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Review

Healthcare-Related Qigong for the Prevention of Lifestyle-Related Diseases

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Abstract

Qigong is a form of traditional Chinese exercise combining breathing, movement, and meditation to improve fitness for the purpose of preventing disease and prolonging life. We review the clinical efficacy and underlying mechanism of the application of Qigong in the healthcare setting. In addition, we discuss topics such as the impacts on respiratory, cardiovascular function, and immune function, as well as studies of the influences on brain

function and mental health. In summary, there is strong evidence of the clinical efficacy of Qigong in preventing diseases; however, further high-quality scientific studies are required for verification.

Keywords
Qigong; preventive medicine; clinical efficacy; respiratory function; cardiovascular function; immune system; emotional aspects; brain function

Qigong in the Healthcare Setting and Clinical Efficacy

Qigong is a form of traditional Chinese exercise that combines breathing, movement, and meditation for the improvement of physical fitness to prevent or alleviate disease and prolong life. In general, Qigong can be divided into four categories: medical Qigong, Qigong in Confucianism, Qigong in Taoism and active Qigong [1]. Depending on the position adopted, the exercise can be distinguished as standing, sitting, lying, and "active" forms of Qigong, with a further classification as dynamic or static Qigong. For example, the well-known types of Tai Chi (Tai Ji Quan) are classified as dynamic Qigong. In addition, there are many other distinguishing features depending on the characteristics, content and function of the exercise. The basic principles of Qigong are very well-described in textbooks and accessible in Western literature [2,3].

In ancient China, Qigong was often referred to only in terms of the control of expiration and inspiration to guide the "Qi" and to initiate the flow of "Qi" through physical and breathing exercises, and also to enhance mental health through meditation. In the 1980s, the development of Qigong therapy was in its early stages. Since then, there has been significant progress in elucidating its characteristics, underlying mechanism, and clinical efficacy, as well as in dissemination of the details of this research in classical literature. Political developments before 2001 led to a decline in Qigong research activity [4]. However, in 2002, the Chinese government launched a series of healthcare-related Qigong measures for self-rehabilitation and self-realization to provide people in China with a better understanding of Qigong therapy [4]. As a sport, Qigong has become a compulsory part of physical education in some universities in China, and students specializing in acupuncture, moxibustion and massage take professional courses to learn systematic training methods of Qigong for use in massage (Figure 1).

Muscle/bone strengthening exercise (Yi Jin Jing), the game of the five animals (Wu Qin Xi), the six healing lutes (Liu Zi Jue) and the eight brocade exercises (Ba Duan Jin) are currently the main forms of Qigong applied in a healthcare setting in China [5] on the recommendation of the Health Qigong Management Center of China National Sports General Administration in 2004. With the development of preventive medicine, Qigong has gradually become a research focus in the field of Traditional Chinese Medicine, since evidence indicates that Qigong is effective in maintaining physical fitness as well as preventing, alleviating and even curing disease. This article summarizes the function of Qigong in various diseases, with a view to disclosing its underlying mechanism.

Figure 1 Qigong in Harbin, China (©G. Litscher).

Effects on Respiratory Function

Health-promoting Qigong as a physical activity has long-term positive effects on the function of the respiratory and cardiovascular systems, especially in older patients.

Investigations in China demonstrated that a 75-day course of Qigong therapy resulted in significant increases in muscle strength, especially those of the lower limbs, and lung capacity [6]. Accumulating clinical evidence has also shown that Qigong can alleviate the common symptoms of chronic obstructive pulmonary disease, such as dyspnea, abnormal sputum, or chronic cough, and can increase pulmonary capacity by increasing the strength of the respiratory muscles, thereby improving the quality of life of patients [7-9]. In particular, Qigong, for example the sitting eight brocade exercises, requires slow action and focuses on the adjustment of breathing [10]. Breathing control exercises using the diaphragm can be used effectively to relax the muscles of the chest and shoulders, reducing energy consumption, and subsequently leading to alleviation of the symptoms of dyspnea [10].

Effects on Cardiovascular Function

Numerous Chinese researchers have also studied the effects of Qigong on the cardiovascular system. Wang considered "Qi" to be a form of vibration energy derived from rhythmic body movements [11]. This energy is used to promote resonance with the heartbeat, which is a major factor in improving the health [11]. It is reported that significant reductions in both systolic and diastolic blood pressure were achieved in a group that performed regular exercise compared to a control group that did not undertake any exercise [12,13]. Similar positive results were also

reported for heart rate, stress, cardiac output, lipids and heart function [14]. These effects may be related to activation of the sympathetic nervous system. Studies showed that the rise in the α1 wave and the decline in the β wave of the electroencephalogram (EEG) recorded during Qigong exercise contributed to the inhibition of activity in the cerebral cortex, thereby reducing activation of the sympathetic nerves and increase in the activity of the vagus nerve [15]. Results of a systematic review based on randomized controlled trials indicated that healthcare-related Qigong Ba Duan Jin was beneficial for patients with coronary heart disease (CHD), leading to a reduction in the number of angina episodes and shortening the duration of angina pectoris, as well as alleviation of anxiety and depression [16]. Further high-quality, large-scale, multi-center studies are required to confirm the effectiveness of Ba Duan Jin for the treatment of CHD.

Influence on the Immune System

In China, strict adherence to recommended Qigong exercises is also regarded as a method of improving immune function. Wu Qin Xi (the game of the five animals), a form of healthcare-related Qigong, employs posture, breathing and meditation exercises to improve the activity of NK cells and the immune system [17]. Studies have shown that Qigong exercises enhance immunoglobulin production and Th1/Th2/Treg cell regulation [18-20]. It is well-known that Treg cells represent a subgroup of T cells that mediate negative regulation of immune responses by inhibiting the activation and proliferation of other immune effector cells and play an important role in the immune system [21]. Due to this characteristic, Cao and colleagues investigated representative Th1/Th2/Treg cell-associated cytokines and demonstrated that moderate exercise improved the immune function, while excessive exercise could lead to immunosuppressive effects [20]. In contrast, Lee investigated the effect of Qigong on intracellular signaling and demonstrated that endogenous growth hormone was released during and immediately after Qigong training, which could mediate the priming of O_2^- production by neutrophils PMNs via tyrosine kinase activation [22]. This indicates that the molecular mechanism underlying the effects of Qigong exercises on the immune system involve tyrosine kinase signaling.

Impacts on Mental Health

Emotion is the experience of attitude to objective situations that has a great impact on the quality of people's lives, work and health. According to epidemiological studies, more than three per cent of the elderly worldwide suffer from severe depression and/or emotional disorders [23], especially those affected by chronic conditions [24]. It could be noted that those people who regularly perform Qigong exercises are less affected by emotional fluctuation than others who never do such exercises [25,26]. Qigong is also associated with a reduction in anxiety, which is particularly helpful in the early stages of depression [27]. These results may be linked to the Qigong principles of the concentration of attention, coordination of breathing with movement, and corrective orientation of body posture. Decreased activity and volitional control leads to reduced mentation, thereby inducing depression in the elderly and people affected by chronic conditions [28]. Thus, Qigong relieves tension and stress, and guides the release of cumulative bio-energy in the static state [29].

Brain Function Research and Qigong

In previous studies [30,31] we investigated changes in cerebral blood flow velocity, near-infrared spectroscopic parameters, electroencephalogram activity, and stimulation-induced 40 Hz oscillations during Qigong exercise in well-trained individuals. With special probe support constructions, the effects of light stimulation and light imaging on the velocity of blood flow in the posterior cerebral artery (PCA) and the middle cerebral artery (MCA) were visualized and quantified [32]. In this context, Niehaus *et al.* [33] presented normal values of visually evoked blood flow alterations in 30 healthy volunteers. During 60 seconds of light stimulation, the mean blood flow velocity in the PCA increased by 13.8% without significant side-effects. In a study of 15 healthy volunteers, our research team found that the mean blood flow velocity during light stimulation was increased by 15% in the PCA and by 4.3% in the MCA [34]. A special eye acupuncture scheme caused a 12.5% increase in the mean blood flow velocity in the PCA while the velocity in the MCA decreased by 4.5% [34]. In the meditation study (Figure 2), light imaging showed a 22.2% increase in the PCA and a mean reduction in blood flow velocity of 23.1% in the MCA in a male subject (Qigong Master). A second study showed a similar trend, although the changes were less marked (PCA: +8.8%, MCA: −4.8%) [30,31]. The differences in the changes in blood flow velocity in the PCA and MDA during Qigong indicate that this training leads to activation or depression of the activity in different areas of the brain area, which is consistent with the results of EEG investigations. Reduction in arterial blood may be a reflection of the decreased oxygen consumption in the corresponding brain area. More studies are essential to evaluate the self-regulatory effect of blood flow during Qigong, and to elucidate the underlying mechanism. During Qigong, EEG alpha activity was detected predominantly in the anterior half of the brain, while none was detected in the posterior half [31]. Furthermore, the frequency of the EEG alpha rhythm during Qigong was slower than that in the resting state [31]. Changes in brain activity during meditation have been described by Wallace in 1970 [35]. Studies showed that meditation increased alpha coherence in both experienced Qigong Masters as well as novices compared to that detected in the resting state with eyes closed [36]. Qigong is considered to elicit a special state of excitation according to a task networks in action, but not a state of consciousness between wakefulness and sleep [36,37].

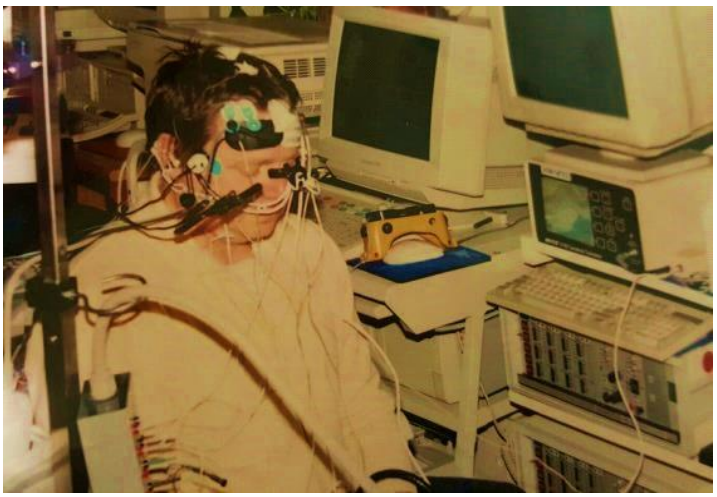

Figure 2 Meditation studies at the Medical University of Graz [30,31].

Discussion

As of February 2017, the scientific PubMed database (www.pubmed.gov) contained more than 100 published reviews on Qigong (February 2017), most of which were published in the last 10 years. In addition to the above-mentioned indications, Qigong may be helpful in the treatment of diseases of hematologic system, musculoskeletal system and other systems [38,39]. With the globalization of economic and cultural healthcare, Qigong has gradually been extended to and partially accepted by the international community. Hempel *et al.* [40], for example, summarized findings on Tai Chi, published in international journals. In addition, Qigong has also received international medical attention in the healthcare sector for various medical conditions including problems with balance and postural control [41], osteoarthritis [42], rheumatoid arthritis [43], osteoporosis [44], psycho-physiological disorders [45], depression [46], immune system modulation [47], cardiovascular disorders and hypertension [48,49].

In China, scientific research on the mechanism of action of Qigong can be traced back to the 1950s and 1960s. Several studies have provided evidence for the inclusion of Qigong exercises in the prevention of diseases and the improvement of the quality of life. Improved respiratory regulation and thus, of the lung function, is the primary advantage of regular Qigong exercise, while increased blood flow, improvements in blood pressure and an adjustment of the heart rate must also be mentioned here. Further Chinese studies have revealed measurable changes in the basic metabolism rate under different circumstances when practicing Qigong [50]. Other parameters, such as heart rate reduced while blood pressure was also subject to positive modulation by Qigong exercise [50]. Functional changes in the cerebrum and subcortical region are also measurable [51]. In recent years, advances in our understanding of the mechanism underlying the effects of Qigong have also been made by investigation at the molecular and genetic level. Some studies reported from China have provided evidence that Qigong exercise can regulate cellular signaling pathways and influence hormone levels, thereby mediating a positive effect on the whole body [52,53].

A meta-analysis of the effects of Qigong in patients with chronic diseases (including diabetes, CHD and hypertension) showed that the most prominent positive effects can be achieved on the immune system, cardiopulmonary function, and depression [54]. The underlying mechanisms can be related to a number of psycho-physiological effects, including improvement in the immune responses, adaptation of the function of the sympathetic and parasympathetic nervous systems, acceleration of metabolism and blood flow, and enhancement of respiratory function [54].

Effects of Qigong and Tai Chi on brain function have also been investigated in Europe using the most modern neuromonitoring methods [30,31,55]. Variations in multidirectional transcranial Doppler sonography, electroencephalography, stimulation-induced 40 Hz oscillations, near-infrared spectroscopy and heart rate have been reported previously [30,31,55]. Modern neuromonitoring seems to be able to elucidate the mechanisms underlying the effects of ancient Chinese meditation technique.

Moreover, randomized controlled trials of the application of Qigong in the treatment or rehabilitation of some diseases are now being carried out in China [56,57]. Qigong could be regarded as an adjunct measure in clinical practice, although further studies of more objective clinical outcome measures with long-term follow-up are required for verification.

Conclusions

In summary, the clinical efficacy of Qigong cannot be ignored. The mechanism underlying the health-enhancing effects of Qigong may be derived from many aspects of this form of exercise. The "three-regulation principle" (breathing, movement and the spirit) has a positive effect on the body and spirit. In addition, evidence suggests that Qigong can prevent the onset and development of some types of disease. This form of healthcare is clearly consistent with the principles of Traditional Chinese Medicine.

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Author Contributions

Both authors contributed equally to this work.

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Competing Interests

The authors have declared that no competing interests exist.

References

1. Wei N. Summary of Qigong Classification. J Fujian Inst Phys Educ (Fujian Tiyu Xueyuan Xuebao).1992;(2):70-2,6.
2. Elleberger O. Qigong für Therapeuten: Vom Umgang mit positiven und negativen Energien. Munich: Elsevier Urban & Fischer; 2005.
3. Wenzel G. Qigong. Quelle der Lebenskraft. Bad Sauerbrunn: Edition Tau; 2000.
4. Zhao D, Ge LB, Feng XX. Analysis of Qigong Literature in 1989–2009. J Tradit Chin Med (Zhongyi WenXian Zazhi). 2011;(5):14-8.
5. Chen XQ, Wang F, Lu JT. Research Review of Chinese Health Qigong. Wushu Sci. (Boji Wushu Kexue). 2012;9(6):102-3.
6. Zeng YG, Zhou XQ, Wang AL, Yang BL, Wang ST. Research on the Impacts of Fitness Qigong·BaDuanJin on Figure and Physical Function among the Middle-aged and Aged People. J Beijing Sport Univ. (Beijing Tiyu Daxue Xuebao). 2005;28(9):1207-9.
7. Xiao CM, Zhuang YC. Efficacy of Liuzijue Qigong in Individuals with Chronic Obstructive Pulmonary Disease in Remission. J Am Geriatr Soc. 2015;63(7):1420-5.

8. Zhu Z, Zhang SQ. Effect of lung Rehabilitation by Health Qigong on Respiratory Function and Quality of Life in Stable Patients with Chronic Obstructive Pulmonary Disease. Jilin J Tradit Chin Med (Jilin Zhongyiyao). 2012;32(8):803-4.
9. Chan AW, Lee A, Suen LK, Tam WW. Effectiveness of a Tai chi Qigong program in promoting health-related quality of life and perceived social support in chronic obstructive pulmonary disease clients. Qual Life Res. 2010;19(5):653-64.
10. Xu YH, Wang JH, Li HF, Zhu XH, Wang G. Efficacy of integrative respiratory rehabilitation training in exercise ability and quality of life of patients with chronic obstructive pulmonary disease in stable phase: a randomized controlled trail. J Chin Integr Med. 2010;8(5):432-7.
11. Wang WG. The Musical Movements of"Qi". Taipei: Locus Publishing Company, 2002.
12. Chen D. Effect of Health Qigong Mawangdui Guiding on Blood Pressure of Individuals with Essential Hypertension. J Am Geriatr Soc. 2016;64(7):1513-5.
13. Wang LJ. Effect of Tai Chi on the Cardiovascular Function of the Elderly. Chin Med Herald (Zhongguo Yiyao Daobao). 2009;6(6): 155-6.
14. Li ZW, Zhou LJ. Intervention Effect of Wu Qin Xi of Health Qigong on Patients with Abnormal lipid. J Guangzhou Sport Univ. (Guangzhou Tiyu Xueyuan Xuebao). 2009;29(4):97-9.
15. Liu WJ. Influences of Eight-week-practice Health Qigong Baduanjin on Human EEG and HRV. Beijing: Beijing Sport University (Beijing Tiyu Daxue); 2012.
16. Sun HL, Wang SR, Wang YH. Systematic Review of Ba Duan Jin Application in Rehabilitation of Coronary Heart Disease. J Changchun Univ Tradit Chin Med. (Changchun Zhongyiyao Daxue Xuebao). 2016,32(2): 326-9.
17. Yu DH, Wu JM. Effects of the Wu Qin Xi of Health Qigong on Elderly NK cells. J Shanghai Univ Sport (Shanghai Tiyu Xueyuan Xuebao). 2008;(1):57-8.
18. Taylor JJ, Mohrs M, Pearce EJ. Regular T cell response develop in parallel to Th response and control the magnitude and phenotype of the Th effector population. J Immunol 2006;176(10):5839-47.
19. Xi BS, Wang B. Effects of Mewangdui Guiding on Cardiovascular Function and Immunoglobulin in Aged Women. Chin J Gerontol (Zhongguo Laonianxue Zazhi). 2015;35(13):3662-4.
20. Cao Y. Effects of Health Qigong - BaDuanJin Exercise on Hba1c and Immune Function in II Diabetes Population. J Guangzhou Sport Univ (Guangzhou Tiyu Xueyuan Xuebao). 2015;35(6):97-9.
21. Khazaie K, von Bochmer H. The impact of CD4 + CD25 Treg on tumor specific CD8 + T cell cytotoxicity and cancer. Semin Cancer Biol. 2006;16(2):124-36.
22. Lee MS, Kim MK, Ryu H. Qi-training (Qigong) enhanced immune functions: what is the underlying mechanism?. Int. J. Neurosci. 2005;115(8):1099-104.
23. Serby M, Yu M. Overview: Depression in the elderly. Mount Sinai J. Med. 2003;70(1):38-44.
24. Noel PH, Williams JW Jr, Unutzer J, Worchel J, Lee S, Cornell J, et al. Depression and comorbid illness in elderly primary care patients: Impact on multiple domains of health status and well-being. Ann Fam Med. 2004;2(6):555-62.
25. Zhai XY. Investigation on Cultivating Mental Hygiene with Gymnastic Qigong Practice. J Henan Univ Chin Med. (Henan Zhongyi Xueyuan Xuebao). 2006;21(3):47-8.
26. Zhang CH, Ma HY. The Influence of Four Fitness Qigongs' Exercise on Emotional Health of Senior Citizens. Chin J Clin Psychol (Zhongguo Linchuang Xinlixue Zazhi). 2011;19(3):393,407-9.

27. Oh B, Butow P, Mullan B, Clarke S, Beale P, Pavlakis N, et al. Impact of medical Qigong on quality of life, fatigue, mood and inflammation in cancer patients: a randomized controlled trial. Ann Oncol. 2010;21(3):608-14.
28. Tsang HW, Cheung L, Lak DC. Qigong as a psychosocial intervention for depressed elderly with chronic physical illnesses. Int J Geriatr Psychiatry. 2002;17(12):1146-54.
29. Xia LX. The Psychological Mechanism of Qigong. Sci Soc Psychol. 1999;15(3):53-7.
30. Litscher G, Wenzel G. Hirnfunktionsforschung und Qigong. Schweiz. Zeitschr. Ganzheits Medizin. 2004;16:90-4.
31. Litscher G, Wenzel G, Niederwieser G, Schwarz, G. Effects of Qigong on brain function. Neurol. Res. 2001;23(5):501-5.
32. Aaslid R. Visually evoked dynamic blood flow response of the human cerebral circulation. Stroke. 1987;18(4):771-5.
33. Niehaus L, Weber U, Lehmann R. Normwerte visuell evozierter Strömungsgeschwindigkeitsänderungen in der A. cerebri posterior. Klin. Neurophysiol. 2000;31:89-93.
34. Litscher G, Cho ZH (Eds.). Computer-Controlled Acupuncture®. Lengerich Berlin Düsseldorf Leipzig Riga Scottsdale Wien Zagreb: Pabst Science Publishers; 2000.
35. Wallace RK. Physiological effects of transcendental meditation. Science. 1970;167(3926):1751-1754.
36. Lehmann D, Faber PL, Tei S, Pascual-Marqui RD, Milz P, Kochi K. Reduced functional connectivity between cortical sources in five meditation traditions detected with lagged coherence using EEG tomography. NeuroImage. 2012;60(2):1574-86.
37. Zhang JZ, Zhao J, He QN. EEG findings during special psychical state (Qigong state) by means of compressed spectral array and topographic mapping. Comput Biol Med.1988;18(6):455-63
38. Jiao RY, Zhong GL, Pan HS. The Influences of Fitness Qigong Baduanjin on Erythrocyte Function of the Elderly. Fujian Sports Sci Technol (Fujian Tiyu Keji). 2013;32(4):25-7.
39. Li TJ, Li X, Wang SZ. Surface Electromyography of low back pain with Health Qigong YiJinJing in special action. Fujian J TCM (Fujian Zhongyiyao Daxue Xuebao). 2011;42(6):11-2.
40. Hempel S, Taylor SL, Solloway MR, Miake-Lye IM, Beroes JM, Shanman R, et al. Evidence Map of Tai Chi. Washington (DC): Department of Veterans Affairs (US); 2014.
41. Wong AM, Lin YC, Chou SW, Tang FT, Wong PY. Coordination exercise and postural stability in elderly people: Effect of tai chi chuan. Arch Phys Med Rehabil. 2001;82(5):608-12.
42. Lee MS, Pittler MH, Ernst E. Tai chi for osteoarthritis: A systematic review. Clin Rheumatol. 2008;27(2):211-8.
43. Lee MS, Pittler MH, Ernst E. Tai chi for rheumatoid arthritis: Systematic review. Rheumatology (Oxford). 2007;46(11):1648-51.
44. Wayne PM, Kiel DP, Krebs DE, Davis RB, Savetsky-German J, Connelly M, et al. The effects of tai chi on bone mineral density in postmenopausal women: A systematic review. Arch Phys Med Rehabil. 2007;88(5):673-80.
45. Lee LY, Lee DT, Woo J. Effect of tai chi on state self-esteem and health-related quality of life in older Chinese residential care home residents. J Clin Nurs. 2007;16(8):1580-2.
46. Tsang HW, Fung KM, Chan AS, Lee G, Chan F, et al. Effect of a Qigong exercise programme on elderly with depression. Int J Geriatr Psychiatry. 2006;21(9):890-7.
47. Irwin MR, Olmstead R, Oxman MN. Augmenting immune responses to varicella zoster virus in older adults: A randomized, controlled trial of tai chi. J Am Geriatr Soc. 2007;55(4):511-7.

48. Lai JS, Lan C, Wong MK, Teng SH. Two-year trends in cardiorespiratory function among older tai chi chuan practitioners and sedentary subjects. J Am Geriatr Soc. 1995;43(11):1222-7.
49. Yeh GY, Wang C, Wayne PM, Phillips RS. The effect of tai chi exercise on blood pressure: A systematic review. Prev Cardiol. 2008;11(2):82-9.
50. Chongqing Physiological Teaching and Research Group. Study on the Physiological Mechanism of Qigong Therapy (Continued). J Tradit Chin Med. (Zhongyi Zazhi). 1963;(05):1-12.
51. Zhang RT, Xiao ZJ, Li YF. Effects of Qigong on the Function of Central Nervous System. J Tradit Chin Med. (Zhongyi Zazhi). 1963;(06):8-10.
52. Xu XQ, Tang QS. Advance research in depression and cellular signal transduction pathway. China Medical Herald. 2012;9(36):49-50.
53. Wei YL, Liu TJ, Zhou ZK, et al. Power Spectrum Response and Molecular Effects of Thought-action Relieving depression. Proceedings of Chinese Medical Qigong Academic; 2014; China. p. 206-12.
54. Ng BH, Tsang HW. Psycho-physiological outcomes of health Qigong for chronic conditions: a systematic review. Psychophysiology. 2009;46(2):257-69.
55. Litscher G, Zhang W, Huang T, Wang L. Heart rate and heart rate variability responses to Tai Chi and jogging in Beijing and Graz. N. Am. J. Med. Sci. 2011;3:70-4.
56. Fu JJ, Min J, Yu PM, McDonald VM, Mao B. Study design for a randomised controlled trial to explore the modality and mechanism of Tai Chi in the pulmonary rehabilitation of chronic obstructive pulmonary disease. BMJ Open. 2016;6(8):e011297.
57. Yeh ML, Chung YC. A randomized controlled trial of Qigong on fatigue and sleep quality for non-Hodgkin's lymphoma patients undergoing chemotherapy. Eur J Oncol Nurs. 2016;23:81-6.
58. Litscher G, Liang FX. Qigong und Gesundheitsvorsorge - Spezielle Aspekte aus Chinesischer Sichtweise. Akupunktur & Aurikulomedizin. 2017;43(1):26-30.