Table 1: Controlled clinical trials of tai chi for cancer


<table>
<thead>
<tr>
<th>Outcome</th>
<th>First author (year) [ref]</th>
<th>Study design</th>
<th>Participants (number, diagnosis)</th>
<th>Interventions (experimental treatments, control)</th>
<th>Main outcome measures</th>
<th>Main results</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Cancer-related fatigue</td>
<td>Zhou 2018 [18]</td>
<td>RCT</td>
<td>Nasopharyngeal Carcinoma patients undergoing Chemoradiotherapy (n=83)</td>
<td>1. Tai chi 2. Usual care</td>
<td>1. Multidimensional fatigue symptom inventory short form (MFSI-SF) 2. Heart rate variability parameters</td>
<td>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&lt;0.01).</td>
<td>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.</td>
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<td>Insomnia</td>
<td>Irwin (2017) [10]</td>
<td>Non-inferiority RCT</td>
<td>Breast cancer survivors with insomnia (n=90)</td>
<td>1. Tai chi 2. CBT-I (Cognitive Behavioural Therapy for Insomnia)</td>
<td>1. Pittsburgh Sleep Quality Index 2. Clinician-assessed remission of insomnia 3. Sleep diaries 4. Polysomnography 5. Symptoms</td>
<td>Tai chi was noninferior to CBT-I at 15 months (p=0.02) and at months 3 (p=0.02) and 6 (p&lt;01). Tai chi and CBT-I both showed similar robust improvements in sleep quality, sleep diary measures, and related symptoms.</td>
<td>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.</td>
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<td>Immuno-logical/blood pressure</td>
<td>Campo (2015) [9]</td>
<td>RCT (feasibility)</td>
<td>Women (senior breast cancer survivors) (n=63)</td>
<td>1. Tai chi 2. Health Education Control (HEC)</td>
<td>Blood pressure Salivary cortisol Inflammatory cytokines Tumour necrosis factor</td>
<td>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&gt;0.05).</td>
<td>Very short follow-up (1-week post intervention) Cortisol results limited by single-day rather than multiple day collection</td>
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2. 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. | Small sample size  
16-week intervention may not be long enough to see any significant changes in NKT and DC cells. |
| Immune function/inflammation| Irwin (2014) [12]         | RCT          | Breast cancer patients with insomnia (n= 90) | 1. Tai chi  
2. Cognitive behavioural therapy | Immune and inflammatory markers | Levels of CRP did not change from baseline to posttreatment in the two groups (CBT-I p=0.13, tai chi p=0.44), 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. | Lack of change in CRP results may have been due to short intervention time. (16 weeks)  
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. |
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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  
2. 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. |
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**CAM Cancer**

- **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