & Yeung, 2002; Gallagher, 2003; Kemp, 2004; Sancier, 1996). Chow and Tsang (2007) remarked that the practice of HQQ fits nicely into various biopsychosocial models. Three meta-analytical studies have been conducted to evaluate the efficacy of HQQ for hypertension (Lee, Pittler, Guo, & Ernst, 2007), cancer (Lee, Chen, Sancier, & Ernst, 2007), and diabetes (Liu, Miller, & Brown, 2007). Their results pointed to positive evidence supporting the efficacy of HQQ to hypertension and diabetes. However, the psychophysiological mechanism underlying its clinical efficacy remains elusive. The aim of this review is to unravel the psychophysiological and clinical benefits based on available randomized controlled trials (RCTs) of various chronic conditions and integrate the evidence to gain a better understanding of the plausible psychophysiological pathways explaining its clinical outcomes.

Method

Data Sources

EBM Reviews—Cochrane Central Register of Controlled Trials, Medline (ovid), Embase (ovid), and CINAHL were searched for articles in English. In addition, the China Academic Journals Full-Text Database—Medicine/Hygiene Series was used for identifying publications in Chinese. Key words used for the English Database included “Qigong” or “Qi Gong” or “Qi Training” or “Chee Kung” or “Chi Kung.” The term “HTQ” was used for the Chinese database. Only intervention studies published for the past 10 years from 1997 to 2006 in peer reviewed journals were considered for the second stage of review. Citations of the short-listed articles were also searched for any potential studies that were missed in the database search.

Study Selection

Only RCTs on human subjects of any age group with a chronic condition (e.g., essential hypertension, cancer, pain, neurological problems, or a health issue) were reviewed. Studies with no control groups or no randomized procedures in subject allocation were excluded. The main intervention under consideration was health qigong or “self-practice qigong.” The intervention could be in any one of the following forms: (a) individual, self-practice, (b) group-based practice with or without a complementary home program, (c) under the instruction of a certified health qigong master or following along audiovisual training materials, and (d) integrated with another therapy, for instance, mindfulness therapy, group discussion, and so forth. In the last form, the proportion of health qigong should not be less than half of the treatment time. Interventions using external qigong or emitted qi therapy by a “Qi” master were excluded. To streamline our current review, static forms of qigong such as Zen meditation, which is purely meditative in nature and does not involve an exercising element, were also excluded. The employed outcome measures included biomarkers or physiological parameters (e.g., natural killer cell cytotoxicity, blood pressure, etc.), and ability tests and/or questionnaire survey (e.g., activities of daily living, balance, exercise self-efficacy scale, Unified Parkinson’s Disease Rating Scale, etc.).

Data Extraction and Quality Assessment

Data were extracted independently by the authors using a specifically designed data extraction form. The quality of each of the extracted studies was assessed using the Jadad score (Jadad et al., 1996) based on the following aspects: (a) randomization procedure, (b) blinding of participants, providers of care, outcome assessors, (c) adherence to qigong treatment, and (d) loss to follow-up.

Data Synthesis

Similar outcome variables from different studies with subjects of comparable age range (age difference not larger than 20 years) were pooled for analysis. The effect size was estimated from the difference between the group means, divided by the variances pooled from both the treatment and control groups. Weighted mean differences (WMD) and 95% confidence intervals (CI) were then calculated using the Cochrane Collaboration’s software (Review Manager [RevMan] version 4.2 for Windows; the Nordic Cochrane Centre, Copenhagen, Denmark).

Results

Study Description

The numbers of citations returned from the database search were 38, 138, 167, 107, and 111 for the EBM Reviews, Medline, Embase, CINAHL, and CAJ (Core Journals), respectively, in January 2007. Fifty studies met the inclusion criteria for intervention studies. Twenty-six studies met the quality criteria of RCT. The other 24 studies were excluded due to the fact that the control group was not available or was recruited by a convenience approach rather than randomization. Figure 1 summarizes the selection process of the eligible RCTs.

Table 1 shows the trend of health qigong intervention studies “2000 and before” and “after 2000” in different regions recruited at the second stage of the screening. An increasing trend in the number of RCTs on health qigong published in peer reviewed journals was observed. \( \chi^2 = 4.61, df = 1, p < .05 \). Published studies were not confined to China and other Asian countries, but were also found in Europe and the United States. Studies conducted in Europe and in the United States had a higher percentage of funding from research organizations such as the National Institutes of Health, \( \chi^2 = 3.90, df = 1, p = .05 \).

Table 2 summarizes the methods and results of the 26 qualified RCTs. The total number of subjects involved was 796, with an average age of the subjects at 52.5 years. Adverse events such as mild pain on prolonged standing were reported in 6 subjects in one study (Mannerkorpi & Arndorw, 2004). “Hypertension” was the most commonly studied clinical condition, which was reported in five studies (Cheung et al., 2005; Lee, Huh, et al., 2003; Lee, Lee, Kim, & Choi, 2004; Lee, Lee, Kim, & Moon, 2003; Lee, Lim, & Lee, 2004). “Fibromyalgia” was the second most commonly studied clinical condition, which was reported in two studies (Astin et al., 2003; Mannerkorpi & Arndorw, 2004). Seventeen studies listed “biomarkers and/or physiological parameters” as the effect of qigong practice on body systems.
The commonest biomarkers employed were “immune function” (Chen, Yeh, & Lee, 2006; Lee, Huh, et al., 2003; Lee, Kang, & Ryu, 2005; Manzaneque et al., 2004), “lipid metabolism” (Cheung et al., 2005; Lee, Lee, et al., 2004; Liu, Jiang, Xia, Yang, & Guo, 2006; Tsujiuchi et al., 2002), and “hormonal variation in the sympathetic nervous system and/or in the hypothalamic-pituitary-adrenal (HPA) axis” (Cheung et al., 2005; Lee, Huh, et al., 2003; Lee, Lee, et al., 2004). One study employed blood rheology to study perfusion (Yuan, Fang, & Chen, 2000). As for the physiological parameters, blood pressure was the most common one to be monitored (Cheung et al., 2005; Lee, Huh, et al., 2003; Lee, Lee, et al., 2003, 2004; Lee, Lim, et al., 2004), and echocardiography of cardiac function ranked second (Cheung et al., 2005; Du et al., 2006; Wang et al., 2006). Although HQG has a great variety of forms and styles, “Bauduajin” was the most commonly used in the RCTs (Chen, Yeh, et al., 2006; Liu et al., 2006; Manzaneque et al., 2004, 2005; Tsang, Fung, Chan, Lee, & Chan, 2006; Tsang, Mok, Au Yeung, & Chan, 2003; Yuan et al., 2000).

**Outcomes**

Only 12 studies adopted a control group with a compatible “conventional therapy” or an “attention placebo,” and the other 14 studies adopted a control group with “no treatment.” In comparing changes and improvement between health qigong groups and the control group, HQG subjects usually demonstrated better outcomes in studies where control subjects had no interventions and just continued their usual life activity. However, when comparing the effect of qigong to a conventional therapy or an attention placebo (e.g., walking, PT/OT training, educational group, etc.), results were inconsistent. Nine studies supported that qigong had superior benefits than the conventional counterpart therapy or the attention placebo (Lee, Huh, et al., 2003; Li, Chen, & Mo, 2002; Liu et al., 2006; Stenlund, Lindstrom, Granlund, & Burell, 2005; Tsang et al., 2006; Wenneberg, Gunnarsson, & Ahlstrom, 2004; Wu et al., 1999; Xu, 2000; Yuan et al., 2000), whereas three studies (Astin et al., 2003; Cheung et al., 2005; Tsang et al., 2003) suggested that the therapeutic effects were similar.

Table 3 shows the pooled effects of 17 outcome parameters from seven aspects of bodily functions and/or symptoms, namely, immune cell counts, blood lipids, blood pressure, cardiac function, ventilatory function, pain, and mood. Positive evidence favoring the effect of health qigong was identified in 12 of them. When compared to the control group, HQG group subjects had a significant increase in the numbers of white blood cells and lymphocytes and in the values of parameters including stroke volume, peak early transmitral filling velocity (VE), peak late transmitral filling velocity (VA), the difference between VE and VA, forced vital capacity, and forced expiratory volume at the first second. On the other hand, HQG subjects had significant lowering of total cholesterol, systolic blood pressure, diastolic blood pressure, and depressive mood scores.

**Study Quality**

Twenty studies out of the total 26 had a JADAD score of 2 or less, which indicated major methodological limitations in most studies. The major limitations of the recruited subjects included unclear description of the randomization procedures, inadequate description of the blinding procedures, employment of unblinded outcome assessors, poor monitoring of compliance, and high
percentage of loss to follow-up. In addition, the number of
subjects recruited for individual studies was, in general, small. A
sample size of less than 30 was reported in half of the studies.

Discussion

Although there has been a vast number of studies on health
qigong implemented in China since the late 1970s (Zhang, Gu,
Liu, Wang, & Song, 1995), some authors regard qigong as “pseudoscience” (Lin, Yu, Guo, Shen, & Zhang, 2000).
There are a number of reasons: (1) Most reports were published
in Chinese, making it difficult for comment by international
experts; (2) most were brief reports with inadequate information
for replication; (3) most were case reports rather than cohort
studies, randomized controlled trials, and so forth; and (4) a
great variety of health qigong forms were reported, making it
difficult to conclude which form did better. Contrary to the
above, the RCTs that we have reviewed in this meta-analytical
study provided some positive evidence supporting the benefits
of health qigong to the health of the participants. The contri-
bution to health was shown by a number of the studies that used
different psychophysiological markers as the outcome measures.
The most salient effects pertained to the immune and cardiopul-
monary functions. Also, it was suggested that qigong had the
effect of depression alleviation.

It appears that health qigong is safe as a form of therapy even
for the frail elderly, with very low chance of developing adverse
effects among the participants. Although there have been iso-
lated reports on induced psychosis (Lee, 2001) and intracerebral
hemorrhage (Leung, Yan, & Li, 2001), similar events were not
identified in the studies reviewed. To further ensure safety in
the practice of health qigong, there should be better adherence
to sport safety issues (e.g., adequate warm-up and cool-down
procedures, etc.), avoidance of breath holding, and the following
of a qualified coach and a health qigong protocol that has been
officially tested. We suggest “the Eight Section Brocades (or
Baduanjin)” for this purpose, as it is the form of health qigong
that is most commonly studied as shown by our review, and it
is one of the four forms of health qigong being reviewed,
standardized, and clinically verified within the Mainland of
China since 2000.

Although the scope of health qigong application seems wide
and covers many chronic conditions, there is an underlying link
on its effect in quelling stress. Stress has been shown to be a
pathogenic factor to a number of chronic conditions or a per-
petuating factor making the respective symptoms worse (Fekete,
Antoni, & Schneiderman, 2007; Schneiderman, Antoni, Saab, &
Ironson, 2001; Sevick et al., 2007; Tak, Hong, & Kennedy, 2007).
In the early 1980s, development in psychoneuroendocrinol-
ogy (PNE) suggested that the nervous, endocrine, and immune
systems are interlinked. A reciprocal regulation exists between
the central nervous and the immune systems through which the
CNS signals the immune system via hormonal and neuronal
pathways and the immune system signals the CNS through
cytokines. A balance of their functions would thus enhance a
healthier environment to ward off diseases (Webster et al., 2002).
Good circulatory function would be a prerequisite for the func-
tions of the endocrine and immune systems, as the functions of
these two systems are mediated through the blood. In addition,
the limbic-hypothalamic-pituitary system is believed to play a vital
role to coordinate the nervous, endocrine, and immune systems

<table>
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<tr>
<th>Asian Countries (e.g., Taiwan, Korea, Japan)</th>
<th>Western Countries</th>
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<td>China, including Taiwan &amp; Hong Kong</td>
<td>United States</td>
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<td>Other Asian Countries, e.g., Korea, Japan</td>
<td>European countries</td>
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</tr>
</tbody>
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Table 1. Qigong Related Intervention Studies from 1997 to 2006
### Table 2. Description of the 26 Reviewed Randomized Controlled Trials

<table>
<thead>
<tr>
<th>Author code</th>
<th>Intervention</th>
<th>Sample</th>
<th>Outcome measures biomarkers and/or physiological parameters</th>
<th>Ability tests and/or questionnaire survey</th>
<th>Study quality, findings, &amp; recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Astin et al. (2003); funded by National Center for Complementary &amp; Alternative Medicine, National Institutes of Health</td>
<td><strong>QG:</strong> Mindful meditation plus “Dance of Phoenix” qigong. 8 no. of 2-h sessions in 8 weeks</td>
<td>Clinical: Fibromyalgia Age: 47.7 QG: n = 32 Control: n = 33</td>
<td>Nil</td>
<td>• Pain &amp; Disability Scores of Fibromyalgia Impact Questionnaire  • Pain score of SF-36  • Beck Depression Inventory  • Total myalgic score (number &amp; severity of tender points)  • 6-min walk  • Coping strategies questionnaire</td>
<td>JADAD Score: 4  Significant improvement in fibromyalgia impact scores, Beck depression inventory, pain score of SF-36, and total myalgic scores across times in both groups, but there was no difference between groups. QG practice can be an alternative to exercise program for the management of fibromyalgia</td>
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<tr>
<td>2. Chen, Yeh, et al. (2006)</td>
<td><strong>QG:</strong> 2 weeks of Baduanjin training plus 36 practice sessions in the subsequent 12 weeks</td>
<td>Clinical: Osteoporosis Age: 45.2 QG: n = 44 Control: n = 43</td>
<td>• Interleukin-6 (IL-6)  • Bone mineral density (BMD)</td>
<td>At baseline &amp; 12 weeks</td>
<td>JADAD Score: 2  Significant reduction of IL-6 in the QG group whereas significant reduction of bone mineral density in the control group across time. 12 weeks of Baduanjin QG practice was helpful to a certain degree in prevention of bone loss common in middle-aged women</td>
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<tr>
<td>3. Cheung et al. (2005); funded by Li Ka Shing Foundation, HK</td>
<td><strong>QG:</strong> Goulin Qigong. 8 2-h training classes in 4 weeks plus home program (daily practice for 60 min in the morning &amp; 15 min in the evening for 16 weeks)</td>
<td>Clinical: Untreated mild essential hypertension subjects recruited from the community Age: 54.5 QG: n = 47 Control: n = 41</td>
<td>• Systolic &amp; diastolic BPs  • BMI  • Waist circumference  • Renal function  • Full lipid profile; total cholesterol  • Urinary cortisol, sodium, creatinine, and protein  • Renin &amp; aldosterone  • Echocardiographic: left ventricular mass index, ejection fraction At baseline, 4, 8, 12, &amp; 16 weeks</td>
<td>• Health Status (SF-36)  • Beck anxiety &amp; depression scores</td>
<td>JADAD Score: 4  Significant reduction in BP, HR, BMI, total cholesterol, renin and 24-h urinary albumin in both groups after 16 weeks. But no significant differences between qigong and conventional exercise. 16 weeks of Goulin QG and conventional exercise have similar effects on BP in subjects with mild essential hypertension. But QG is not superior to conventional exercise, but can be used as an alternative to conventional exercise in those who prefer it as a form of nonpharmacological management of hypertension.</td>
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<td>4. Du et al. (2006) (Chinese); funded by General Administration of Sport of China</td>
<td><strong>QG:</strong> Yi Jin Jing. 1 h per day and not less than 5 times a week for 6 months</td>
<td>Healthy: Cardiac function in elderly Age: 66.6 QG: n = 39 Control: n = 30</td>
<td>Echocardiographic measurements for  • Stroke volume (SV)  • Peak early transmitral filling velocity (VE)  • Peak late transmitral filling velocity (VA) At baseline &amp; 6 month</td>
<td>Nil</td>
<td>JADAD Score: 1  Significant difference in SV, VE, and (VE-VA) across time and between groups, although the value of (VE-VA) remained as negative. Cardiac function improved as attributed to regular QG practice</td>
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<tr>
<td>Author code</td>
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<td>Sample</td>
<td>Outcome measures biomarkers and/or physiological parameters</td>
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<td>5. Lee et al. (2005)</td>
<td><strong>QG:</strong> 1 h of ChunDoSunBup (CDSB) Qi-training; 15 min rest/15 min sound (Chun-moon) reciting/15 min slow movement/20 min meditation</td>
<td><strong>Healthy:</strong> Immune responses of young male subjects recruited on a voluntary basis at a university <strong>Age:</strong> 26.5 <strong>QG:</strong> $n = 9$ <strong>Control:</strong> $n = 9$</td>
<td>Blood sample for • NK cell quantity and activity as analysis by flow cytometry <strong>At 10 min before QG, within 10 min of the end of QG, and 2 h after QG</strong></td>
<td>Nil</td>
<td>JADAD Score: 2 <strong>NK cell cytotoxicity, but not NK cell number, showed a significant increase in the QG group than in the control group after 1 h Qi-training. But the NK cell activity returned to basal level within 2 h after training. QG had an acute stimulatory effect on NK cell activity but had no effect on phenotypical changes in the NK cell subset, and it was suggested that QG might have an effect in immune surveillance against infection, spontaneously arising tumors, etc.</strong></td>
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<tr>
<td>6. Lee, Huh, et al. (2003)</td>
<td><strong>QG:</strong> 1 h of ChunDoSunBup (CDSB) Qi-training; 25 min sound (Chun-moon) reciting/15 min slow movement/20 min meditation <strong>Control (Attention control):</strong> sham qigong; similar motion without integrating breath and mind</td>
<td><strong>Healthy:</strong> Immune responses in adults from 6 cities in Korea <strong>Age:</strong> 36 <strong>QG:</strong> $n = 30$ <strong>Control:</strong> $n = 30$</td>
<td>Blood sample for immune cell concentration from • White blood cell (WBC) • Neutrophil • Lymphocyte • Monocyte • NK cell number <strong>At baseline, immediately after 1 h of practice, &amp; another 2 h of rest</strong></td>
<td>Nil</td>
<td>JADAD Score: 1 <strong>WBC &amp; lymphocyte increased significantly 2 h after QG, but not in control group. QG demonstrated an effect on modulation of immune cell numbers in peripheral blood.</strong></td>
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<td>7. Lee, Lim, et al. (2004)</td>
<td><strong>QG:</strong> 16 30-min sessions of Shuxinpingxuegong in 8 weeks (2 times a week). <strong>Control (No treatment):</strong> Wait-listed subjects; no intervention</td>
<td><strong>Clinical:</strong> subjects with essential hypertension voluntarily recruited from 3 outpatient clinics at Mokpo, Korea <strong>Age:</strong> 53.5 <strong>QG:</strong> $n = 23$ <strong>Control:</strong> $n = 24$</td>
<td>• Blood pressure <strong>At baseline &amp; 8 weeks</strong></td>
<td>General self-efficacy scale (GES) • Exercise self-efficacy (ESE) • Perceived benefit on exercise • The effect of emotional state on exercise <strong>At baseline &amp; 8 weeks</strong></td>
<td>JADAD Score: 1 <strong>Significant decreases in BPs as well as improvements in self-efficacy and other cognitive perceptual efficacy variables after QG practice for 8 weeks. QG practice enhanced BP control and perceptions of self-efficacy.</strong></td>
</tr>
<tr>
<td>8. Lee, Lee, et al. (2004)</td>
<td><strong>QG:</strong> 16 30-min sessions of Shuxinpingxuegong in 8 weeks (2 times a week). <strong>Control (No treatment):</strong> Wait-listed subjects; no intervention</td>
<td><strong>Clinical:</strong> subjects with essential hypertension voluntarily recruited from 3 outpatient clinics at Mokpo, Korea <strong>Age:</strong> 53.5 <strong>QG:</strong> $n = 23$ <strong>Control:</strong> $n = 24$</td>
<td>• Blood pressure • High density lipoprotein (HDL) • Apolipoprotein A1 (APO-A1) • Total cholesterol (TC) • Triglycerides (TG) <strong>At baseline &amp; 8 weeks</strong></td>
<td>Nil</td>
<td>JADAD Score: 1 <strong>Significant decreases in BPs and changes in level of TC, HDL, APO-A1 after QG practice for 8 weeks. QG reduced BP and might have acted as an antihypertensive agent by modulation of lipid metabolism.</strong></td>
</tr>
<tr>
<td>Author code</td>
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<td>Subjects</td>
<td>Sample</td>
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<td>9. Lee, Lee, Choi, and Chung (2003)</td>
<td>QG: 30 30-min sessions of Shuxinpingxuegong in 10 weeks; the set is composed of eight types of movements, and the whole 30-min session consists of 5-min warm-up, 20-min QG and 5-min cool-down. Control (No treatment): Wait-listed subjects; no intervention</td>
<td>Clinical: subjects with essential hypertension recruited on a voluntary basis in two living regions in Korea. Age: 56.5 QG: n = 33 Control: n = 32</td>
<td>Blood pressure, Urinary catecholamines, Forced vital capacity (FVC), forced expiratory volume in the first second (FEV), Blood pressure reduction of withdrawal symptoms in Urinary catecholamines QG group occurred more rapidly than in the other groups. Also the QG group had significantly lower anxiety scores. QG may be an effective alternative for heroin detoxification without side effects.</td>
<td>Nil</td>
<td>JADAD Score: 2 Significant decrease in BP, norepinephrine, metanephrine, and epinephrine, and increase in FVC, FEV1 in the QG group. QG showed a stabilizing effect on the sympathetic nervous systems in patients with essential HT.</td>
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<td>Clinical: subjects with essential hypertension recruited on a voluntary basis in two living regions in Korea. Age: 56.5 QG: n = 29 Control: n = 29</td>
<td>Blood pressure, Plasma norepinephrine (NE), Plasma epinephrine (EPI), Forced vital capacity (FVC), forced expiratory volume in the first second (FEV), Blood pressure reduction of withdrawal symptoms in Urinary catecholamines QG group occurred more rapidly than in the other groups. Also the QG group had significantly lower anxiety scores. QG may be an effective alternative for heroin detoxification without side effects.</td>
<td>Nil</td>
<td>JADAD Score: 2 Significant decrease in BP, rate pressure product, norepinephrine, epinephrine, cortisol, and stress level in QG group but not in control group. QG might reduce BP and catecholamines via stabilizing the sympathetic nervous system. Therefore, QG was an effective nonpharmacological modality to reduce BP in essential hypertensive patients.</td>
</tr>
<tr>
<td>11. Li et al. (2002)</td>
<td>QG: Pan Gu Qigong; 25 min for a complete session being practiced 4 to 5 times daily throughout the 10 days of detoxification period. Meditation: Detoxification pill (loloxudine HCl, 0.2 mg) using a 10-day gradual-reduction. Control (Conventional therapy): received only emergency care for acute physical symptoms such as pain, diarrhea, sleep disorder when necessary</td>
<td>Clinical: Heroin addicts. Age: 32.4 QG: n = 26 Medication: n = 26 No treatment control: n = 26</td>
<td>Urine morphine test Throughout the 10 days of treatment Blood pressure</td>
<td>VAS scale for perceived stress level</td>
<td>JADAD Score: 1 Significant decrease in BP, norepinephrine, metanephrine, and epinephrine, and increase in FVC, FEV1 in the QG group. QG showed a stabilizing effect on the sympathetic nervous systems in patients with essential HT.</td>
</tr>
<tr>
<td>12. Liu et al. (2006)</td>
<td>QG: Baduanjin. 30 min per practice and daily practice for 2 times for 3 months. Control (Attention): Walking. Control (Attention): Walking</td>
<td>Clinical:</td>
<td>High density lipid (HDL), Low density lipid (LDL), Total cholesterol (TC), Triglyceride (TG), Body Awareness Rating scale, Fibromyalgia Impact Questionnaire, Chair Test, Hand Grip Test</td>
<td>Nil</td>
<td>JADAD Score: 2 Significant decrease in BP, rate pressure product, norepinephrine, epinephrine, cortisol, and stress level in QG group but not in control group. QG might reduce BP and catecholamines via stabilizing the sympathetic nervous system. Therefore, QG was an effective nonpharmacological modality to reduce BP in essential hypertensive patients.</td>
</tr>
<tr>
<td>13. Mannerkorpi &amp; Arndorw (2004); funded by Swedish Rheumatism Association &amp; the Swedish Research Council</td>
<td>QG: Not described in detail (included some form of standing still for 20 min). 14 1.5-h sessions in 3 months. Control (No treatment): Continue lifestyle as usual</td>
<td>Clinical: Fibromyalgia. Age: 45 QG: n = 19 Control: n = 17</td>
<td>Body Awareness Rating scale, Fibromyalgia Impact Questionnaire, Chair Test, Hand Grip Test</td>
<td>Nil</td>
<td>JADAD Score: 3 Significant better improvement in movement harmony but not in fibromyalgia symptoms or physical function in the QG group. Adverse effects were reported for QG including lengthy standing in this patient group. Dynamic form of QG might help improve movement harmony for patients with FM.</td>
</tr>
<tr>
<td>Author code</td>
<td>Intervention</td>
<td>Sample</td>
<td>Outcome measures biomarkers and/or physiological parameters</td>
<td>Ability tests and/or questionnaire survey</td>
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<tr>
<td>14. Manzaneque et al. (2004)</td>
<td>QG: Baduanjin. 20 no. of 30-min group sessions, conducted on weekdays in a month Control (No treatment): Continue lifestyle as usual</td>
<td>Healthy: Immune responses of students not taking any drugs recruited at University of Malaga on voluntary basis Age: 19.5 QG: n = 16 Control: n = 13</td>
<td>• Total blood count • Serum immunoglobulins and complement • Lymphocytes subsets</td>
<td>Nil</td>
<td>JADAD Score: 2. Experimental subjects exhibited lower values than controls in innate immune response cells and proteins, including monocytes, granulocytes and complement. However, the direction of these changes was different from the effect of meditation and physical exercise. QG training produced a change in immunological functions and it suggested that QG might represent an effective psychosomatic training for immune modulation.</td>
</tr>
<tr>
<td>15. Schmitz-Hubsch et al. (2006); funded by German Parkinson’s Patients’ organization</td>
<td>QG: Form developed by Tai Chi &amp; Medicinsk Qi Gong Centre, Malmo. 12 weekly sessions in 3 months; each session 1 h Qigong plus 2 h of discussion on various themes Control (No treatment): Not stated</td>
<td>Clinical: Parkinson’s disease Age: 63.8 QG: n = 32 Control: n = 24</td>
<td>Nil</td>
<td>Unified Parkinson’s Disease Rating Scale motor part (UPDRS-III) Montgomery Asberg Depression Rating Scale (MADRS) At baseline, 3, 6, &amp; 12 months • Activity level • Fear of falling • Fall efficacy scale • Tandem standing • One-legged stance • Coordination • Box-climbing test</td>
<td>JADAD Score: 2. More patients of QG group improved in motor symptoms as assessed by UPDRS-III at 3 and 6 months FU, but not at 12 months. QG appeared to have a stabilizing effect on PD motor symptoms.</td>
</tr>
<tr>
<td>16. Stenlund et al. (2005); funded by Vardal Foundation, the Swedish Heart and Lung Foundation, and the Vasterbotten’s County Council</td>
<td>QG: Form developed by Tai Chi &amp; Medicinsk Qi Gong Centre, Malmo. 12 weekly sessions in 3 months; each session 1 h Qigong plus 2 h of discussion on various themes Control (Conventional therapy): Continue usual care including medical FU at clinic</td>
<td>Clinical: Patient with coronary artery disease(s) admitted to the Heart Centre at the University Hospital, Umea in Sweden Age: 77.5 QG: n = 56 Control: n = 53</td>
<td>Nil</td>
<td></td>
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</tr>
<tr>
<td>17. Tsang et al. (2006); funded by Area of Strategic Development Grant A102 of the Dept. of Rehab. Sciences, the HK PolyU</td>
<td>QG: Baduanjin. 48 30–45-min sessions in 16 weeks (3 times a week) plus advice on 15 min of daily practice on their own Control (Attention control): Same number newspaper discussion session</td>
<td>Clinical: Patients with depression Age: &gt; 65 QG: n = 48 Control: n = 34</td>
<td>Nil</td>
<td>• Geriatric Depression Scale (GDS) • Chinese General Self-efficacy Scale (CGSS) • Personal Well-being Index (PWI) • General Health Questionnaire – 12 • Self-concept Scale • Perceived Benefit Questionnaire</td>
<td>JADAD Score: 2. Significant improvement in self-estimated level of physical activity, performance in one-leg stance test, coordination and box-climbing test in the QG &amp; discussion group. QG may be an option for elderly patients who do not participate in the ordinary cardiac rehabilitation.</td>
</tr>
<tr>
<td>18. Tsang et al. (2003); funded by Area of Strategic Development Grant A102 of the Dept. of</td>
<td>QG: Baduanjin. 24 1-h training sessions in 12 weeks plus home program of daily practice for 30 min Control (Conventional therapy):</td>
<td>Clinical: Patients with various chronic disabilities from a geriatric day hospital and an elderly home</td>
<td>Nil</td>
<td>• Geriatric Depression Scale (GDS) • Perceived Benefit Questionnaire WHOQOL-BREF(HK)</td>
<td>JADAD Score: 4. After 8 weeks of QG practice, the intervention group outstripped themselves in improvement in mood, self-efficacy, and personal well-being compared to control group. At 16 weeks of QG practice, improvement generalized to daily task domain. QG practice could relieve depression, improve self-efficacy and personal well-being among elderly persons with depression.</td>
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<td></td>
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<td></td>
<td>JADAD Score: 1. Trends of improvement in physical health, ADL, &amp; PBQ were noted, but no significant difference within group and between groups. However, more</td>
</tr>
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</table>
| Rehab. Sciences, the HK PolyU | Same amount of traditional PT/OT training activities under the supervision of qualified professionals | Age: 74.7; QG: n = 24; Control: n = 26 | • HbA1c  
• C-peptide  
• Caloric intake  
• Caloric consumption  
• BMI  
• Lipid metabolism | • Self-concept scale  
At baseline, 6, & 12 weeks | Positive feedbacks from QG participants were accumulated. There was no evidence to support QG was better than traditional PT/OT training, but QG could be considered as an alternative intervention for elderly with chronic physical illness, who felt good about it. |
| 19. Tsuchuchi et al. (2002) | QG: Form not described. Weekly 2-h session in 4 months and being advised to continue practice at home  
Control (Conventional therapy): Dietary advice and exercise treatment | Clinical: Type 2 diabetes; Age: 62.9; QG: n = 16; Control: n = 10 | • HbA1c  
• C-peptide  
• Caloric intake  
• Caloric consumption  
• BMI  
• Lipid metabolism | • Anxiety Index  
• Mood Inventory  
At baseline & 4 months | JADAD Score: 1  
HbA1c levels was significantly lowered and C-peptide was significantly improved in QG group, and improvement could be predicted by: higher pretreatment HbA1c, younger age, obesity, and weaker personality. QG improved glucose metabolism and insulin resistance especially in obese type 2 diabetes. |
| 20. Wang et al. (2006) (Chinese) | QG: Yi Jin Jing. 1 h per day and not less than 5 times a week for 6 months  
Control (No treatment): No systematic training; continue lifestyle as usual | Healthy: cardiac function of elderly; Age: 50–70; QG: n = 110; Control: n = 110 | • Stroke Volume (SV)  
• Peak early transmitral filling velocity (VE)  
• Peak late transmitral filling velocity (VA) | Nil | Significant difference in SV, VE, and (VE-VA) across time and between groups, although the value of (VE-VA) remained as negative. Cardiac function improved as attributed to regular QG practice  
JADAD Score: 4  
Benefits in perceived health (SF-36) and coping skills were identified in the QG group  
QG appeared have an impact on perceived health rather than on physical ability. |
| 21. Wenneberg et al. (2004); funded by the Claes Groschinsky Memorial Fund, the Center for Rehab. Research Committee in the County of Orebro, the Orebro County Council Research Committee and University of Orebro, Orebro, Sweden | QG: Not described in detail. 9 sessions (duration not mentioned) in 3 months plus advice on daily practice  
Control (No treatment): Not described. | Clinical: Muscular dystrophy; Age: 51.4; QG: n = 16; Control: n = 15 | • Berg Balance Scale  
• 36-item Short Form Health Survey (SF-36)  
• Ways of Coping Questionnaire (WCQ)  
• Montgomery Asberg Depression Rating Scale (MADRS) | Nil | JADAD Score: 4  
Menawara & Irons, 2004; funded by the American Heart Association.  
A significant difference was found in Berg Balance Scale, 36-item Short Form Health Survey, Ways of Coping Questionnaire, and Montgomery Asberg Depression Rating Scale between QG and control group at 6 months. Cardiac function improved as attributed to regular QG practice.  
JADAD Score: 4  
Among the QG group 82% reported less pain by the end of the first training session compared to 45% of control patients. By the last training session, 91% of QG patients reported analgesia compared to 36% of control patients. Anxiety was reduced in both groups over time, but the reduction was significantly greater in the QG group than in the control group. QG appeared an impact on physical ability. |
| 22. Wu et al. (1999); funded by NIH grant R21 00-93-002 | QG: Life Information Qigong. 6  
40-min sessions in the first 3 weeks, then followed by 7 weeks of self practice daily  
Control (Attention Control): 6 sessions of simulated qigong training | Clinical: Treatment-resistant patients with late-stage complex regional pain syndrome type I recruited from the Pain Management Center at New Jersey Medical School; Age: 38; QG: n = 11; Control: n = 11 | • Thermography  
At baseline, 1, 2, 3, 6, & 10 weeks | • ROM  
• Visual signs of swelling, discoloration & muscle wasting  
• Visual analog pain scale (VAPS)  
• Medication usage  
• Sleep & rest (SL) & home management (HM) subscales of Sickness Impact Profile (SIP)  
• Pain awakening  
At baseline, 1, 2, 3, 6, & 10 weeks | JADAD Score: 4  
Menawara & Irons, 2004; funded by the American Heart Association.  
A significant difference was found in Berg Balance Scale, 36-item Short Form Health Survey, Ways of Coping Questionnaire, and Montgomery Asberg Depression Rating Scale between QG and control group at 6 months. Cardiac function improved as attributed to regular QG practice.  
JADAD Score: 4  
Among the QG group 82% reported less pain by the end of the first training session compared to 45% of control patients. By the last training session, 91% of QG patients reported analgesia compared to 36% of control patients. Anxiety was reduced in both groups over time, but the reduction was significantly greater in the QG group than in the control group. QG appeared an impact on physical ability. |
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<tr>
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<th>Outcome measures biomarkers and/or physiological parameters</th>
<th>Ability tests and/or questionnaire survey</th>
<th>Study quality, findings, &amp; recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>23. Xu (2000) (Chinese)</td>
<td>QG: DB &amp; PLB in lying followed by massage to “Dan Tin”. 20 min per practice and daily practice for 2 times for 20 days</td>
<td>Clinical: COPD patients Age: 63.5 QG: n = 30 Control: n = 30</td>
<td>• Lung function (FVC, FEV₁, PEF) • Blood gas component (PaO₂, PaCO₂, SaO₂) • Descending &amp; ascending breath of diaphragm</td>
<td>Nil</td>
<td>JADAD Score: 1 Both QG &amp; EDP were capable of remarkably improving lung function, blood gas component, and the descending and ascending of diaphragm. But QG was superior to EDP in improving lung function. QG was low-cost but produced therapeutic effect for COPD patients.</td>
</tr>
<tr>
<td>24. Yuan et al. (2000) (Chinese)</td>
<td>QG: Baduanjin. 30–40 min per practice and daily practice for 2 times for 30 days plus herbal medicine</td>
<td>Clinical: Patients with radicular cervical spondylopathy Age: not stated QG: n = 26 Control: n = 18</td>
<td>• Clinical integral • Indexes of blood rheology including high-shear viscosity, low-shear viscosity, high-shear reduction viscosity, aggregation of index of RBC, &amp; stiffness index</td>
<td>Nil</td>
<td>JADAD Score: 1 Significantly better improvement in index of blood rheology, including high-shear viscosity, low-shear viscosity, high-shear reduction viscosity, aggregation of index of RBC, &amp; stiffness index in the QG group than in the control group at 20 &amp; 30 days, but not at 10 days Consistent practice of QG facilitated blood rheology</td>
</tr>
<tr>
<td>25. Zhang, Zhong, &amp; Wu (2006) (Chinese); funded by General Administration of Sport of China</td>
<td>QG: Yijinjing. 1 h of daily practice following a coach for not less than 5 times a week in 6 months</td>
<td>Healthy: cognitive function of elderly Age: 61 QG: n = 63 Control: n = 61</td>
<td>Various tests (including reaction time, digit memory, etc.) from a computerized cognitive assessment system</td>
<td>Nil</td>
<td>JADAD Score: 1 Significant improvement in cognitive test performance in the QG group but not in the control group Consistent practice of QG might have an effect to slow down intelligence decline of the aged.</td>
</tr>
<tr>
<td>26. Zhong &amp; Zhang (2006) (Chinese); funded by General Administration of Sport of China</td>
<td>QG: Yijinjing. 1 h of daily practice following a coach for not less than 5 times a week in 1 year</td>
<td>Healthy: cognitive function of elderly Age: 61 QG: n = 115 Control: n = 99</td>
<td>• The Symptom Checklist (SCL-90) At baseline, 6, &amp; 12 months</td>
<td>Nil</td>
<td>JADAD Score: 1 Significant improvement in various aspects of psychological health, e.g., depression, obsession, social relationship, anxiety, etc. at 6 months, and even better at 1 year. Consistent practice of QG might have a positive effect on psychological health of the aged</td>
</tr>
</tbody>
</table>

QG: qigong.
Table 3. Results of Pooled Analysis of Outcome Parameters

<table>
<thead>
<tr>
<th>Outcome comparisons</th>
<th>Studies</th>
<th>Participants</th>
<th>WMD(^a)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immune cells count</td>
<td>2 (nos. 5 &amp; 6)</td>
<td>46</td>
<td>0.32</td>
<td>(0.09, 0.56)*</td>
</tr>
<tr>
<td>White blood cell (1000 cells/cubic mm)</td>
<td>2 (nos. 5 &amp; 6)</td>
<td>46</td>
<td>0.21</td>
<td>(0.08, 0.33)*</td>
</tr>
<tr>
<td>Lymphocyte (1000 cells/cubic mm)</td>
<td>2 (nos. 5 &amp; 6)</td>
<td>46</td>
<td>–0.01</td>
<td>(–0.01, 0.00)</td>
</tr>
<tr>
<td>NK cell (1000 cells/cubic mm)</td>
<td>2 (nos. 5 &amp; 6)</td>
<td>46</td>
<td>–0.34</td>
<td>(0.34, –0.09)*</td>
</tr>
<tr>
<td>Blood lipids High density lipoprotein, HDL (mmol/L)</td>
<td>3 (nos. 2, 8, &amp; 12)</td>
<td>165</td>
<td>0.01</td>
<td>(–0.01, 0.03)</td>
</tr>
<tr>
<td>Low density lipoprotein, LDL (mmol/L)</td>
<td>2 (nos. 2 &amp; 12)</td>
<td>129</td>
<td>0.01</td>
<td>(–0.05, 0.06)</td>
</tr>
<tr>
<td>Total cholesterol, TC (mmol/L)</td>
<td>3 (nos. 2, 8, &amp; 12)</td>
<td>170</td>
<td>0.34 (0.34, –0.09)*</td>
<td></td>
</tr>
<tr>
<td>Triglyceride, TG (mmol/L)</td>
<td>3 (nos. 2, 8, &amp; 12)</td>
<td>170</td>
<td>0.05 (0.01, 0.00)</td>
<td></td>
</tr>
<tr>
<td>Blood pressure Systolic BP</td>
<td>4 (nos. 3, 7, 8, &amp; 9)</td>
<td>206</td>
<td>3.93 (4.67, 3.19)*</td>
<td></td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>4 (nos. 3, 7, 8, &amp; 9)</td>
<td>206</td>
<td>4.99 (5.42, 4.56)*</td>
<td></td>
</tr>
<tr>
<td>Cardiac function Stroke volume, SV (ml)</td>
<td>2 (nos. 3 &amp; 20)</td>
<td>290</td>
<td>10.86 (10.53, 11.39)*</td>
<td></td>
</tr>
<tr>
<td>Peak early transmitral filling velocity, VE (cm/s)</td>
<td>2 (nos. 3 &amp; 20)</td>
<td>290</td>
<td>8.20 (7.56, 8.84)*</td>
<td></td>
</tr>
<tr>
<td>Peak late transmitral filling velocity, VA (cm/s)</td>
<td>2 (nos. 3 &amp; 20)</td>
<td>290</td>
<td>2.42 (1.92, 2.92)*</td>
<td></td>
</tr>
<tr>
<td>Difference, VE – VA (cm/s)</td>
<td>2 (nos. 3 &amp; 20)</td>
<td>290</td>
<td>4.25 (3.42, 5.08)*</td>
<td></td>
</tr>
<tr>
<td>Ventilatory function Forced vital capacity, FVC (L)</td>
<td>2 (nos. 9 &amp; 23)</td>
<td>118</td>
<td>0.50 (0.44, 0.56)*</td>
<td></td>
</tr>
<tr>
<td>Forced expiratory volume in first second, FEV1 (L)</td>
<td>2 (nos. 9 &amp; 23)</td>
<td>118</td>
<td>0.27 (0.22, 0.33)*</td>
<td></td>
</tr>
<tr>
<td>Pain SF-36 Pain Score</td>
<td>2 (nos. 1 &amp; 20)</td>
<td>96</td>
<td>0.51 (2.70, 1.68)</td>
<td></td>
</tr>
<tr>
<td>Mood Geriatric Depression Scale</td>
<td>2 (nos. 17 &amp; 18)</td>
<td>132</td>
<td>0.90 (1.08, 0.71)*</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)WMD: Weighted mean difference.

*p<.05.

Our review also revealed that most of the studies had obvious methodological limitations. To provide further evidence for advocating health qigong as a mind–body exercise to improve health status of chronic conditions, studies with more vigorous procedures in randomization and blinding should be implemented to unravel the five psychophysiological pathways suggested above. The adoption of a control group in future studies with a compatible “conventional therapy or attention placebo” is also important in order to rule out the effects of nonspecific factors. The number of study subjects is recommended to be not less than 30. Compliance to the therapy should also be more thoroughly examined, as it is a major factor determining the clinical outcome of the modalities. Qigong is not a quick-fix therapy, and its clinical benefits depend very much on the individuals’ commitment to regular practice over an extended period of time. Thus researchers should pay attention to all possible strategies to prevent loss to follow-up for a certain period of time. The apparent small effect size may be related to dilution by those subjects who may not have full compliance to the recommended treatment regimen and/or may not have acquired the necessary skills. Practice with a higher ability to clear their mind or achieve the “tranquil” state as mentioned by some qigong masters is believed to be good predictor of health (Jouper, Hassmen, & Johansson, 2006). Ways for objective or physiological identification of such “tranquil states” should be explored, which may help differentiate those who are better in mastering the skills. Possible measuring instruments may include handy physiological monitors for measuring electroencephalogram activity (Chan, Han, & Cheung, 2008; Thibodeau, Jorgensen, & Kim, 2006), heart rate variability (Perini & Veicsteinas, 2003; Sandercoc, Bromley, & Brodie, 2005; Terathongkum & Pickler, 2004), and more sophisticated neuroimaging techniques such as fMRI (Kinugasa, Kawakami, & Fukunaga, 2006).

Conclusion

Qigong can be viewed as a multicomponent mind–body intervention that includes elements of stress management, coping skills training, cognitive–behavioral interventions, and relaxation. The ultimate aim is to enhance the self-healing ability recovering from diseases and/or the self-defense ability to guard

... by transducing the experience of “mind” and emotion into physiological responses (Rossi, 1996). Whereas the states of mindfulness influence the neural impulses generated from cerebral cortex, the secretory cells in the hypothalamus transform the neural impulses into the hormonal messengers in regulating the body. The neuroendocrine system is thus regarded as the communication channel to bridge the mind–body interaction (Rossi, 1996). This adds another plausible explanation for the psychophysiological outcomes induced by health qigong practice. To conclude, health qigong may be viewed as an intervention to help individuals relax and exert an influence over their internal organs for achieving a state of hemostatis and promoting the self-healing capability.

Readers should be aware that there were limitations in the pooled results as listed in Table 3. For example, the subject group was heterogeneous in terms of diagnosis, health status, and age. We did not intend to make valid conclusions about the effect of health qigong. Instead, we purported to identify areas that may constitute the focus of further research efforts. Nevertheless, we noted, based on the review, that the psychobiological mechanism of health qigong may involve down-regulation of the activity of the sympathetic nervous system (Lee, Huh, et al., 2003; Lee, Lee, Kim, et al., 2003) and the HPA axis (Cheung et al., 2005; Tsang & Fung, 2008), modulation of the immune system, either by changing the number of immune cell types or by improving the functionality of specific immune cells (e.g., the cytotoxicity of the Natural Killer cells; Chen, Yeh, et al., 2006; Lee, Huh, et al., 2003; Lee et al., 2003; Manzaneque et al., 2004), regulation of the metabolism of blood lipids, with a potential value in the prevention of atherosclerotic-related pathogenesis (Cheung et al., 2005; Lee, Lee, et al., 2004; Liu et al., 2006; Tsujuchi et al., 2002), improvement of circulation through improving the contracting and relaxation abilities of the heart (Cheung et al., 2005; Du et al., 2006; Wang et al., 2006), and improvement of oxygenation by improvement in tidal volume and minimizing anatomic dead space (Xu, 2000). These findings are compatible with two descriptive reviews published in China (Shum & Hua, 2006; Yuan & Zhang, 1999).
against diseases. Our reviews identified some positive evidence supporting the clinical benefits of health qigong, although it may not be superior to other conventional modalities. Its mechanisms may be related to a range of psychophysiological mechanism such as enhancement of immune responses, regulation of the sympathetic and parasympathetic nervous systems, promotion of metabolism of the blood lipid, enhancement of blood circulation, and improvement of respiration. There is still a lack of high-quality studies in this field. This review did not intend to conclude the clinical effect of health qigong but to summarize findings of respective research in the past decade and to shed light on the direction of future research on this treatment modality, which has been in existence for over 2000 years within the Chinese population as well as attracting the interest of Western society in recent years. The escalating funds and publications pertaining to health qigong also suggest that the study of health qigong as a modality of CAM has entered an era of scientific consolidation. In view of its safety, minimal cost, and potential clinical benefit, the authors support that health qigong can be advocated as an adjunctive therapy for elderly with chronic conditions.

REFERENCES


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