

Table 1: Controlled clinical trials of tai chi for cancer

Source: Ava Lorenc, Helen Cooke, CAM-Cancer Consortium. [Tai chi \[online document\]](#). March 2019.

Outcome	First author (year) [ref]	Study design	Participants (number, diagnosis)	Interventions (experimental treatments, control)	Main outcome measures	Main results	Comments
Cancer-related fatigue	Zhou 2018 [18]	RCT	Nasopharyngeal Carcinoma patients undergoing Chemoradiotherapy (n=83)	1. Tai chi 2. Usual care	1. Multidimensional fatigue symptom Inventory short form (MFSI-SF) 2. heart rate variability parameters	Tai chi group had lower MFSI-SF total score and three negative subscale (general, physical, and emotional fatigue) scores and higher vigour score compared to control (all p<0.01).	Small sample size (not powered) and quite high dropout (n=31; although ITT analysis used). Randomisation seems adequate. Very short follow-up (immediately after chemoradiotherapy completed). Tai chi taught by professionals who learned it only for the study.
Insomnia	Irwin (2017) [10]	Non-inferiority RCT	Breast cancer survivors with insomnia (n=90)	1. Tai chi 2. CBT-I (Cognitive Behavioural Therapy for Insomnia)	1. Pittsburgh Sleep Quality Index 2. Clinician-assessed remission of insomnia 3. Sleep diaries 4. Polysomnography 5. Symptoms	Tai chi was noninferior to CBT-I at 15 months (p=0.02) and at months 3 (p=0.02) and 6 (p<0.1). Tai chi and CBT-I both showed similar robust improvements in sleep quality, sleep diary measures, and related symptoms.	Long follow-up. Evaluated treatment fidelity and credibility. Powered sample size. High drop-out in tai chi group possibly due to difficulties practising at home).
Immuno-logical/ blood pressure	Campo (2015) [9]	RCT (feasibility)	Women (senior breast cancer survivors) (n=63)	1. Tai chi 2. Health Education Control (HEC)	Blood pressure Salivary cortisol Inflammatory cytokines Tumour necrosis factor	Tai chi group had significantly lower systolic blood pressure (p=0.002) and cortisol area-under-curve (p=0.02) at post-intervention than the Health Education Control group. There was no intervention effect on inflammatory cytokines (p>0.05).	Very short follow-up (1-week post intervention) Cortisol results limited by single-day rather than multiple day collection

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Immune function	Liu, (2015) [11]	RCT	Non-small cell lung cancer patients (n=27)	<ol style="list-style-type: none"> Tai chi and hospital care Hospital care 	Mono nuclear cell function blood tests	Tai chi significantly promoted PBMC proliferation and cytotoxicity against NSCLC tumor cells ($p < 0.05$). No significant difference in percentage of NKT, CD123+ and CD11c + dendritic cells between the two groups, with the exception of NK cells at 16 weeks that demonstrated a significant increase in tai chi group compared to control group.	<p>Small sample size</p> <p>16-week intervention may not be long enough to see any significant changes in NKT and DC cells.</p>
Immune function/ inflammation	Irwin (2014) [12]	RCT	Breast cancer patients with insomnia (n= 90)	<ol style="list-style-type: none"> Tai chi Cognitive behavioural therapy 	Immune and inflammatory markers	<p>Levels of CRP did not change from baseline to posttreatment in the two groups (CBT-I $p=0.13$, tai chi $p=0.44$),</p> <p>Decreased TLR-4-activated monocyte production of IL-6 and TNF, as well as reduced expression of genes encoding pro-inflammatory mediators and increased expression of genes involved in antiviral responses in peripheral blood mononuclear cells from tai chi-treated cancer survivors.</p>	<p>Lack of change in CRP results may have been due to short intervention time. (16 weeks)</p> <p>Participants were aware of their intervention assignment, which may have introduced bias in the results, although expectancy for benefit was similar in the two groups.</p>

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Joint mobility/sleep	Fong (2015) [14]	Single-blinded, non-randomized clinical trial.	Nasopharyngeal cancer survivors (n=52)	1) Weekly tai chi qigong (tai chi/qigong) training for 6 months 2) Usual hospital care	1. Cervical spine ROM 2. Shoulder ROM 3. Temporomandibular ROM 4. Medical Outcomes Study (MOS) Sleep Scale	Intention-to-treat analysis revealed improvement in cervical side flexion ROM only ($P < .008$) and unchanged shoulder and TMJ mobility ($P > .008$) after the tai chi/qigong training. Deterioration was observed in shoulder flexion ROM and mouth opening capacity in the no-training controls over time ($P < .008$). Sleep problems also decreased in the tai chi/qigong group ($P < .008$). ROM was associated with a reduction in sleep problems in the experimental group after tai chi/qigong training ($P < .05$).	Group allocation was not randomized. Therefore, subject self-selection bias may be present. Both groups were able to attend usual hospital care sessions during the trial period which may have differed for the groups. This may confound the results of the study.
Peripheral circulatory status and aerobic capacity	Fong (2014) [15]	Single blinded, non-randomized CT	Nasopharyngeal cancer survivors (n=52)	1. Weekly tai chi qigong training for 6 months Usual hospital care	1. Blood flow velocity 2. Arterial resistance 3. Palmar skin temperature Functional aerobic capacity (6MWT)	1,2,3: Higher diastolic blood flow velocity ($p=0.010$), lower arterial resistance ($p=0.009$) and higher palmar skin temperature ($p=0.004$) after the tai chi qigong training. 4) Significantly longer over time in the tai chi qigong group ($p<0.008$) but not in the control group ($p=0.123$) Between group differences not provided	Small sample size. Not randomized but participants self-selected. High attrition rate; only 35 participants completed the study, 14 and 21 in the tai chi qigong group and the control group respectively.
Balance performance	Fong (2014)[13]	Cross sectional exploratory study	Nasopharyngeal cancer survivors (n=120)	1. Tai chi qigong trained 2. No tai chi qigong experience • Healthy control	1. One-leg stance test (OLS) • Six-minute walk test (6MWT)	The NPC-control group had a shorter OLS time in all of the visual and supporting surface conditions than the healthy control group ($p<0.05$). The OLS time of the tai chi qigong -NPC group was comparable to that of the healthy control group in the somatosensory-challenging condition (condition 3) ($p=0.168$) only. There was no significant difference in the 6MWT distance among the three groups ($p>0.05$).	Convenience sample may have introduced a self-selection bias that may threaten the internal validity of the study.

RCT: Randomised clinical trial

PBMC: Peripheral blood mononuclear cell

NSCLC: Non-small cell lung cancer

CRP: C-reactive protein

ROM: ranges of motion

6 MWT: Six-minute walk test

OLS: One-leg stance test

NPC: Nasopharyngeal cancer

ITT: Intention to treat