Using Tai Chi and Qigong to Treat Insomnia and Sleep Disorders: 10 Applications of Artificial Intelligence to Traditional Chinese Medicine

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ABSTRACT

Background: Insomnia and other sleep disturbances are highly prevalent and often chronic, while standard pharmacological treatments may be limited by side effects, tolerance, and patient preference for non-drug approaches. Tai chi and qigong, two traditional Chinese medicine practices, have been increasingly investigated as mind–body interventions for improving sleep in a variety of clinical populations.

Objective: This study uses artificial intelligence to assist in summarizing and synthesizing clinical research on the use of tai chi and qigong to treat insomnia and sleep disorders.

Methods: Studies were identified through the PubMed database, and an AI assistant (Grok) was used to help summarize randomized controlled trials, systematic reviews, and meta-analyses that examined tai chi and/or qigong with sleep-related outcomes. Extracted information included study design, participant characteristics, intervention protocols, main sleep outcomes, proposed mechanisms, strengths and limitations, and clinical recommendations.

Results: The reviewed literature, encompassing older adults with chronic insomnia, cancer patients with treatment-related sleep problems, and individuals with various comorbid conditions, indicates that tai chi and, to a lesser extent, qigong can significantly improve subjective sleep quality, sleep latency, sleep efficiency, and related day time functioning. Several meta-analyses report small-to-moderate effect sizes on global sleep indices, with some evidence that tai chi may outperform other forms of traditional Chinese exercise for certain sleep outcomes. Proposed mechanisms include reductions in physiological arousal and inflammation, improvements in mood and anxiety, and the cultivation of relaxation and mindfulness.

Conclusions: The available evidence supports tai chi and qigong as safe, low-cost, and clinically useful non-pharmacological options for managing insomnia and sleep disturbances, particularly as adjuncts to standard care. At the same time, heterogeneity in protocols and outcomes, limited objective sleep measures, and methodological constraints highlight the need for more rigorous and standardized trials. The present review also demonstrates how artificial intelligence can streamline evidence synthesis in traditional Chinese medicine and suggests that AI-assisted methods may play an important role in future integrative sleep research.

Keywords: Tai Chi; Qigong; Insomnia; Sleep Disorders; Randomized Controlled Trial; Meta-Analysis; Cancer-Related Insomnia; Older Adults; Mind-Body Intervention; Non-Pharmacological Treatment

Introduction

Tai chi and qigong are both forms of traditional Chinese medicine (TCM). The origins of tai chi are steeped in myth, but some studies estimate that tai chi started around the twelfth or thirteenth century. Qigong is much older, going back several thousand years. Many studies have found that the application of tai chi and qigong yield multiple health benefits for a wide range of ailments [1-17]. Several bibliometric studies have been conducted on the health benefits of these forms of traditional Chinese medicine [18-22]. In recent years artificial intelligence has been used as both a research and administrative tool in Western medicine [23-30]. The present study utilizes artificial intelligence to summarize studies where tai chi and qigong have been used to treat insomnia. Insomnia and other sleep disturbances represent a major global public health problem, with substantial implications for quality of life, cognitive performance, mood, accident risk, and health-

care utilization. Pharmacological treatments, although often effective in the short term, are associated with adverse effects, tolerance, dependence, and limited acceptability in some patient populations. These limitations have stimulated growing interest in non-pharmacological and mind–body approaches, including exercise, meditation, and traditional Chinese medicine (TCM)–based interventions. Within this broader movement, tai chi and qigong stand out as gentle, low-cost, and scalable practices that can be adapted for a wide range of ages and comorbidities, including older adults and cancer survivors.

A steadily expanding empirical literature has examined tai chi and qigong for diverse clinical conditions, such as cancer, rheumatoid arthritis, cardiovascular disease, back pain, cognitive decline, and mental health disorders, with many studies reporting improvements in both physical and psychological outcomes. Several of these studies, including randomized controlled trials and systematic reviews, have specifically evaluated sleep-related endpoints or have reported sleep as an important secondary outcome. More recently, bibliometric analyses have documented a rising volume of publications on traditional Chinese health exercises and non-drug treatments for insomnia, suggesting that these modalities are increasingly recognized within mainstream medical research. However, despite this growth, the insomnia literature remains fragmented across specialties, conditions, and intervention types, which can make it challenging for clinicians and researchers to obtain an integrated view of the evidence on tai chi and qigong for sleep. At the same time, artificial intelligence (AI) tools have become more widely available and are beginning to transform how literature reviews, evidence syntheses, and clinical decision support are conducted in Western medicine. AI systems can assist with rapid identification, screening, and summarization of studies, potentially reducing the time and effort required to generate up-to-date, practice-oriented reviews. Yet only a limited number of publications have explicitly explored AI as a methodological aid in the context of traditional Chinese medicine, and even fewer have applied AI to organize and interpret the evidence on tai chi and qigong for specific indications such as insomnia and sleep disorders.

The present study is part of a broader research program that uses AI to map the clinical applications of tai chi and qigong across multiple disease domains, with the current paper focusing specifically on insomnia and sleep-related outcomes. By combining conventional database searching with AI-assisted summarization of randomized controlled trials, systematic reviews, and meta-analyses, this article aims to provide a concise, clinically oriented overview of how tai chi and qigong have been used to treat insomnia and sleep disturbances in different patient populations. The objective is not to conduct a formal meta-analysis, but rather to synthesize the main study designs, intervention characteristics, effect sizes, and reported mechanisms in a format that is accessible to medical professionals, researchers, and tai chi/qigong instructors. This approach illustrates one concrete way in which AI can be integrated into evidence-based TCM and mind–body medicine, while also identifying gaps in the current insomnia literature and suggesting priorities for future research.

Methodology

Studies were selected from the PubMed database. Grok, an artificial intelligence assistant, was then used to summarize the studies.

Study Summaries

Kreutz C et al. (2019) [31]

- **Study Design**: Systematic review and meta-analysis of RCTs on physical/mind-body exercise for sleep in breast cancer.

- **Participant Details**: 2107 women with breast cancer; age/sex/conditions not detailed for Tai Chi/Qigong.

- **Intervention Protocols**: Tai Chi/Qigong as mind-body; supervised, varied types (Tai Chi Chih, Qigong/Tai Chi Easy); duration/frequency not specified.

- **Key Findings with Statistical Data**: Improved total sleep (SMD -0.27, 95% CI -0.44 to -0.09); sleep quality (SMD -0.28, 95% CI -0.44 to -0.11); disturbances (SMD -0.26, 95% CI -0.45 to -0.06); no objective effects.

- **Potential Mechanisms for Medical Professionals**: Reduced inflammation, improved mood/psychosocial factors.

- **Benefits for Tai Chi/Qigong Enthusiasts**: Enhances Qi and mindfulness, supporting sleep during cancer treatment.

- **Strengths**: Large sample, subjective/objective measures.

- **Limitations**: Protocol variability, no objective effects.

- **Clinical Recommendations**: Recommend Tai Chi/Qigong for subjective sleep-in breast cancer; tailor to patient.

Li F et al. (2004) [32]

- **Study Design**: Randomized controlled trial comparing Tai Chi to low-impact exercise.

- **Participant Details**: 118 adults aged 60-92 years with moderate sleep complaints; both sexes.

- **Intervention Protocols**: Tai Chi: 60-minute sessions, 3 times/week for 24 weeks.

- **Key Findings with Statistical Data**: Improvements in PSQI subscales (quality, latency, duration, efficiency, disturbances; p<0.01), global PSQI (p=0.001), ESS (p=0.002); latency -18 min (95% CI -28.64 to -7.12), duration +48 min (95% CI 14.71-82.41).

- **Potential Mechanisms for Medical Professionals**: Not detailed; possibly relaxation and arousal reduction.

- **Benefits for Tai Chi/Qigong Enthusiasts**: Cultivates Qi for better energy flow, enhancing sleep quality.

- **Strengths**: Randomized design, validated measures.

- **Limitations**: No specific limitations detailed.

- **Clinical Recommendations**: Tai Chi for self-rated sleep-in older adults with complaints.

Li H et al. (2020) [33]

- **Study Design**: Systematic review and meta-analysis of RCTs on Tai Chi for sleep quality.

- **Participant Details**: 1703 patients from 20 studies; age/sex not detailed; insomnia and other conditions.

- **Intervention Protocols**: Tai Chi (24-form/8-form Yang-style); duration/frequency not specified.

- **Key Findings with Statistical Data**: Significant PSQI improvement vs non/active treatment; no specific SMD/p/CI provided.

- **Potential Mechanisms for Medical Professionals**: Not detailed.

- **Benefits for Tai Chi/Qigong Enthusiasts**: Improves Qi balance for better sleep.

- **Strengths**: Large sample, multi-country.

- **Limitations**: Inconclusive for some insomnia types.

- **Clinical Recommendations**: Tai Chi (Yang-style) for sleep quality improvement.

Liu H et al. (2023) [34]

- **Study Design**: Systematic review and meta-analysis of RCTs on traditional Chinese exercise (TCE) for sleep quality.

- **Participant Details**: 1832 participants across 20 studies, ages 20.63-72.96 years, both sexes; conditions include fibromyalgia, cancer, stroke, insomnia, etc.

- **Intervention Protocols**: TCE (Tai Chi, Baduanjin Qigong, etc.); duration 3 weeks-6 months, frequency 2-5+ times/week; home practice in some.

- **Key Findings with Statistical Data**: VSHSS MD 344.17 (95% CI 316.95-371.39, p<0.00001); PSQI MD -2.24 (95% CI -3.05 to -1.43, p<0.00001); Tai Chi superior to Qigong (MD -2.27 vs -1.55, p=0.02); improvements in multiple conditions except stroke/breast cancer.

- **Potential Mechanisms for Medical Professionals**: Physiological: muscle relaxation, reduced tension; psychological: stress/anxiety reduction via breathing/meditation.

- **Benefits for Tai Chi/Qigong Enthusiasts**: Regulates Qi and meridians, balancing vital energy for restorative sleep.

- **Strengths**: Subgroup analyses by condition/practice.

- **Limitations**: Few studies on Qigong types, bias in blinding.

- **Clinical Recommendations**: TCE, especially Tai Chi, for sleep in various conditions; encourage home practice.

Sarris J et al. (2011) [35]

- **Study Design**: Systematic review of RCTs on complementary medicine for insomnia.

- **Participant Details**: Not specified for Tai Chi.

- **Intervention Protocols**: Tai Chi; no details.

- **Key Findings with Statistical Data**: Support for Tai Chi (d=0.22-2.15); no p/CI.

- **Potential Mechanisms for Medical Professionals**: Not detailed.

- **Benefits for Tai Chi/Qigong Enthusiasts**: Qi enhancement for sleep.

- **Strengths**: Quality analysis.

- **Limitations**: Methodological rigor lacking in RCTs.

- **Clinical Recommendations**: Tai Chi as adjuvant; more rigorous studies needed.

Siu PM et al. (2021) [36]

- **Study Design**: Randomized 3-arm assessor-masked trial comparing Tai Chi, exercise, control.

- **Participant Details**: 320 older adults (mean 67.3±6.8 years, 80% female) with DSM-5 chronic insomnia (duration 124.4±134.5 months).

- **Intervention Protocols**: Yang-style 24-form Tai Chi: 1-hour sessions, 3 times/week for 12 weeks, in small groups.

- **Key Findings with Statistical Data: Vs Control**: sleep efficiency +3.4% (95% CI 1.6-5.1, p<0.001), WASO -13.3 min (95% CI -21.3 to -5.2, p=0.001); sustained at 24 months; remission 34.4% vs 2.1% (log odds 3.2, 95% CI 1.7-4.6, p<0.001); ES PSQI 0.83, ISI 0.92.

- **Potential Mechanisms for Medical Professionals**: Physiological relaxation, reduced arousal/anxiety.

- **Benefits for Tai Chi/Qigong Enthusiasts**: Builds Qi, promoting well-being and reduced medication need.

- **Strengths**: Objective actigraphy, long follow-up, high adherence.

- **Limitations**: Single-center, cultural bias potential.

- **Clinical Recommendations**: Tai Chi alternative to exercise for insomnia in older adults.

Sun X et al. (2025) [37]

- **Study Design**: Systematic review and network meta-analysis on interventions for insomnia in cancer patients.

- **Participant Details**: 21 studies, 16-255 participants; age/sex/conditions not detailed for Tai Chi.

- **Intervention Protocols**: Tai Chi (e.g., Tai Chi Chih); no duration/frequency specified.

- **Key Findings with Statistical Data**: Improved sleep efficiency MD 5.26% (95% CI 0.41-10.11) vs standard care.

- **Potential Mechanisms for Medical Professionals**: Inflammation reversal (IL-6/TNF reduction).

- **Benefits for Tai Chi/Qigong Enthusiasts**: Qi cultivation to combat cancer-related sleep issues.

- **Strengths**: Comparative ranking.

- **Limitations**: Methodological issues.

- **Clinical Recommendations**: Tai Chi for sleep efficiency in cancer insomnia.

Yang M et al. (2023) [38]

- **Study Design**: Meta-analysis of RCTs on Tai Chi for sleep, depression, anxiety in insomnia, per PRISMA.

- **Participant Details**: 1547 patients (mean age 54.22 years, 385 male/517 female); insomnia with comorbidities like cancer.

- **Intervention Protocols**: Tai Chi (24-style Yang, Chen, 8-style Yang); 2-25 weeks, mostly 3 times/week.

- **Key Findings with Statistical Data**: PSQI WMD -1.75 (95% CI -1.88 to -1.62, $p<0.001$); HAMD -5.08 (95% CI -5.46 to -4.69, $p<0.001$); HAMA -2.18 (95% CI -2.98 to -1.37, $p<0.001$); improvements in PSQI components ($p<0.001$).

- **Potential Mechanisms for Medical Professionals**: Physiological: reduces inflammation, enhances neurotrophics/neurotransmitters; psychological: reduces stress/tension.

- **Benefits for Tai Chi/Qigong Enthusiasts**: Cultivates Qi, alleviating insomnia/depression via holistic balance.

- **Strengths**: Large sample, comprehensive PSQI analysis.

- **Limitations**: Publication bias, low-moderate evidence quality.

- **Clinical Recommendations**: Tai Chi as non-drug for sleep/depression/anxiety in insomnia.

Yeh GY et al. (2008) [39]

- **Study Design**: Retrospective ECG analysis from RCT comparing Tai Chi + usual care vs usual care in chronic heart failure.

- **Participant Details**: 18 patients (mean age 59±14 years, 50% male); chronic heart failure (ejection fraction ≤40%).

- **Intervention Protocols**: Tai Chi: 1-hour classes twice weekly for 12 weeks, adapted Yang-style (5 core movements); home practice ≥3 times/week with video.

- **Key Findings with Statistical Data**: Increased high-frequency coupling +0.05±0.10% vs -0.06±0.09% ($p=0.04$); reduced low-frequency -0.09±0.09% vs +0.13±0.13% ($p<0.01$); correlated with QoL ($p=0.01-0.02$).

- **Potential Mechanisms for Medical Professionals**: Increases EEG delta, neurohormonal modulation, reduced chemoreflex, improved baroreflex; psychological: better hygiene, reduced anxiety.

- **Benefits for Tai Chi/Qigong Enthusiasts**: Enhances Qi stability, improving sleep in heart conditions.

- **Strengths**: Novel spectrogram method, QoL correlation.

- **Limitations**: Retrospective, small sample, no PSG.

- **Clinical Recommendations**: Adjunctive Tai Chi for sleep stability in heart failure; add PSG in future.

Zhou ES et al. (2017) [40]

- **Study Design**: Review on integrative medicine for insomnia.

- **Participant Details**: Not specified.

- **Intervention Protocols**: Tai Chi mentioned; no details.

- **Key Findings with Statistical Data**: Insufficient; potential benefits.

- **Potential Mechanisms for Medical Professionals**: Not detailed.

- **Benefits for Tai Chi/Qigong Enthusiasts**: Qi for sleep.

- **Strengths**: Integrative focus.

- **Limitations**: No specific data.

- **Clinical Recommendations**: Consider Tai Chi.

Concluding Comments

Converging evidence from randomized controlled trials, systematic reviews, and meta-analyses indicates that tai chi and, to a lesser extent, qigong can produce clinically meaningful improvements in subjective sleep quality, sleep efficiency, sleep latency, and related daytime symptoms in individuals with insomnia and sleep disturbances. These benefits have been observed in diverse populations, including community-dwelling older adults with chronic insomnia, cancer patients with treatment-related sleep problems, and individuals with comorbid medical conditions such as cardiovascular dis-

ease and fibromyalgia. Effect sizes in several trials and meta-analyses fall within the small-to-moderate range, which is comparable to many other non-pharmacological interventions and, in some cases, approaches the magnitude of improvement seen with standard exercise programs. Mechanistically, the reviewed studies suggest that tai chi and qigong may enhance sleep through multiple physiological and psychological pathways, including reductions in sympathetic arousal, modulation of inflammatory markers, improvement in mood and anxiety, and promotion of relaxation and mindfulness. From the perspective of traditional Chinese medicine, these practices are understood to regulate Qi and harmonize the meridians, thereby restoring balance that manifests in deeper and more stable sleep. While these conceptual frameworks differ, they converge on the idea that slow, coordinated movement, breathing, and focused attention can shift the organism toward a more restorative state that is conducive to sleep.

The practical advantages of tai chi and qigong are particularly relevant for chronic insomnia, which often requires long-term management rather than short-term symptom suppression. These interventions are low-cost, have a favorable safety profile, can be practiced in groups or at home, and are adaptable to varying levels of physical function, including in frail older adults and patients undergoing or recovering from cancer treatment. As such, tai chi and qigong are well-suited as adjuncts to standard care, including cognitive-behavioral therapy for insomnia, pharmacotherapy, and other behavioral strategies, and they may also serve as stand-alone options for individuals who prefer non-drug approaches or have contraindications to sedative-hypnotic medications. At the same time, the existing literature has important limitations that should temper overgeneralization. Heterogeneity in intervention protocols, duration, frequency, instructor expertise, and outcome measures complicates cross-study comparisons, and relatively few trials have rigorously compared different styles or doses of tai chi and qigong. Many studies rely primarily on subjective sleep measures, with less consistent use of polysomnography or actigraphy, and the methodological quality of some trials is constrained by small sample sizes, limited blinding, or incomplete reporting. These gaps underscore the need for more standardized, high-quality research that can clarify optimal training parameters and identify which patient groups are most likely to benefit. This article also illustrates how artificial intelligence can be used as a practical tool to support evidence synthesis in traditional Chinese medicine and integrative health.

By using an AI assistant to structure and summarize the insomnia literature on tai chi and qigong, it becomes easier to highlight key findings, extract clinically relevant details, and rapidly update reviews as new studies appear. Future work could build on this approach by integrating AI-driven screening with formal meta-analytic techniques, developing AI-based decision aids for clinicians, and applying similar methods to other TCM modalities and clinical conditions. Taken together, the present review supports the inclusion of tai chi and qi-

gong as promising non-pharmacological options for the management of insomnia and sleep disorders and points to AI-enhanced evidence synthesis as a valuable ally in advancing evidence-based traditional Chinese medicine.

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