INTEGRATIVE CARE (C LAMMERSFELD, SECTION EDITOR)

Qigong or Tai Chi in Cancer Care: an Updated Systematic Review and Meta-analysis

Yingchun Zeng¹ · Xiaohua Xie² · Andy S. K. Cheng³

© Springer Science+Business Media, LLC, part of Springer Nature 2019

Abstract



Purpose of Review Qigong and Tai Chi are two increasingly popular mind-body interventions with the potential to address the multifaceted needs of cancer survivors. The aim of this updated review and meta-analysis was to quantitatively evaluate the treatment effects of Qigong/Tai Chi on cancer survivors since 2014.

Recent Findings There were statistically significant and clinically meaningful effects in favor of Qigong/Tai Chi interventions for symptoms of fatigue and sleep quality. There were positive trends, but not statistically significant effects, observed for anxiety, stress, depressive symptoms, and overall quality of life (QOL). Cancer-related cognitive impairment is a common complaint among cancer survivors that has received increasing attention in this area in recent years.

Summary Qigong/Tai Chi in cancer care shows great promise with short-term effects in treating many cancer-related symptoms. Further methodologically sound trials with longer follow-up periods and more active control conditions are required, before definitive conclusions can be recommended for cancer patients.

Keywords Integrative oncology \cdot Qigong \cdot Tai Chi \cdot Fatigue \cdot Sleep \cdot Anxiety \cdot Stress \cdot Depression \cdot Cognitive function \cdot Quality of life (QOL)

Introduction

With early detection and advanced treatment of cancer, the 5-year relative survival rate of all cancer sites is 67%, resulting in an increasing number of cancer survivors [1]. As more cancer survivors live longer after curative treatment, long-term or late effects of cancer and its treatment, such as fatigue, sleep disturbance,

This article is part of the Topical Collection on Integrative Care

➢ Yingchun Zeng chloezengyc@hotmail.co.uk

- ¹ Research Institute of Gynecology and Obstetrics, The Third Affiliated Hospital of Guangzhou Medical University, Guangzhou, China
- ² Department of Nursing, The Second People's Hospital of Shenzhen, The First Affiliated Hospital of Shenzhen University, Shenzhen, China
- ³ Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hong Kong, China

mood, neurocognitive function deficits, and quality of life, are more commonly seen in cancer survivors [2, 3•].

The use of Qigong or Tai Chi has a much longer history—especially in cancer care [4•]. Qigong and Tai Chi are two increasingly popular mind-body interventions with the potential to address the multifaceted needs of cancer survivors [3•, 5•]. Qigong, often used to enhance vital energy or life force, balances a patient's spiritual, emotional, mental, and physical health, and aims to reduce fatigue, anxiety, and depressive symptoms [6•]. "Qigong practices are used to increase the qi, circulate it, use it to cleanse and heal the body, store it, or emit qi to help heal others" [6•]. Tai Chi is also a form of ancient and traditional Chinese medicine that integrates movement (physical postures), meditation (focused attention), and controlled breathing to achieve a state of mental calm and relaxation [7]. Tai Chi aims to improve the health of cancer patients through increased mind-body awareness, and especially when incorporating Qigong practices can add a stronger meditative aspect to enhance physical and emotional balance [4•, 6•].

Table 1 Characteri	stics of 12	2 included studies			
Author and year	Study type	Cancer type	Interventions	Outcome measures	Main results
Campo et al. [8]	RCT	40 prostate cancer patients, with	Qigong, 60 min/section, two	BSI, FACIT-F	Qigong has significantly reducing symptoms of fatigue $(p = 0.02)$
Chuang et al. [9]	RCT	a mean age of 1/2 years out 96 patients with lymphoma, with a mean age of 60 years old	unnes week, 12 weeks Qigong, 60 min/section, two times/week, 10 weeks	BFI, EORTC-QLQ, VSHSS	and utsuess $(p < 0.03)$, and Qugong is sate and reasone. Qigong group exhibited decreased fatigue intensity from 5.49 (SD = 1.02) to 0.37 (SD = 1.39), and decreased fatigue interference from 5.53 (SD = 1.27) to 0.20 (SD = 1.93).
Larkey et al. [15]	RCT	101 breast cancer patients with a mean age of 59 years old	Qigong plus Tai Chi, 60 min/section, two times/week, 12 weeks	BDI, FSI, PSQI	Fatigue decreased significantly in the Qigong group compared to control at post-intervention ($p = 0.005$) and 3-month follow-up ($n = 0.024$) but not decreasion and sheen quality.
Larkey et al. [16]	RCT	101 breast cancer patients with a mean age of 59 years old	Qigong plus Tai Chi, 60 min/section, two times/week, 12 weeks	BMI, FACT-Cog, SF-36	V = 0.02-Y, our not uppression and each quanty. Qigong plus Tai Chi groups demonstrated pre-to-post-intervention improvements in physical and mental health. For a subset of women enrolled later in the study, a significant reduction in BMI [-0.66, ($p=0.048$)] was found for Qigong/Tai Chi compared to sham Oiono
Loh et al. [10]	RCT	197 breast cancer patients, no age reported	Qigong, 60 min/section, two times/week, 8 weeks	DASS, FACT-B, FACT-F	The Qigong group showed significant marginal improvement in quality of life scores compared to placebo ($p = 0.036$), compared to usual contraine ($n = 0.038$) on FACT.R
McQuade et al. [17]	RCT	76 prostate cancer patients, with a mean age of 62 years old	Qigong plus Tai Chi, 60 min/section, three times/week, 6–8 weeks	BFI, EPIC, PSQI	Qigong plus Tai Chi group reported longer sleep duration at mid-radiotherapy (7.01 vs. 6.50 h in the wait-list group, $p = 0.05$), but this difference did not persist over time. There were no own of thereness in faitone
Myers et al. [11]	RCT	24 advanced cancer patients with a mean age of 66 years old	Medical Qigong, 60 min/section, two times/week, 6 weeks	FACT-G, HADS	Qigong participants reported the most reduction of distress ($p = 0.02$), and improvement in self-reported cognitive function ($p = 0.007$).
Oh et al. [12]	RCT	27 metastatic breast cancer patients with a mean age of 57 years old	Medical Qigong, 60 min/section, two times/week, 10 weeks	FACT-B, FACT-COG, FACT-F, PSS	Reporting medical Qigong is safe and feasible. Qigong only statistically reducing neuropathy symptoms ($p = 0.014$).
Thongteratham et al. [18]	RCT	30 breast cancer patients, no age reported	Qigong plus Tai Chi, 60 min/section, three times/week 12 weeks	FACT-B, FSI	Tai Chi plus Qigong has large effect size (ES) for self-esteem (1.29), medium ES for fatigue (0.80), cortisol (0.75), and OOI. (0.68), respectively.
Vanderbyl et al. [13]	RCT	19 lung and gastrointestinal cancer patients with a mean age of 65 years old	Qigong, 60 min/section, three times/week, 6 weeks	BPI, HADS, FACT-G	Compared with active control of strength training, Qigong has significant effects in improving physical well-being ($p = 0.04$), but has equivalent effects in aspects of psychological functions ($n \ge 0.05$)
Yeh et al. [14]	RCT	108 lymphoma patients with a mean age of 60 years old	Qigong, 60 min/section, three times/day 3 weeks	BSI, VSHSS	Qigong statistically reduced the severity of fatigue ($p < 0.001$) and minimum-verticed the severity of $(p < 0.001)$
Zhang et al. [19]	RCT	96 lung cancer patients with a mean age of 63 years old	Tai Chi, 60 min/section, three times/week, 12 weeks	MFSI-SF	At 6 weeks, in 2 we partially $y = 5000$ meV. FF general subscale scores (18.1 ± 4.6 vs. 20.4 ± 4.5, $p < 0.05$) and physical subscale scores (17.5 ± 4.4 vs. 19.1 ± 4.5, $p < 0.05$), and higher MFSI-SF vigor subscale scores (14.5 ± 3.3 vs. 11.6 ± 3.4, $p < 0.05$), compared with the control group. At 12 weeks, the MFSI-SF subscale scores showed the same trends as at six weeks.
BFI Brief Fatigue In Research and Treatm Assessment for Canc Assessment for Canc Pittsburgh Sleep Qua	ventory, I tent of Ca ser Therar er Therap ulity Index	3MI body mass index, BPI Brief Pai ncer-Quality of Life Questionnaire, E sy-Breast, FACT-Cog Functional Ass ty-General, FSI Fatigue Symptom In t, PSS Perceived Stress Scale, SF-36	in Inventory, BSI Brief Symptom Inv EPIC Expanded Prostate Cancer Inde sessment of Cancer Therapy–Cogniti ventory, HADS Hospital Anxiety an Short Form 36, RCT randomized co	ventory, DASS Depression and ex Composite, FACIT-F Functio ive Function, FACT-F Function d Depression Scale, MFSI-SF 1 ntrolled trial, VSHSS Verran ar	I Anxiety Stress Scale, EORTC-QLQ European Organization for onal Assessment for Chronic Illness Therapy, FACT-B Functional nal Assessment for Cancer Therapy–Fatigue, FACT-G Functional Multidimensional Fatigue Symptom Inventory–Short Form, PSQI d Snyder-Halpern Sleep Scale





Fig. 1 Risk of bias summary on the 12 trials of Qigong/Tai Chi for cancer patients

Aims

An existing review of the effects of Qigong/Tai Chi in cancer care includes reports that have been published until 2013 [5•]. The aim of this updated review and meta-analysis was to quantitatively evaluate the treatment effects of Qigong/Tai Chi on cancer survivors after 2013.

Methods

Three databases (Medline, CINAHL, and the CAJ Full-text Database) were searched until September 30, 2018. Randomized controlled trials (RCTs) of Qigong/Tai Chi as a treatment intervention for cancer patients were considered for inclusion. Data synthesis used the Cochrane Collaboration Review Manager (RevMan 5.3; https://community.cochrane.org/help/tools-and-software/revman-5) to generate pooled estimates of effect size.

Results

A total of 915 subjects from 12 studies conducted since 2014 were included in this updated review (Table 1). The mean age of study participants ranged from 57 to 72 years old, and the sample sizes varied from 19 to 197. All included studies are randomized controlled trials. Of 12 RCTs, seven used Qigong [8–14]. Four studies used Qigong plus Tai Chi interventions [15–18] and one study [19] used Tai Chi as an intervention. The duration per session was 60 min; supervised training frequency ranged from three times per day to twice a week, and the total duration of the interventions varied from 3 to 12 weeks. Outcome measures and the main results of these studies are shown in Table 1. Each included trial assessed the risk of bias, and the risk of bias summary is shown in Fig. 1. Major sources of risk of bias were a lack of participant blinding, incomplete outcome data, and unclear allocation concealment, resulting in potential selection bias.

Compared with usual care, support groups, waitlist control or sham Qigong control, Qigong/Tai Chi, or Qigong plus Tai Chi interventions had positive effects on reducing the clinical symptoms of fatigue, sleep difficulties, anxiety, stress, and depressive symptoms, and improved overall quality of life. Of 12 RCTs, eight studies examined the effects of Qigong on fatigue in cancer patients. Figure 2 indicates that Qigong/ Tai Chi had statistically significant effects on reducing fatigue symptoms, and the standardized mean difference (SMD) was

Qigong Control Mean Difference										Mean Difference				
Study or Subgroup Mean SD Total Mean SD Total Weight IV, Random, 95% CI										IV, Random, 95% Cl				
Chuang 2017 5.12 1.62 48 1.6 0.72 48 19.5% 3.52 [3.02, 4.02]											•			
Larkey 2015	2.3	1.97	35	2.5	1.67	38	18.6%	-0.20 [-1.04, 0.64]			+			
Loh 2014	41.85	7.3	32	38.25	9.3	32	7.5%	3.60 [-0.50, 7.70]				_		
McQuade 2016	2.56	0.39	21	1.81	0.35	24	19.9%	0.75 [0.53, 0.97]			-			
Myers 2018	0.94	2.67	19	-0.73	3	11	13.7%	1.67 [-0.47, 3.81]			+			
Thongteratham 2015	22.4	9.09	15	9.2	19.68	15	1.5%	13.20 [2.23, 24.17]				Ŭ.		
Yeh 2016	4.77	1.42	51	1.92	1.71	51	19.2%	2.85 [2.24, 3.46]						
Total (95% CI)			221			219	100.0%	2.05 [0.63, 3.47]			•			
Heterogeneity: Tau ² = 2.63; Chi ² = 142.61, df = 6 (P < 0.00001); l ² = 96% Test for overall effect: Z = 2.83 (P = 0.005)										-10 Favours Contro	0 I Favoi	10 urs Qigon	20 g	

Fig. 2 Fatigue after Qigong intervention at follow-up (\leq 3 months)





Fig. 5 Anxiety after Qigong intervention at follow-up (\leq 3 months)

2.08 (95% CI 0.77 to 3.47). Figures 3 and 4 show the weighted mean differences (WMD) of Qigong on sleep quality at post-intervention and the mean change from baseline to post-intervention (*Z* scores = 24.78 and 4.02, respectively; ps < 0.0001). Figures 5, 6, 7, 8, and 9 show the effects of anxiety, stress, depressive symptoms, cognitive function, and quality of life in favor of the Qigong or Qigong plus Tai Chi group, but there were no statistically significant differences (p = 0.32, 0.06, 0.29, 0.05, and 0.17, respectively).

Discussion

Integrative oncology addresses the holistic cancer experience by viewing the individual as a whole and recognizing the mind-body connection [20]. Qigong is a system of mindbody exercises that integrate physical postures of movement, focused attention of meditation, and controlled breathing to restore and potentiate the whole person [21•]. A previous meta-analysis included RCTs published before 2014 and concluded that Qigong/Tai Chi had positive effects on fatigue, immune function, and cortisol levels of cancer patients, with clinically meaningful and statistically significant benefits on cancer-specific QOL following Qigong intervention [5•].

Findings of this updated meta-analysis indicate there were statistically significant and clinically meaningful effects in favor of Qigong/Tai Chi interventions for symptoms of fatigue and sleep quality. There were positive trends, but not statistically significant effects, observed for anxiety, stress, depressive symptoms, and overall QOL. Cancer-related cognitive impairment, a common complaint among cancer survivors, has received increasing attention in recent years [2]. There were three trials that examined the effects of Qigong interventions on cancer patients



Fig. 6 Stress after Qigong intervention at follow-up (\leq 3 months)



Fig. 7 Depression after Qigong intervention at follow-up (≤ 3 months)



Fig. 8 Cognitive function after Qigong intervention at follow-up (\leq 3 months)

[9, 11, 16]. Patients reported an improvement in cognitive function, but the pooled effects on cancer patients' cognitive function show a non-significant trend in favor of Qigong intervention. Mechanistic explorations of how Qigong is effective at reducing cancer-related symptoms may include "(1) psychoneuroimmunology, which is the study of mind-body interactions and their influence on the immune system [22]; (2) the relaxation response effect [23]; and (3) the effects of epigenetics, including biological, environmental, emotional, lifestyle, and belief factors that influence genetic expression [24]."

Assessing the risk of bias in the included trials was limited to key design features, such as randomization, blinding, and selective outcome reporting. Future studies should report features specifically relevant to Qigong studies, including intervention details and the validity of Qigong training protocols. According to the findings of this review, there are advances in methodological development applying sham Qigong as a control for blinding participants [15, 16], which could allow clinical trials to better evaluate Qigong-specific effects in cancer care. In addition, the total duration of the interventions varied from 3 to 12 weeks. In addition, with variations in session frequency, future research should assess the appropriate Qigong dosage for cancer patients in terms of session frequency, session intensity, and total number of sessions. Finally, this review pooled results that included patients with all types of cancer, and limited recommendations on the benefits of Qigong/Tai Chi for specific cancer populations.

Conclusion

This review provides updated evidence on the short-term effectiveness of Qigong/Tai Chi in ameliorating fatigue, sleep quality, anxiety, stress, depressive symptoms, cognitive function, and overall quality of life in cancer patients. While the pooled effects of these study outcomes were all in favor of Qigong/Tai Chi intervention, there were statistically significant effects observed on symptoms of fatigue and sleep quality. Further methodologically sound trials with longer follow-up periods and more active control conditions are required before definitive conclusions can be recommended for cancer patients.



Fig. 9 Overall quality of life after Qigong intervention at follow-up (≤ 3 months)

Compliance with Ethical Standards

Conflict of Interest Yingchun Zeng, Xiaohua Xie, and Andy S.K. Cheng declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

References

Papers of particular interest, published recently, have been highlighted as:

- Of importance
- •• Of major importance
- Siegel RL, Miller KD, Jemal A. Cancer statistics, 2018. CA Cancer J Clin. 2018;68:7–30.
- Wefel JS, Kesler SR, Noll KR, Schagen SB. Clinical characteristics, pathophysiology, and management of noncentral nervous system cancer-related cognitive impairment in adults. CA Cancer J Clin. 2015;65:123–38.
- 3.• Wayne PM, Lee MS, Novakowski J, Osypiuk K, Ligibel J, Carlson LE, et al. Tai chi and qigong for cancer-related symptoms and quality of life: a systematic review and meta-analysis. J Cancer Surviv. 2018;12(2):256–67 This review is of importance as it provides recent summary of the benefits of tai chi and qigong in cancer.
- 4.• Carlson LE, Zelinski E, Toivonen K, Flynn M, Qureshi M, Piedalue KA, et al. Mind-body therapies in cancer: what is the latest evidence? Curr Oncol Rep. 2017;19(10):67 This review is of special importance as it provides recent and comprehensive summary of the benefits of all mind-body therapies in cancer care.
- 5.• Zeng Y, Luo T, Xie H, Huang M, Cheng AS. Health benefits of qigong or tai chi for cancer patients: a systematic review and meta-analyses. Complement Ther Med. 2014;22(1):173–86 This study is of special importance as this updated review is based on this review, which provides its depth and breadth of outcomes associated with the health benefits of Qigong/Tai Chi in cancer care.
- 6.• Greenlee H, DuPont-Reyes MJ, Balneaves LG, Carlson LE, Cohen MR, Deng G, et al. Clinical practice guidelines on the evidence-based use of integrative therapies during and after breast cancer treatment. CA Cancer J Clin. 2017;67(3):194–232 This review is of importance because it provides a comprehensive resource of integrative therapies in cancer care.
- Jahnke R, Larkey L, Rogers C, Etnier J, Lin F. A comprehensive review of health benefits of qigong and tai chi. Am J Health Promot. 2010;24(6):e25.
- Campo RA, Agarwal N, LaStayo PC, O'Connor K, Pappas L, Boucher KM, et al. Levels of fatigue and distress in senior prostate cancer survivors enrolled in a 12-week randomized controlled trial of qigong. J Cancer Surviv. 2014;8(1):60–9.
- 9. Chuang TY, Yeh ML, Chung YC. A nurse facilitated mind-body interactive exercise (Chan-Chuang Qigong) improves the health

status of non-Hodgkin lymphoma patients receiving chemotherapy: randomised controlled trial. Int J Nurs Stud. 2017;69:25–33.

- Loh SY, Lee SY, Murray L. The Kuala Lumpur qigong trial for women in the cancer survivorship phase-efficacy of a three-arm RCT to improve QOL. Asian Pac J Cancer Prev. 2014;15(19): 8127–34.
- Myers JS, Mitchell M, Krigel S, Steinhoff A, Boyce-White A, Van Goethem K, et al. Qigong intervention for breast cancer survivors with complaints of decreased cognitive function. Support Care Cancer. 2018. https://doi.org/10.1007/s00520-018-4430-8.
- Oh B, Butow P, Boyle F, Costa DSJ, Pavlakis N, et al. Effects of qigong on quality of life, fatigue, stress, neuropathy, and sexual function in women with metastatic breast cancer: a feasibility study. Int J Phys Med Rehabil. 2014;2:217.
- Vanderbyl BL, MayerMJ NC, Tran AT, Windholz T, Swanson T, et al. A comparison of the effects of medical qigong and standard exercise therapy on symptoms and quality of life in patients with advanced cancer. Support Care Cancer. 2017;25(6):1749–58.
- 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.
- Larkey LK, Roe DJ, Weihs KL, Jahnke R, Lopez AM, Rogers CE, et al. Randomized controlled trial of qigong/tai chi easy on cancerrelated fatigue in breast cancer survivors. Ann Behav Med. 2015;49(2):165–76.
- Larkey LK, Roe DJ, Smith L, Millstine D. Exploratory outcome assessment of qigong/tai chi easy on breast cancer survivors. Complement Ther Med. 2016;29:196–203.
- McQuade JL, Prinsloo S, Chang DZ, Spelman A, Wei Q, Basen-Engquist K, et al. Qigong/tai chi for sleep and fatigue in prostate cancer patients undergoing radiotherapy: a randomized controlled trial. Psychooncology. 2017;26(11):1936–43.
- Thongteratham N, Kanaungnit P, Olson K, Adune R, Dechavudh N, Doungrut W. Effectiveness of tai chi qi qong program for Thai women with breast cancer: a randomized control trial. Pac Rim Int J Nurs Res. 2015;19:280–94.
- Zhang LL, Wang SZ, Chen HL, Yuan AZ. Tai chi exercise for cancer-related fatigue in patients with lung cancer undergoing chemotherapy: a randomized controlled trial. J Pain Symptom Manag. 2016;51(3):504–11.
- Rosenthal DS, Doherty-Gilman AM. Integrative medicine and cancer care. Virtual Mentor. 2011;13:379–83.
- 21.• Klein P, Qigong in cancer care: theory, evidence-base, and practice, Medicines (Basel) 2017; 4(1). This study is noteworthy because it provides theory and evidence-base of how Qigong works.
- 22. Adler R, Felten DL, Cohen N. Psychoneuroimmunology. 4th ed. San Diego: Academic Press; 2007.
- 23. Benson H. The relaxation response: updated and expanded. New York: Harper Collins; 2008.
- Grolleau-Julius A, Ray D, Yung RL. The role of epigenetics in aging and autoimmunity. Clin Rev Allergy Immunol. 2010;39: 42–50.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.