

Effects of Qigong on symptom management in cancer patients: A systematic review



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ARTICLE INFO

Article history:

Received 4 August 2017

Accepted 5 September 2017

Keywords:

Qigong
Symptom
Cancer

ABSTRACT

Purpose: Qigong as a complementary and alternative therapy is often used by cancer patients for symptom management. The aim of this systematic review is to critically evaluate the effectiveness of Qigong on symptom management among cancer patients.

Methods: A systematic search was conducted in the following databases from their inception through May 2016: Cochrane Library, PubMed/MEDLINE, CINAHL, PsycINFO, PEDRO. All controlled clinical trials of Qigong among cancer patients were included. The strength of the evidence was evaluated for all included studies using the Oxford Centre for Evidence-based Medicine Levels of Evidence. The risk of bias was assessed using the Cochrane Collaboration's Tool for Assessing Risk of Bias.

Results: Twenty-two studies including fifteen randomized controlled trials and eight controlled clinical trials examined the efficacy of Qigong in symptom management among patients with various cancers. Results of these studies indicated that symptoms in the Qigong group were significantly improved or there was an observed positive trend from pre-to post-interventions scores for physical symptoms and psychological symptoms.

Conclusion: The effectiveness of Qigong as a health practice adopted by cancer patients to manage their symptoms during their cancer journey is not proven, but there are promising results that need further verification in future research.

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1. Introduction

Due to advances in medical technology and cancer treatments, the prognosis associated with cancer has improved markedly. The estimated 5-year survival rate across all cancers has risen to about 66% [1]. These successes have been achieved largely as a result of aggressive interventions including surgery, chemotherapy, and radiation therapy. Diagnosis and treatment of cancer represent a major lifetime stressor for any patient, posing both physical and psychological threats to the patient [30,35,36]. Symptomatic problems in cancer vary extensively but often include pain, fatigue, weakness, anorexia, lack of energy, nausea, dry mouth, constipation, early satiety, dyspnea, vomiting [3] all of which can have a significant impact on a cancer patient's quality of life [2,11,12,24,28,29,33–36,38,52]. Therefore, approaches to help patients effectively manage cancer symptoms form an important element of cancer care.

Symptom management is to prevent or treat the symptoms of a disease, address the side effects caused by the treatment of a disease and reduce any psychological, social and spiritual problems related to the disease as early as possible [32]. Most cancer patients experience multiple symptoms related to either the cancer itself or side effects of prolonged chemotherapy, radiotherapy, and/or surgical treatment. Cancer patients therefore often turn towards complementary or alternative therapies to manage such symptoms [5,26,54]. The frequently experienced and severe adverse events associated with such treatments lead patients to seek supportive complementary and alternative medicine (CAM) [41]. The results of many studies showed that rates of CAM used are especially high among USA patients with a serious illness such as cancer. Several surveys reported CAM usage by 53–88% of cancer patients and showed that CAM is usually combined with conventional treatments [4,35,36,43].

Non-pharmacological interventions typically encompass a broad range of psychosocial, behavioral and environmental strategies that may complement conventional treatment to manage symptom and enhance QOL for cancer patients [47]. Qigong as a complementary and alternative modality of traditional Chinese form is often used by cancer patients to manage their symptoms [6]. Qigong has been developed and often used in cancer treatment [25]. Qigong consists of a series of simple, repeated practices including body posture or/and movements, breathing practice, and meditation performed in synchrony [8]. These exercises consist mostly of gentle movements (with some vigorous and shaking movements in addition to quiet, stillness practice) designed to attain deeply relaxed states. Globally, Qigong is practiced in a variety of modern and traditional forms. Despite variation among the myriad styles, Qigong is health oriented and emphasizes the same principles and practice elements [20,26].

Although neither Qigong itself nor the mechanism of its effect is understood within the paradigm of medical science, there are increased reports of its effects on human health [17]. In cancer care,

there have been several studies that have explored the use of Qigong in relation to symptom management [5]. Many positive health-related impacts from the use of Qigong have been reported in the literature, such as: improving depression, fatigue, anxiety, appetite, nausea and vomiting; and decreasing heart rate, decreasing blood pressure; lowering lipid levels, decreasing levels of circulating stress hormones, and improving immune function [10,26,38,43,48,54].

Several reviews claimed that Qigong offers therapeutic benefits for cancer patients. In a systematic review of controlled trials of Qigong in cancer patient care, two of nine trials indicated that Qigong may prolong the life of cancer patients [26]. A more recent systematic review of Qigong as a supportive measure for cancer patients included twenty-three trials and found some evidence that the immune function of patients was better than patients treated with conventional methods alone [12]. Likewise, a review of the benefits of Qigong for cancer survivors showed that it has therapeutic effects and suggested that it may be beneficial for cancer patients [48].

However, some other reviews have indicated that the evidence is not convincing enough to suggest that Qigong is an effective supportive cancer treatment [37,54]. Many of these purported outcomes are vaguely defined, and may overlap. There is also some concern over the safety aspects of Qigong [33], particularly when used with conventional cancer treatments such as chemotherapy and radiotherapy. Moreover, all the previous systematic reviews mentioned above explored the effectiveness of Qigong on a single symptom only or symptom distress in cancer patients. There is a lack of a review to examine the benefit of Qigong on a variety of symptoms in cancer patients and synthesis the broader picture of Qigong available evidence. Also, several new studies were published since the last published review. Hence, a thorough systematic review of the evidence is necessary to provide healthcare professionals with the information on which to base clinical judgments.

1.1. Review question

The aim of this systematic review is to critically evaluate the effectiveness of Qigong on symptom management in cancer patients. The specific questions addressed are:

- Does Qigong reduce physical symptoms?
- Does Qigong reduce psychological symptoms?
- Does Qigong improve the quality of life?
- Does Qigong produce any unwanted side effects?

1.2. Inclusion criteria

- Randomized controlled trials (RCTs), clinical trials (quasi-experimental trials and trials where there was a comparison

group but no mentioning of randomization), and feasibility trials involving adult participants (with 18 years old and above) with a diagnosis of cancer and receiving care in any healthcare setting.

- Eligible intervention: Trials that were comparing Qigong interventions with usual care, placebo or other intervention to manage symptoms in cancer patients. Trials which tested Qigong intervention that is initiated during or after cancer treatment.
- Eligible outcomes were patient-reported physical symptoms (fatigue, pain, dyspnea, and weakness, lack of energy, nausea, dry mouth, constipation, early satiety, vomiting, and anorexia) and/or psychological symptoms (depression, anxiety, and mood disturbance) and quality of life (using reliable and valid assessment tools). All studies were required to report the above symptoms as a primary or secondary outcome and studies including outcome measures of symptoms either as continuous measures or as dichotomous outcomes were included.

1.3. Exclusion criteria

- Trials that involved people who were receiving hospice care, or were at the end of their life.
- Observational and other types of studies such as prospective and retrospective cohort studies, case-control studies, qualitative studies, and analytical cross-sectional studies.

1.4. Primary and secondary outcomes of this systematic review

Primary outcomes for this review were changes in physical symptoms (fatigue, pain, dyspnea, weakness, lack of energy, nausea, dry mouth, constipation, early satiety, vomiting, and anorexia) or psychological symptoms (depression, anxiety, and mood disturbance) and quality of life related to cancer patients who had undertaken a Qigong intervention, compared to those who had not. Secondary outcomes for this review were adverse events, referring to any harm caused to participants from the Qigong intervention.

1.5. Search strategy

The search strategy aimed to find both published and unpublished studies. A three-step search strategy was utilized in this review. An initial limited search of MEDLINE and CINAHL was undertaken followed by analysis of the text words contained in the title and abstract, and of the index terms used to describe an article. A second search using all identified keywords and index terms was undertaken across all included databases: Cochrane Library, PubMed, MEDLINE, CINAHL, PsycINFO, PEDRO. Thirdly, the reference lists of all identified reports and articles were searched for additional studies. Studies published in The Chinese Clinical Trial Registry (<http://www.chictr.org.cn>) and trial registry of the US National Institutes of Health (<http://clinicaltrials.gov>) were considered for inclusion in this review. The databases were searched including electronic databases from their inception through December 2015.

1.6. Assessment of methodological quality

Research papers were selected for retrieval, based on assessment for inclusion, were assessed by two reviewers independently using the Cochrane Collaboration's Tool for Assessing Risk of Bias [46]. This mainly consists of seven domains:

Random sequence generation (for checking potential selection bias); Allocation concealment (for checking potential selection bias); Blinding of participants and personnel (for checking potential performance bias); Blinding of outcome assessment (for checking potential detection bias); Incomplete outcome data (for checking potential attrition bias); Selective reporting (for checking potential reporting bias);

1.7. Other bias

Any disagreement between the reviewers about the criteria or level of bias were discussed until a mutual decision was reached, or with the arbitration of a third reviewer. Where necessary the study authors were contacted to obtain more detailed information. Assessment of the reliability and validity of the assessment tools were based on the information provided in each report.

1.8. Quality appraisal

The strength of the evidence was evaluated for all included studies using the Oxford Centre for Evidence-based Medicine Levels of Evidence [40]. This mainly consists of ten domains:

- (1a) Systematic review (with homogeneity) of inception cohort studies; Clinical Decision Rule validated in different populations;
- (1b) Individual inception cohort study with >80% follow-up; Clinical Decision Rule validated in a single population;
- (1c) All or none case-series;
- (2a) Systematic review (with homogeneity) of either retrospective cohort studies or untreated control groups in RCTs;
- (2b) Individual cohort study (including low-quality RCT; e.g., <80% follow-up);
- (2c) "Outcomes" Research; Ecological studies;
- (3a) Systematic review (with homogeneity) of case-control studies;
- (3b) Individual Case-Control Study;
- (4) Case-series (and poor quality prognostic cohort studies);
- (5) Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles".

1.9. Data extraction

Data from included studies were extracted independently, discussed and collected by two reviewers using a data extraction form. For each eligible study, the following information were extracted and recorded: (1) Name of first author and country, (2) year of publication, (3) participants' characteristics (4) sample size (5) intervention and control group information, (6) duration of intervention, (7) primary and all other outcome measures, and (8) results.

1.10. Data synthesis

The Cochrane Collaboration's Review Manager (RevMan 5.3) was used to generate pooled estimates of effect size. All results were subject to double data entry. Where statistical pooling was not possible the findings were presented in a narrative form including tables and figures to aid in data presentation where appropriate. For continuous variables, weighted mean differences were calculated when outcomes were measured using the same scale, and the standardized mean differences were used, with corresponding 95% confidence intervals. The following source of heterogeneity among included studies was presumed: types of intervention (Qigong), types of cancer.

2. Results

The search of the literature retrieved 2082 citations, of which 1816 records were excluded on the basis of the title and abstract alone because of non-relevance ($n = 1509$) or duplication ($n = 307$). The full texts of the remaining 266 articles were retrieved for more detailed evaluation and 244 papers were excluded because: 1) they included herbs or another medicine ($n = 113$); 2) Qigong was combined with other non-Qigong intervention ($n = 63$); 3) no relevant outcomes ($n = 22$); 4) Case study ($n = 7$); 5) insufficient information ($n = 39$). An additional three articles were gleaned from reference lists and incorporated, for a total of 22 studies included in this review (Fig. 1). Two papers reported the same findings of the same study that may be duplicate publication [28,29], and hence only one of these two papers was included in the analysis.

2.1. Study characteristics

Included reports covered the period from 1995 to 2015 and were conducted in Hong Kong, China, Taiwan, Malaysia, South Korea, United States, Israel, and Australia. The trials comprised 1751 patients including breast cancer, prostate cancer, gynecological cancer, nasopharyngeal cancer, unresectable hepatocellular carcinoma, metastatic colon cancer, non-Hodgkin's lymphoma, advanced lung cancer, and gastrointestinal cancer. Timing of interventions ranged from an early stage in the treatment through the recovery phase. The median intervention duration was six weeks (ranging from 3

weeks to 24 weeks). Supervised training frequency varied from one to three times per week (Table 1).

2.2. Risk of bias analysis

Each trial was evaluated in terms of its risk of bias (Fig. 2). Sixteen (73%) of the reports had a high risk of bias, and 6 (27%) low risks of bias. Major sources of risk of bias were a lack of blinding, allocation concealment, and incomplete outcome data. Of twenty-two studies, only twelve (55%) studies described the method of blinding and methods of allocation concealment (Fig. 3). Less than half of the twenty-two reports provided specified numbers and reasons for drop-outs by each subject group. No more than 30% of the twenty-two reports provided information on the method of randomization used.

2.3. Effects of the Qigong on symptom management

Effects are described according to outcome measures: symptoms including fatigue (10/22), sleep disturbance (3/22), pain (3/22), depression (2/22), anxiety (2/22), dyspnea (2/22), strength, appetite, diarrhea or irregular defecation (2/22), mood disturbance (1/22), neuropathy symptoms and sexual function (1/22), and overall QOL (10/22 of the comparisons), other clinical outcomes involving vital capacity (3/22) and body mass index (BMI) (3/22). Nineteen studies evaluated two or more outcomes (Table 1).

Twenty-two studies including fourteen randomized trials and 8 controlled clinical trials examined the efficacy of Qigong in

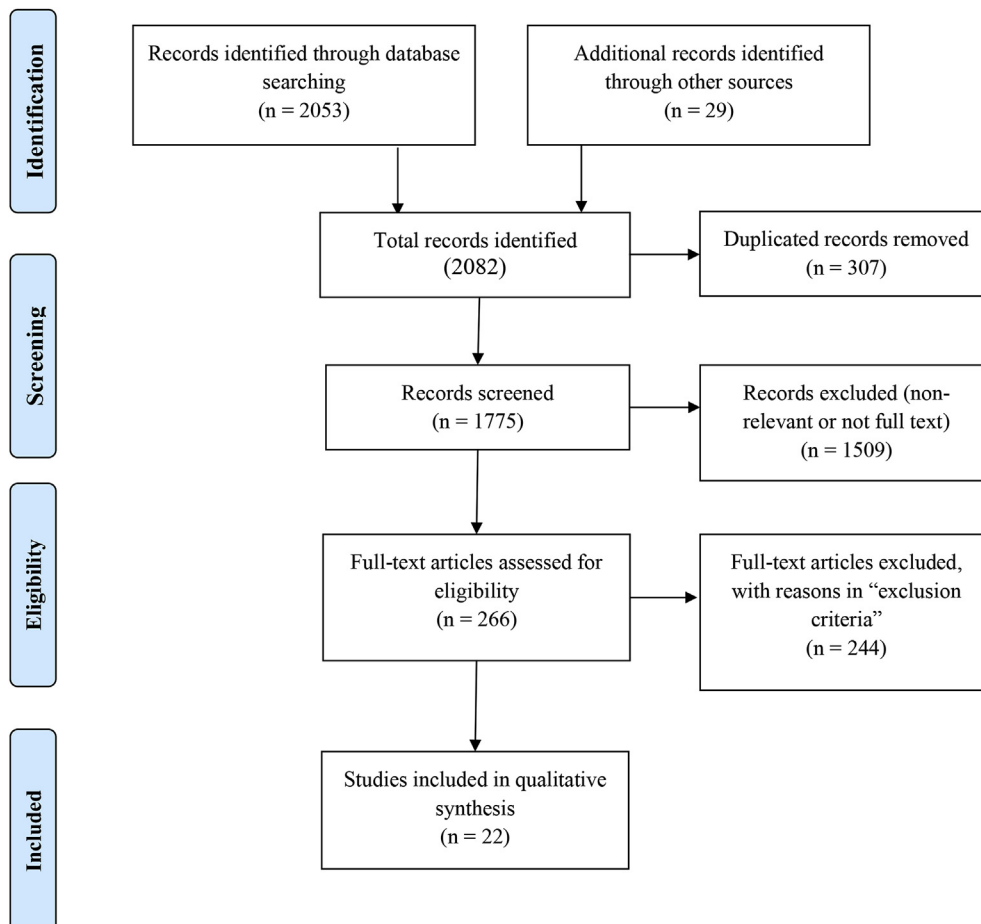


Fig. 1. PRISMA flow diagram of study selection.

Table 1
Descriptive Summary of Studies Included in the systematic review (n = 23).

Author, Year, and Country	Design	Diagnosis	Sample size In number of subjects	Intervention/ Duration/follow	Time intervention	Control Condition	Outcome measures	Results	Adverse effect	Level of evidence
[4] USA	RCT	Prostate cancer	P = 40 QC: 20/ 16 CG: 20/ 13	Tai –chi Qigong 60 min/session, 2 times per week 12 weeks	Cancer survivors	Nonaerobic Stretching	1) Fatigue (FACTIT –F) 2) Distress (BSI –18)	1) p = 0.02 2) p < 0.05	Safe and feasible	A (2b)
[7] China	RCT	Breast cancer	P = 96 QG: 49 CG: 47	Guolin new Qigong 40 min/session, 5 times per week 6 weeks	Receiving 5–6 weeks Radiotherapy	waiting-list with usual care	1) Depressive symptoms (CES-D) 2) Fatigue (BFI) 3) QOL (FACT-G) 4) Sleep disturbances (PSQI) 5) Cortisol rhythm	1) p = 0.04 2) p < 0.01 3) p < 0.05 4), 5) No significant changes	No reports	A(1b)
Israel	RCT	Gynecological cancer	P = 60 TC/QG: 30 CG: 30	Tai-chi/Qi-gong 45 min/section once a week for 10 weeks	Receiving first or second line of CT	Usual medical care	1) Overall QOL (FACT-G) 2) Fatigue (LFS)	1) p < 0.05 2) P < 0.05	No reports	A(2b)
[11] Hong Kong	CCT	Breast cancer	P = 23 QG: 11 CG: 12 HT CG: 16	18 forms Tai-chi internal Qigong Unclear about duration 6 months	Cancer survivors	Usual medical care	1) Muscular strength 2) QOL (FACT-B)	1) Significantly improved 2) No significant changes	No reports	B(2b)
[12] Hong Kong	CCT	Nasopharyngeal Cancer	P = 52 QC: 25 CG: 27	18 forms Tai-chi internal Qigong 90 min/section weekly 6 months	Completed all cancer treatments	Usual medical care	1) Fatigue 2)QOL (QLQ-C30 and QLQ-H&N35) 3) Pain 4) Dyspnea	All with no significant changes	Safe and feasible	B(2b)
[10] Hong Kong	RCT	Nasopharyngeal Cancer	P = 52 QC: 25 CG: 27	18 forms Tai-chi internal Qigong 90 min/section weekly 6 months	Completed all cancer treatments	Usual medical care	1) Flexion ROM 2) TMJ mobility 3) Sleep disturbance	1) p < 0.008 2) p = 0.70 3) p = 0.037	No reports	A (1b)
[15] China	RCT	Gastric cancer	P = 20 QG: 10 CG: 10	Qigong exercise (3 times daily) 4 weeks	Unclear about time of intervention	Usual care	1) Physical function 2) Symptoms	1) Response rate: p = 0.54 between the two groups. 2) Symptoms improved significantly (p-value not reported): QG: 80% CG: 70%	No report	B (2b)
[14] China	RCT	Late stage Stomach Cancer	P = 40 QG 22 CG18	Qigong plus herbal medicine Unclear about duration 3 months	Unclear about time of intervention	Herbal medicine	1) x-ray, CT or Ultrasound to measure tumor size 2) symptoms checklist & quality of life	1) No Significant changes 2) p < 0.05	No report	B (2b)
[18] South Korea	CCT	Advanced gastric cancer	P = 24 CQ: 12 CG: 12	Yudong Kong exercise plus chemotherapy 15–20 min, twice per day 8 weeks	Unclear about time of intervention	Usual care	1) Fatigue (Piper fatigue scale) 2) Physical functioning (PF, SF-36) 3) Chemotherapy side effects	1) p < 0.05 after 4 weeks, p < 0.01 after 8 weeks 2) p < 0.01 after 4 weeks, p < 0.001 after 8 weeks 3) Nausea and vomiting: p < 0.05 after 4 weeks, p > 0.05 after 8 weeks Stomatitis: p < 0.001 After 8 weeks	No report	B(2b)
[19] Taiwan	Qua-si CCT	Breast cancer	P = 95 SQC: 31 NSQG: 33 CG: 31	Sporting Qigong 30 min/3 times/week 3 months	During Chemotherapy	Non-sporting Qigong Post-surgical excise	1) Frailty (EFS) 2) Physical component 3) QOL (SF36-T)	1) p < 0.01 2) No Significant changes 3) p < 0.01	No report	B (2b)
[21] China	RCT	Hepatocellular carcinoma	P = 58 QG 29/ 13 CG 29/14	Guolin Qigong exercise plus TACE (2 h class, twice weekly for 6 weeks plus home based exercise, daily), 24 weeks	Unclear about time of intervention	TACE only	1) Survival rate 2) Quality of life (SF-36)	1), 2) No Significant changes	No report	A(2b)

(continued on next page)

Table 1 (continued)

Author, Year, and Country	Design	Diagnosis	Sample size In number of subjects	Intervention/ Duration/follow	Time intervention	Control Condition	Outcome measures	Results	Adverse effect	Level of evidence
[23] USA	RCT	Breast cancer	P = 101 QC/TCE: 49/42 SQG: 52/45	Qigong/Tai Chi Easy (QG/TCE) 60min/section Meeting twice/week in first two weeks Practice 30min/day 5 day/week 12 weeks	Completion of primary treatment	Sham Qigong (SQG)	1) Fatigue (FSI) 2) Depression (BDI) 3) Sleep disruption (PSQI)	1) 12 weeks (p = 0.005) 3 months (p = 0.024) 2) 12 weeks (p = 0.725) 3 months (p = 0.902) 3) 12 weeks (p = 0.136) 3 months (p = 0.239)	No report	A (1b)
[27] Taiwan	CCT	Breast cancer	P = 67 QG: 32 CG: 35	Chan-Chuang Qigong (15-60 min daily) 3 weeks (21 days)	Doing chemotherapy	Usual care	1) Symptom distress (Pain, numbness, heartburn and dizziness) 2) Psychological distress	1) p < 0.05 after intervention 2) Overall severity of psychological distress not improved (p > 0.05).	No report	B(2b)
[28] Malaysia	RCT	Breast cancer	P = 197 Qigong: 66 Placebo: 65 CG: 66	Zhi Neng Qigong 90 min/section 8 weeks Follow-up 12 months	Completed primary treatment	Placebo Usual care	1) QOL (FACT-B) 2) Distress (DASS) 3) Fatigue (FACIT-F)	1) QOL Qigong/Placebo p = 0.036 Qigong/Control p = 0.048 2) p > 0.05 3) p > 0.05	No report	A (1b)
[39] Australia	RCT	Metastatic Breast cancer	P = 27 MQ: 14 MC: 13 Follow-up < 80%	Medical Qigong 60 min/section 2 times/week 10 weeks	Unclear about time of intervention	Meditation	1) QOL (FACT-B) 2) Fatigue (FACT - F) 3) Stress (PSS) 4) Neuropathy symptoms (FACT/GOG-NTX) 5-7) Sexual function (SFQ)	1) QOL (p = 0.084) 2) Fatigue (p = 0.71) 3) Stress (p = 0.52) 4) Neuropathy symptoms (p = 0.014) 5) Sexual satisfaction (p = 0.55) 6) Sexual activities (p = 0.95) 7) Sexual relationship (p = 0.79)	Safe and feasible	A (1b)
[38] Australia	RCT	Various cancers	P = 81 QG: 37/23 CG: 44/31	Medical Qigong, 90-min/session, twice per week 10 weeks	Unclear about time of intervention	Usual care	1) Cognitive function (FACT-Cog) 2) QOL (FACT-G)	1) p = 0.014 2) p < 0.001	No report	A (1b)
[35,36] Australia	RCT	Various cancers	P = 162 QG: 79/54 CQ: 83/54	Medical Qigong exercise 90 min/section twice per week 10 weeks	Unclear about time of intervention	Usual medical care	1) Overall QOL (FACT-G) 2) Fatigue (FACT-F) 3) Mood disturbance (PMS)	1) Overall QOL improved (p < 0.001) 2) Fatigue improved (p < 0.001) 3) Mood disturbance improved (p = 0.021)	Safe and feasible	A (1b)
[34] Australia	RCT	Various cancer	P = 30 QG:15/8 CG:15/10	Medical Qigong exercise plus usual medical care (90 min, twice a week), 8 weeks	Unclear about time of intervention	Usual medical care	1) QOL (EORTC QLQ-C30), 2) Symptoms of the side effect of treatment	No significant difference between the two groups	No report	A (2b)
[45] Taiwan	CCT	Advanced stage of various cancers	P = 127 QG: 97 CG: 30	Qigong (2 h daily for 3 months), 3 months	Unclear about time of intervention	Usual medical care	1) Strength 2) Appetite 3) Diarrhea or defecation	All with significant difference (no p value reported)	No report	B(2b)
[50] China	CCT	Various cancers	P = 211 QG: 104 CG: 107	Qigong 2.5–3.5 months	Unclear about time of intervention	Usual medical care	1) Symptoms (strength, appetite, diarrhea or irregular defecation) 2) Body weight	1) p < 0.01 between the two groups 2) Increased more than 3 kg: 50.54% in QG and 13.33% in CG; Decreased more than 3 kg: 5.4% in QG and 30% in CG (p values not reported).	No report	B(2b)
[49] China	CCT	Various cancers	P = 80 QG: 40 CG: 40	Guo Lin Qigong 2.5–3.5 months	Unclear about time of intervention	Usual care	1) QOL 2) Depression 3) 6-min walking	1) p < 0.05 2) p > 0.05 3) p < 0.05	No report	B(2b)

Table 1 (continued)

Author, Year, and Country	Design	Diagnosis	Sample size In number of subjects	Intervention/ Duration/follow	Time intervention	Control Condition	Outcome measures	Results	Adverse effect	Level of evidence
[53] Taiwan	RCT	Non-Hodgkin's Lymphoma	P = 108 QG: 54 CG: 54	Chan – Chuang Qigong 3 weeks	During Chemotherapy	Usual care	1) Fatigue 2) Sleep quality (VSHSS)	1) p < 0.001 2) p < 0.001	No report	A (1b)

Quality of life Questionnaire – FACT-F: Functional Assessment of Cancer Therapy: Fatigue; BSI: Brief Symptom Inventory; CES-D: Centre for Epidemiologic Studies Depression Scale; BFI: Brief Fatigue Inventory; FACT-G: Functional Assessment of Cancer Therapy-General; PSQI: Pittsburgh Sleep Quality Index; LFS: Lee Fatigue Scale; FACT-B: Functional Assessment of Cancer Therapy-Breast; FACT-H&N: For patients with Head & Neck cancer; EORTC: European Organization for Research and Treatment of Cancer; SF-36: the MOS item short form health survey; EFS: Edmonton Frail Scale; FSI: Fatigue Symptom Inventory; BDI: Beck Depression Inventory; DASS: Distress Alerting Satellite System; PSS: Perceived Stress Scale; GOG-NTX: Gynecologic Oncology Group- Neurotoxicity; FACT-Cog: FACT-Cognitive Function; BMI: Body mass index; VSHSS: Verran and Snyder-Halpern Sleep Scale; TACE: Transcatheter arterial chemoembolization.

Level of evidence: A - Consistent level 1 studies; B - Consistent level 2 or 3 studies or extrapolations from level 1 studies; 1b = Individual RCT (with narrow Confidence interval), >80% follow-up; 2b = Individual cohort study (including low quality RCT; e.g., <80% follow-up).

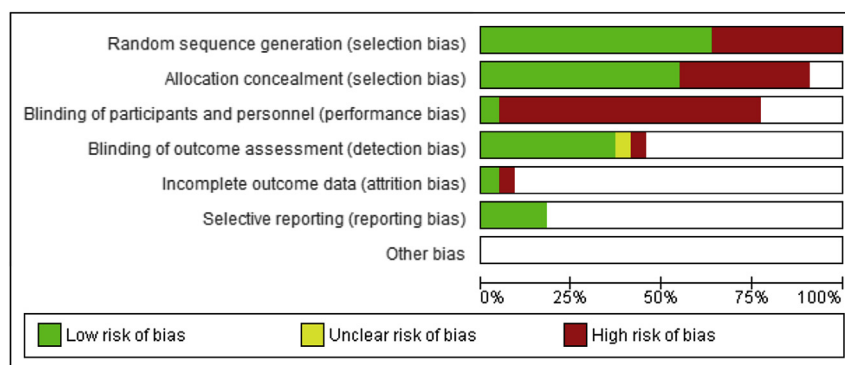


Fig. 2. Risk of bias graph.

symptom management among patients with various cancers. Results of these studies indicated that symptoms in the Qigong group were significantly improved at post-intervention compared with the control group or there was an observed positive trend from pre- to post-intervention scores for physical symptoms (fatigue, pain, dyspnea, weakness, lack of energy, nausea, dry mouth, constipation, early satiety, vomiting, and anorexia) or psychological symptoms (depression, anxiety, and mood disturbance) and quality of life related to cancer patients as primary or secondary outcomes.

2.4. Qigong protocols

Interventions varied among protocols. Specific styles or forms of Qigong intervention in included studies consisted of: General Qigong (ten studies), Medical Qigong (four studies), Guolin Qigong (three studies), Chan-Chuang Qigong (two studies), Zhi Neng Qigong (one study), Yudong Kong Qigong (one study), and sport Qigong (one study). All seven protocols were found to be effective for one or more major outcomes studied. Using the constant-comparative method of analysis, descriptions of effective protocols were qualitatively analysed for common constructs. Constructs were categorized into two major categories as content or logistic.

Content constructs addressed exercises or techniques performed as Qigong therapy. All effective intervention protocols employed some variations of slow exercise described and practiced as gentle, integrated, repetitious, flowing, weight-bearing movements. Each referred to a specific stylized form. Meditation/mindfulness training was described in six of seven protocols. Training in breath regulation was described in five of seven protocols.

Reference to energy cultivation was evident in four of seven protocols. Reference to relaxation or arousal state was made in three of seven protocols.

Logistic constructs address delivery management. All studies engaged experienced instructors certified or trained in the specific styles or forms of Qigong therapy employed in the respective study protocols. Three protocols described the instructor as a Qigong master. Home practice was reported in six of seven protocols. The home practice aids, described as DVDs or compact discs, were distributed in four of seven protocols. Some portions of the exercises were practiced as seated or accommodation for seated exercises were provided in three of seven protocols. Qigong therapy protocol constructs identified in the analysis and their frequency of use are presented in Table 2.

2.5. Primary outcomes

2.5.1. Physical symptoms

Fatigue was evaluated in ten reports involving 814 participants (four with General Qigong, three with Medical Qigong, one with Chan-Chuang Qigong, one with Guolin Qigong, and one with Yudong Kong Qigong). Qigong significantly lowered fatigue in seven studies [4,7,15,18,19,23]; [35,36]. Three trials involving 305 patients evaluated Qigong on sleep level using the Pittsburgh Sleep Quality Index (PSQI) and Verran and Snyder-Halpern Sleep Scale (VSHSS) as an outcome measure. A significant effect was only observed in one study [53]. There was no significant effect for this symptom in two studies [7,22]. Two studies including 82 patients [12,34] evaluated the impact of Qigong intervention on dyspnea (both using general Qigong). There was no significant effect for

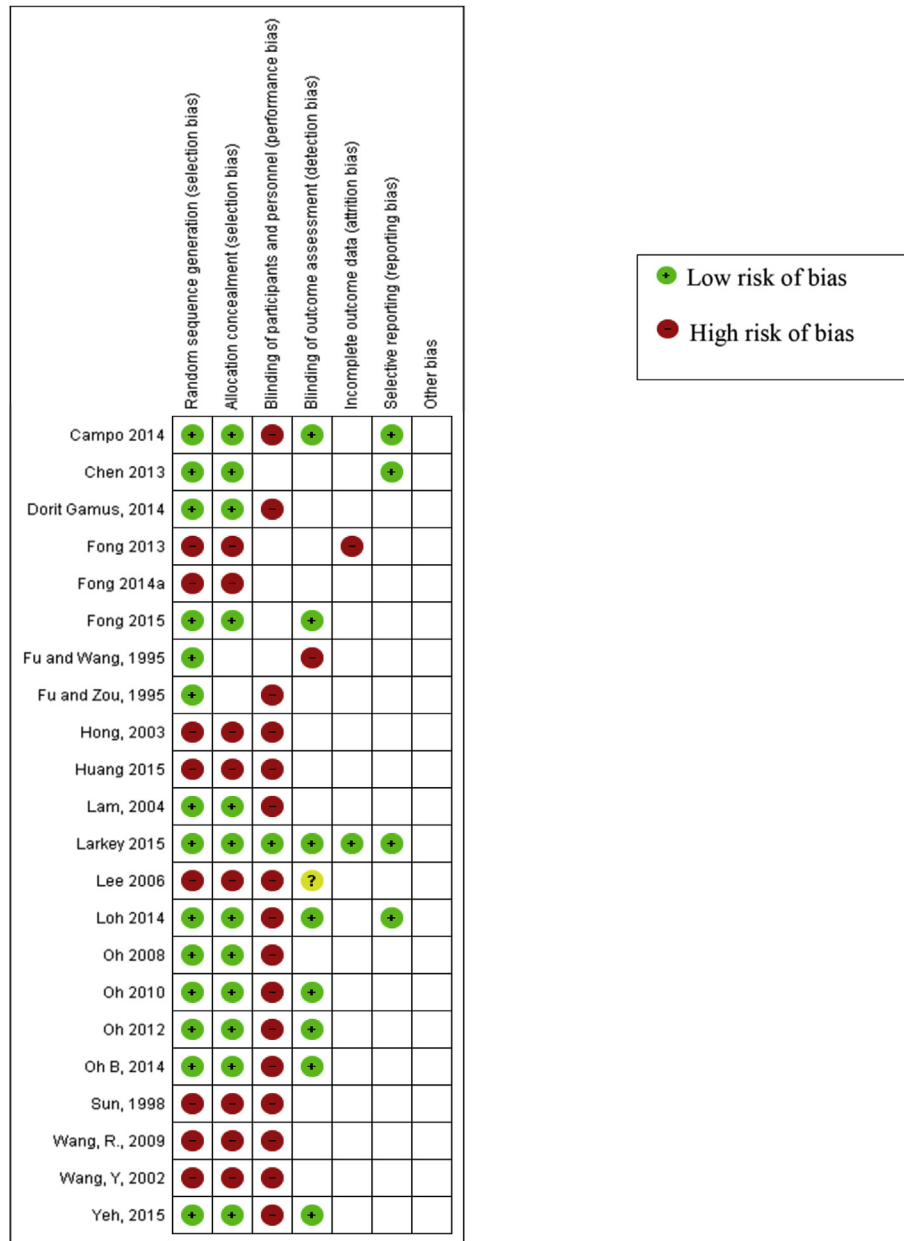


Fig. 3. Risk of bias summary.

Table 2

Content and logistic constructs identified through constant-comparison analysis and frequency of use extracted from data reported in seven Qigong protocols.

Constructs	Qigong Types						
	General Qigong	Medical Qigong	Guolin Qigong	Chan-Chuang Qigong	Zhi Neng Qigong	Yudong Kong Qigong	Sport Qigong
Gentle/integrated/repetitious/flowing/weight-bearing exercises	X	X	X	X	X	X	X
Stylized exercises	X	X	X	X	X	X	X
Meditation/mindfulness	X	X	X	X	X	X	X
Breath regulation		X	X	X		X	
Energy cultivation		X	X	X			X
Relaxation		X				X	X
Self-massage	X		X				
Logistic							
Qualified instructor	X	X	X	X	X	X	X
Home practice	X	X	X	X	X	X	X
Home practice aid		X	X	X	X		
Accommodation for seated exercises	X	X		X			

dyspnea symptom. There was also no significant effect of Qigong on pain in these two studies [12,34]; however, a significant effect was found in another study [27].

Qigong was found to be effective on improving strength, appetite, diarrhea or irregular defecation in one study [50]. In another study, there was no significant effect for diarrhea or irregular defecation [45].

2.5.2. Psychological symptoms

Qigong significantly lowered depression in one study [7]. In another two studies, there was no significant effect for this symptom [23,49]. There was no significant effect for anxiety in two other studies [27,28]. A significant effect was observed lower in one study [4]. Qigong significantly improved mood disturbance in only one study [35,36].

2.5.3. Quality of life

Cancer-specific QOL was measured by the FACT-G, FACT-B, SF-36 or EORTC QLQ-30 in ten studies. Multiple studies confirm that Qigong significantly improves QOL [7,14,28] [35,36]; [38,49], although four studies showed that there was no significant effect on QOL in some studies [12,21,33,34]. In addition, Guolin Qigong had no effect on QOL of hepatocellular cancer [21].

2.6. Secondary outcome

2.6.1. Safety and feasibility

Four studies [4,12,33,34] mentioned that Qigong intervention was safe, feasible and potentially efficacious in improving symptoms and functioning. No unwanted side effects were reported in the included studies.

2.6.2. Other clinical outcomes

Qigong had a significant effect on improving muscular strength [11], cervical spine range of motion and shoulder complex range of motion [10], frailty [19], cognitive function [38], 6-min walking [49]. One study [50] involving 211 patients assessed the effect of Qigong on the BMI of various cancer patients demonstrating a small significant effect.

There was no significant effect on other clinical outcome such as: Cortisol rhythm [7], temporomandibular joint mobility [10], tumour size [14], and survival rate [21]. Another report [33] evaluated the effect of Qigong on neuropathy symptoms and sexual function (SFQ); a significant effect was observed on neuropathy symptoms only.

3. Discussion

This is an updated systematic review on the effects of Qigong on symptom management and QOL in patients with cancer. We searched for all the reports in which the interventions were used in clinical cancer trials published prior to December 2015. This systematic review identified 22 trials (covering 1751 patients) reporting comparisons of treatment against either standard medical care or active control. Although we retrieved studies from many countries around the world and regardless of whether the paper was published in English, more than half of the 22 studies were performed in China, Hong Kong, and Taiwan. Whereas the studies covered various cancer sites and treatments, the evidence clearly clustered in studies of breast cancer. Intervention duration ranged from three weeks to six months. Different types and stages of disease were used among and even within studies; the studies recruited more than nine types of cancer patients.

Content constructs of Qigong characterized as gentle, integrated, repetitious, flowing, weight-bearing movements which can

accommodate varying levels of activity tolerance. Additional content constructs included breath regulation, mindfulness and meditation, energy cultivation including self-massage, and emphasis on relaxation. No conclusions can be suggested regarding the superiority of one Qigong style or form over another. Rather, a plurality of adapted Qigong is supported. Qigong programmes were designed by a Qigong master [34] and positive results were found for each. While Guolin Qigong, used in three studies, often includes repetition of gentle exercise patterns and self-massage, it is primarily a stylized walking program. Skills of mindfulness, relaxation, breath regulation and intent are more readily mastered when learning and performing relatively simple movements as compared to more complex movement patterns.

Logistical considerations include instruction by qualified instructors, home practice, and accommodation for compromised activity tolerance. Beyond instructor training in Qigong style and energy cultivation, knowledge of special considerations associated with this specific clinical population is advised. Qigong is likely to need adaptation by individuals with physical limitations.

Improved quality of life can have great importance in the day-to-day life of those experiencing cancer. The overall QOL of cancer patients was evaluated by various tools, including primarily the FACT-G, SF-36, FACT-B, EORTC QLQ-C30, and other QOL tools that were used no more than once. Clinical treatment varied among studies ranging from surgery, radiotherapy, various regimens of chemotherapy, cancer survivors and various combinations of them. The number of subjects in some studies was generally small; the smallest sample size was only ten participants. Therefore, the reliability of the evidence presented in the studies is clearly limited.

Results of the studies reviewed indicated that some symptoms in the Qigong group were significantly improved at post-intervention compared with the control group or some symptoms were not significantly improved but there was an observed positive trend from pre-to post-interventions scores. Findings are a meaningful contribution to our understanding of what Qigong may bring to the care of cancer patient's recovery from symptom distress.

Although these results are positive and promising, still there are some limitations such as high risk of bias and low follow-up rate (from 63 to 87%). Major sources of risk of bias were related to allocation concealment, blinding study subjects for research personnel, and random sequence generation. Only a few studies described the method of randomization, the quality and the dosage of Qigong intervention in detail and addressed incomplete outcome data with intention-to-treat analysis. Despite the difficulties of blinding participants and intervention delivery, some trials attempted to blind the outcome assessors to minimize potential methodological biases.

The risk of bias was present in many trials. Over 70% of the studies were burdened with a high risk of bias; only six (27%) had a low or moderate risk of bias. Only 20% provided information regarding adequate concealment of the randomization sequence and methods of blinding. Because of the nature of Qigong, it may be difficult to blind participants to intervention delivery. Few trials attempted to blind the outcome assessors to minimize potential methodological bias. Therefore, bias may affect most of the trials. Although the lack of allocation concealment and blinding may be associated with exaggerated effect estimates for subjective outcomes, the degree of bias seems to be rather limited [51].

Incomplete follow-up data pose another problem, although this may be caused by the unfavorable prognosis inherent in many cancer diagnoses. Selective outcome reporting was present in one-third of the studies, sometimes precluding the quantitative analysis of effects [44]. Because unreported outcomes were often non-significant, this may have inflated the effect sizes [9]. Low compliance with protocols and lack of motivation to continue

participating influence intervention impact and can be other potential sources of bias and also an indicator that the intervention is inappropriate for the recruited subjects.

Many studies included only small samples, thus raising the issue of insufficient power [31]. However, small studies often produce larger effects than large studies do. Moreover, those studies investigated the short-term benefits of the Qigong intervention but not the long term. Further studies with a larger sample size and including objective outcomes are needed to validate results and identify the mechanisms by which components of Qigong contribute to positive results. This may provide additional information that may assist patients with cancer and clinicians in providing optimal comprehensive cancer care.

Limitations of this systematic review, in general, pertain to the potential incompleteness of the evidence reviewed. Although an attempt was made to retrieve both published and unpublished research and to conduct a comprehensive search, some studies may have been missed. Moreover, some of the identified studies could not be retrieved. The main reasons for conducting systematic reviews are to increase power, improve precision, answer questions not asked by individual studies, settle controversies arising from conflicting results, and generate new hypotheses [16]. The meta-analysis was not appropriate in this systematic review due to lack of input data for analysis from included studies. In our review, for the evaluation of the effect of Qigong on neuropathy, for example, the conclusions are from only one RCT with small sample size (14 patients); and therefore, the conclusions can only be tentative.

Future RCTs of Qigong for symptoms and QOL of cancer patients should adhere to accepted standards of trial methodology. Furthermore, even though it is difficult to blind subjects to some forms of interventions, employing assessor blinding is important for reducing bias. We recommend that future publications give detailed information of randomization methods including sequence generation and randomization concealment and blinding information, including whether blinding is used and who was blinded, if available. Detailed reporting according to the requirements presented by the CONSORT statement will make it easier to reach a clear conclusion regarding study quality [42].

4. Conclusion

This systematic review included twenty-two studies (fourteen randomized trials and 8 controlled clinical trials), examining the efficacy of Qigong in symptom management among patients with various cancers. Symptoms in the Qigong group in many but not all studies were significantly improved at post-intervention compared with the control group or there was an observed positive trend from pre- to post-interventions scores for physical symptoms or psychological symptoms and quality of life related to cancer patients.

Due to the limited number of Qigong trials, methodological problems and high risk of bias in the included studies, the effectiveness of Qigong as a health practice adopted by cancer patients to manage their symptoms during their cancer journey is not proven, but there are promising results. Therefore, further well-designed large-scale placebo-controlled, randomized studies with validated outcome measures are particularly needed.

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