Integration of Chinese herbal medicines and exercise for insomnia: a systematic review and meta-analysis

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Author contributions
Competing interests
The authors declare no conflicts of interest.

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Abbreviations
AP: auricular point; CHM, Chinese Herbal Medicines; CI, confidence interval; CHM-ET, Chinese herbal medicines combined with exercise therapy; ET, exercise therapy; GARDE, Grading of Recommendations Assessment, Development, and Evaluation; PSQI, Pittsburgh sleep quality index; RCT, randomized controlled trials; RR, relative risk; TER, total effective rate.

Citation

Abstract
Background: As a disease, insomnia is often ignored by the general public. Insomnia, which not directly fatal, may be equivalent to chronic suicide if it is not paid attention to. However, there are many theories on how to treat insomnia, and researchers have been searching for a cure. Chinese herbal medicine (CHM) and exercise therapy (ET) are relatively effective, and have been used since ancient times to treat insomnia. This study aimed to examine the effect of CHM combined with ET (CHM-ET) on patients with insomnia.
Methods: We searched eight electronic databases including PubMed, Web of Science, EMBASE, the Cochrane Library, the China National Knowledge Infrastructure (CNKI), the China Biology Medicine disc (CBMdisc), the China Science and Technology Journal Database (VIP), the Wanfang Database to find randomized controlled trials (RCTs) evaluating CHM-ET in the treatment of insomnia patients up to September 13, 2022. Two researchers read and screened the publications to extract data. We used the Pittsburgh sleep quality index (PSQI) as the evaluation indicators for each study, and the other was the total effective rate (TER). The Cochrane risk-of-bias assessment tool was used to assess the risk of bias of the included literature. The level of evidence for this result was assessed by GARDE method. The meta-analysis was performed using STATA 14 software and RevMan 5.3. The research method was registered with PROSPERO (CRD420222350926).
Results: We included fourteen randomized controlled trials, which including a total of 1,126 participants. Compared with the control group, the experimental group showed significantly improvements in sleep effect as reflected by the reduced PSQI score [mean difference (MD) = −2.47, 95% confidence interval (CI) (−3.15, −1.78), I² = 92%] with low quality of evidence, and increased TER [risk ratio (RR) = 1.23, 95% CI (1.14, 1.33), I² = 40%] with moderate quality of evidence. Compared with hypnotic drugs, CHM-ET significantly reduced the PSQI score [mean difference (MD) = −3.18, 95% CI (−5.48, −0.89), I² = 73%] with low quality of evidence. The PSQI of CHM-ET significantly decreased compared with single CHM [mean difference (MD) = −3.04, 95% CI (−5.84, −0.25), I² = 98%] with low quality of evidence, and ET [mean difference (MD) = −2.44, 95% CI (−2.87, −2.02), I² = 0%] with moderate quality of evidence. No serious adverse reactions were observed.
Conclusion: This review suggested that CHM-ET may be an effective treatment for insomnia. However, given the limited quality of the studies and methodologies included in the trials, further rigorous randomized controlled trials are needed for more accurate results.

Keywords: insomnia; Chinese herbal medicines; meta-analysis; exercise therapy
Introduction

Increasing work pressure intensifies people’s physical and mental stress, and this is associated with an increased incidence of insomnia. Recent studies have shown that about 20 percent of the world’s population suffers from insomnia [1, 2]. Insomnia is characterized by difficulty falling asleep and decreased sleep quality. It is accompanied by daytime dysfunction, including fatigue or general malaise; impaired attention, attention maintenance, or memory; tension, headaches, dizziness, or other physical symptoms associated with sleep loss, all of which can interact and exacerbate the development of the disease [3].

At present, there are many treatments for insomnia. A number of hypnotic drugs are available to treat insomnia, such as benzodiazepines or non-benzodiazepine, anti-epileptic drugs, and atypical antipsychotics [4]. However, previous studies have shown that long-term use of hypnotic drugs may cause adverse reactions and side effects such as forgetfulness and cognitive impairment, and that the body easily develops tolerance and dependence on sleeping pills [5]. In addition to drug treatment, there are non-drug treatments for insomnia, such as music therapy and cognitive behavioral therapy. However, these methods also have limitations such as slow efficacy and complicated operation. Therefore, it is urgent to find a more appropriate treatment plan for clinical treatment of insomnia [6, 7].

In 2017, in line with China’s national conditions and the theory of TCM, the diagnosis and treatment of insomnia the Chinese guidelines were formulated. Based on the balanced energy theory, the guidelines focus on the energy balance of the five zang organs and regulate the body from the root. It is recommended to use Chinese herbal medicines (CHM) on the basis of psychotherapy, supplemented by physical therapy [8, 9]. CHM therapy includes auricular acupressure, Chinese herbal decoction, medicine pillow, and other treatments containing herbs [10]. Non-drug therapies are effective for insomnia, and many of them have been shown to have similar effects to sleep MEDs [11–15]. Baduanjin . Taijiquan and aerobic exercise are not only able to relax the tendons and physiologically activate collaterals , adjust breathing rhythm, improve circulation, and regulate the endocrine system; but they also lead patients to be physically and mentally relaxed, and effectively improve their poor mental state [16–18]. Although both Chinese herbal medicines (CHM) and exercise therapy (ET) can improve sleep quality, there is still no systematic and effective meta-analysis of their combined effects. Therefore, we conducted a meta-analysis to evaluate the efficacy of the comprehensive therapy in treating insomnia and to provide evidence-based medical evidence for more effective clinical treatment of insomnia. The specific research questions were as follows: (1) Is CHM combined with ET associated with improved sleep quality compared with conventional hypnotics? (2) Is CHM combined with ET associated with better improvement in sleep quality compared with CHM or ET monotherapy?

Methods

Systematic retrieval

We systematically searched published researches from common English and Chinese datasets (viz. PubMed, EMBASE, Web of Science, the Cochrane Library, China National Knowledge Infrastructure, China Science and Technology Journal Database, China Biology Medicine disc, Wanfang Database). Our search strategy was comprised of 3 parts: 1) Diseases: insomnia; 2) Study design: randomized controlled trial (RCT); 3) Treatments: CHMs and ET, whose details was displayed in Table S1. And we also searched potential eligible studies as the grey literatures from Chinese Clinical Trial Registry. Besides, our retrieval interval was set from inception to September 13, 2022. No restrictions on race, gender or even age was applied.

Inclusion and exclusion criteria

RCTs involved with insomnia disorders sufferers who accepted both CHM-ET and more than one of following treatments (viz. conventional therapies or care, ET, CHMs, hypnotics, placebo and no treatment) were included, where sleep effect was measured by PSQI. And total effective rate (TER) that includes cure, improvement and inefficacy could be measured in aforementioned RCTs for assessing clinical efficacy. Afterwards, RCTs without definitive diagnostic criteria and with focus on treatments of other diseases would be excluded.

Screening of eligible studies

In accordance with pre-set search strategy, C W conducted systematic search independently. Then duplicate articles was removed by computer-aid and manual approaches. Subsequently, two of us (C W and R W) independently screened in accord to inclusion and exclusion criteria via titles and abstracts. Lastly, abovementioned authors separately executed full-text review. When inconsistency occurred, the third investigator (L Z) would resolve the problem and promote a consistent decision.

Quality appraisal

ROB1 (Cochrane risk of bias tool) was utilized for methodological appraisal of the included RCTs, under framework of following areas: 1)Selection bias; 2) Performance bias; 3) Detection bias; 4) Attrition bias; 5) Reporting bias and other unclear distribution of prognostic factors [19]. Independent evaluation was performed by C W and R W as a result of 3 grades of risk bias: “low-risk” in green, “high-risk” in red and “uncertain-risk” in yellow. During this procedure, discrepancies were resolved by consulting L Z.

Data extraction

Using pre-set Excel form, we refined core information, namely age, sex, sample size, treatment duration, therapeutic protocol, diagnostic criteria, endpoints measured by PSQI and TER [20–22]. And patients with CHM-ET were chosen as experimental intervention, while patients treated by CHMs, hypnotics, placebo, ET or conventional treatment and care were regarded as a control group.

Statistical methods

RevMan5.3 and STATA 14 were used for meta-analysis. For continuous variables, mean difference (MD) with its corresponding 95% confidence intervals (CIs) was calculated, while risk ratio (RR) accounted for dichotomous ones. When standard deviations were absent, we preferred to estimate value based on CIs or standard deviation of the mean [19]. Next, the Cochran chi-squared test was applied to assess heterogeneity among studies. Specifically, P-values below 0.1 were considered as statistical significance, and 12 value above 50% suggested that significant heterogeneity appeared, where random-effect model was applied; Otherwise, fixed-effect model should make sense [23, 24]. Furthermore, at least 10 studies included, funnel plot would be conducted to detect potential publication bias.

Registration and reporting

This meta-analysis has been registered on PROSPERO platform (No. CRD42022350926) and reported according to PRISMA statement 2020.

Results

Eligible study of screening

Our retrieval yielded 3,426 records with 252 duplicates. Afterwards, 236 studies were excluded after title-abstraction-screening process. The remaining 2,924 records were assessed for eligibility through full-text review. Eventually, 14 RCTs were identified for systematic review and meta-analysis [25–38], whose detailed screening process of literature selection was displayed in Figure 1.

Characteristics of included studies

A total of 14 included studies published between 2009 and 2021 in Chinese journals were analyzed in our study (Table 1), which contained 560 subjects and 566 controls in 14 RCTs. We found that diagnosis of insomnia was conforming to the validated questionnaires such as PSQI in 11 studies [25, 27–29, 31–35, 37, 38], Chinese
Classification and Diagnostic Criteria of Mental Disorders third edition (CCMD-3) and Karnofsky (kPS) in 3 studies [26, 30, 36]. And PSQI scores was the major instrument to assess the effect of CHM-ET, and 8 RCTs preferred to use the TER [25, 27–30, 32, 35, 38]. Other outcomes mainly included the SAS and SDS.

When it came to specific intervention, 5 trials (36%) used the auricular point as a treatment combined with Baduanjin, progressive muscle relaxation training therapy, Taijiquan, meridian beating, and aerobic exercise [25–27, 32, 33], 3 trials (21%) used CHM health pillow as a treatment combined with respiratory relaxation training as well as aerobic exercise [28, 30, 34], 3 trials (21%) used CHM-decoction as a treatment combined with Baduanjin, rehabilitation training, and aerobic exercise [29, 31, 38], and the rest (21%) used Chinese medicine foot bath as a treatment combined with progressive muscle relaxation training therapy, meridian beating, and aerobic exercise [35–37]. Concretely, there were 3 of 14 RCTs used hypnotherapy, including estazolam and estazolam combined with rehabilitation training [25, 29, 38], and 4 studies used CHM, such as auricular point (AP), CHM health pillow and warming and settling method [26, 30, 31, 33]. Another 7 studies used respiratory relaxation training [28], usual care [27, 34, 37], routine education [35], water foot bath combined with aerobic exercise [36], and meridian beating [32].

After 2015, with the increasing popularity of the Internet and electronic devices, people’s energy level changed, exercise decreased, and the corresponding function of zang-fu organs is weakened [39]. However, the update of information technology has also brought about improved treatment methods, such as aerobic exercise before 2015, and scientific exercise methods such as Baduanjin and Taijiquan have been gaining popularity since 2015. The RCTs of insomnia had a treatment period of 7 days to 8 weeks.

Quality appraisal
A total of 14 studies with comparable and randomized baseline data, 9 of 14 studies elaborately described the random assignment method, and therefore they were rated as low-risk-biased grade. The rest 5 studies only reported random-related words instead of specific description, which ranked rated as unknown-risk-biased; As to allocation hiding, none of 14 studies presented detailed schemes, resulting in unknown risk bias. In terms of blinding, 7 of 14 studies did not blind either participants or staff, which were considered as high-risk-biased studies, and 6 of 14 studies did not report the blinding details and were rated as unknown-risk-biased grade. However, only 1 of 14 studies mentioned exact blinding method and was rated as low-risk-biased study. Regarding to attrition bias, 3 of 14 studies with a dropout was rated as researches exposed to high-risk bias. And the remaining studies (11/14) reported no withdrawal during follow-up so that they were assessed as low-risk biased grade. No reporting bias or other source bias was found in 14 studies, and they were therefore assessed as low-risk bias in Figure 2(a) and 2(b).

Meta-analyses
Total effective rate. The meta-analysis of the TER (Figure 3) included a total of 8 RCTs with 652 patients. It was reported that, in the Q test, $P = 0.11 > 0.1$, and in the $I^2$ test, $I^2 = 40% < 50%$, belonging to a low grade of heterogeneity. Therefore, a fixed effect model was used in this study. According to the fixed effect model [RR = 1.23, 95% CI = 1.14 to 1.33, $P < 0.00001$], it was suggested that CHM-ET was superior to other therapies in the treatment of insomnia, the curative effect of CHM-ET was 1.23 times than that in the control group ($P < 0.05$). The GRADE showed moderate quality of evidence for PSQI outcomes for CHM-ET compared to controls, for the reasons cited in Table S2 for non-blinding.

Total scores and publication bias. A total of 1,126 patients were included in the meta-analysis of total scores from 14 RCTs in Figure 4. It was reported that, in the Q test, $P < 0.00001$ and in the $I^2$ test, $I^2 = 92% > 50%$, belonging to a high grade of heterogeneity. Therefore, a random effect model was used in this study. According to the result of the random effect model [MD = −2.47, 95% CI = −3.15 to −1.78, $P < 0.00001$], it was suggested that the total scores of CHM-ET on insomnia was significantly better than other therapies, the PSQI of the total scores in the CHM-ET was 2.47 lower than that in the control group ($P < 0.05$). The GRADE showed low quality of evidence for PSQI outcomes for CHM-ET compared to controls, for the reasons cited in Table S2 for non-blinding.

Figure 1 The flow chart of the search process.
Table 1 Basic characteristics of included studies.

<table>
<thead>
<tr>
<th>Author(Year)</th>
<th>Study design</th>
<th>Mean age,(I/C)</th>
<th>NO.(I/C)</th>
<th>Diagnosis</th>
<th>Intervention group</th>
<th>Control group</th>
<th>Treatment Duration</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>YANG Chao (2021)</td>
<td>RCT</td>
<td>(45/45)</td>
<td>42/45</td>
<td>PSQI&gt;7</td>
<td>AP combined with Baduanjin</td>
<td>estazolam</td>
<td>12 days</td>
<td>PSQI. SAS. SDS. TER</td>
</tr>
<tr>
<td>FENG Yu (2014)</td>
<td>RCT</td>
<td>(N/A)</td>
<td>47/47</td>
<td>CMD-3</td>
<td>AP combined with progressive muscle relaxation training therapy</td>
<td>AP</td>
<td>1 month</td>
<td>PSQI. HAMA. SF-36</td>
</tr>
<tr>
<td>WANG Fanglin (2020)</td>
<td>RCT</td>
<td>(49.26/50.55)</td>
<td>38/38</td>
<td>PSQI&gt;7</td>
<td>AP combined with Taijiquan</td>
<td>Usual care</td>
<td>8 weeks</td>
<td>PSQI. TER</td>
</tr>
<tr>
<td>LIU Zhongxia (2019)</td>
<td>RCT</td>
<td>(32/32)</td>
<td>68/68</td>
<td>Traditional Chinese medicine health pillow combined with respiratory relaxation training</td>
<td>relaxation training</td>
<td>30 days</td>
<td>PSQI. TER</td>
<td></td>
</tr>
<tr>
<td>CHEN Hongrong (2017)</td>
<td>RCT</td>
<td>(41.11/41.57)</td>
<td>35/35</td>
<td>PSQI&gt;7</td>
<td>the modified GuiPi decoction combined with Baduanjin</td>
<td>estazolam</td>
<td>4 weeks</td>
<td>PSQI. TER</td>
</tr>
<tr>
<td>GUO Ya (2019)</td>
<td>RCT</td>
<td>(34.4/34.4)</td>
<td>36/36</td>
<td>Traditional Chinese medicine health pillow combined with respiratory relaxation training</td>
<td>28 days</td>
<td>PSQI. TER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEN Yue (2009)</td>
<td>RCT</td>
<td>(56.06/58.25)</td>
<td>20/20</td>
<td>PSQI&gt;7</td>
<td>warming and settling method combined with Aerobic exercise</td>
<td>settling method</td>
<td>8 weeks</td>
<td>PSQI. BFI</td>
</tr>
<tr>
<td>REN Xiu (2021)</td>
<td>RCT</td>
<td>(49.44/50.94)</td>
<td>31/34</td>
<td>PSQI&gt;7</td>
<td>AP combined with meridian beating</td>
<td>meridian beating</td>
<td>4 weeks</td>
<td>PSQI. TER. SAS</td>
</tr>
<tr>
<td>YIN Hui (2009)</td>
<td>RCT</td>
<td>(N/A)</td>
<td>30/30</td>
<td>PSQI&gt;7</td>
<td>AP combined with Aerobic exercise</td>
<td>AP</td>
<td>4 weeks</td>
<td>PSQI</td>
</tr>
<tr>
<td>SUN Lijuan (2019)</td>
<td>RCT</td>
<td>(58.48/56.89)</td>
<td>40/40</td>
<td>Traditional Chinese medicine health pillow combined with Aerobic exercise</td>
<td>usual care</td>
<td>4 weeks</td>
<td>PSQI</td>
<td></td>
</tr>
<tr>
<td>YANG (2017)</td>
<td>RCT</td>
<td>(35.64/15.36)</td>
<td>43/43</td>
<td>PSQI&gt;7</td>
<td>Chinese medicine foot bath combined with progressive muscle relaxation training therapy</td>
<td>routine education</td>
<td>4 weeks</td>
<td>PSQI. SAS. SDSS</td>
</tr>
<tr>
<td>LI Shanshan (2019)</td>
<td>RCT</td>
<td>(56.7/56.3)</td>
<td>40/40</td>
<td>KPS≥60</td>
<td>Chinese medicine foot bath combined with Aerobic exercise</td>
<td>bath combined with Aerobic exercise</td>
<td>4 weeks</td>
<td>PSQI. BFI</td>
</tr>
<tr>
<td>XIONG Yaqin(2019)</td>
<td>RCT</td>
<td>(46.6/45.2)</td>
<td>60/60</td>
<td>PSQI&gt;8</td>
<td>Chinese medicine foot bath combined with traditional Chinese medicine meridian manipulation</td>
<td>Chinese medicine foot bath Estazolam</td>
<td>7 days</td>
<td>PSQI. SAS. SDS.</td>
</tr>
<tr>
<td>LIU Jianzhen(2011)</td>
<td>RCT</td>
<td>(64.51/63.93)</td>
<td>30/30</td>
<td>PSQI&gt;7</td>
<td>Ziyin Anshen Decoction combined with rehabilitation training</td>
<td>combined with rehabilitation training</td>
<td>4 weeks</td>
<td>PSQI. TER</td>
</tr>
</tbody>
</table>

I, intervention; C, control; PSQI, Pittsburgh sleep quality index; N/A, not available; CCMD-3, Chinese classification and diagnostic criteria of mental disorders 3rd edition; TER, TER; KPS, karnofsky performance score; BFI, brief fatigue inventory; SAS, Zung self-rating anxiety scale; SDS, Self-Rating Depression Scale; HAMA, Hamilton anxiety scale; SF-36, 36-item Short-Form; SDSS, Social Disability Screening Schedule.
Figure 2 Risk of bias graph

Figure 3 Forest plot of the TER in the fixed effect model
The heterogeneity of the “total scores” was significant, so we considered dividing the subjects in the “total scores” into subgroups to make sure the origination of the heterogeneity in Figure 5. However, the general condition (including the age, gender, and the course of the disease) between the two groups (the intervention group and the control group) was comparable. After analyzing the data, we believe that the high heterogeneity should be reduced by reevaluating the duration of treatment. The treatment time used to be more than 4 weeks, except for the two written by Yang Chao [25] and Xiong Yaqin [37], which lasted for 12 days and 7 days. In the subgroup analysis, treatment with the Chinese medicine foot bath combined with Aerobic exercise, the Chinese herbal medicines health pillow combined with respiratory relaxation training, and the auricular point combined with meridian beating significantly were superior to ET in the treatment of insomnia [MD = −2.44, 95% CI = −2.87 to −2.02, P < 0.00001], and the heterogeneity (I² = 0%). The GRADE showed moderate quality of evidence for PSQI outcomes for CHM-ET compared to ET, for the reasons cited in Table S2 for non-blinding.

The analysis of publication bias for PSQI was shown in Figure 6, and the quantitative analysis based on Egger (P = 0.124 > 0.05) and Begg tests (P = 0.443 > 0.05) indicated no significant publication bias for PSQI.

Discussion

Main findings

In this work, 14 RCTs involving 1,126 participants were reviewed and analyzed. From our findings, CHM-ET significantly improved patients’ status of insomnia status based on total PSQI scores and TER, with low and moderate quality of evidence, respectively. Additionally, in line with result of subgroup analysis, compared with ET, several treatments could significantly reduce the PSQI score with moderate quality of evidence. And those were merging Chinese medicine foot bath into aerobic exercise, CHM health pillow combined with respiratory relaxation training, as well as integration of auricular point and meridian beating. Besides, CHM-ET also significantly improved sleep outcomes compared with either hypnotics or CHMs, but its evidence quality was still low. Whereas, although no adverse drug reactions were found in this study, long-term use of high concentrations of CHMs might cause side effects. As such, therapeutic principle of treating insomnia is supposed to be highly weighted with ET, supplemented by CHM, homeopathy, and keeping energy balance of body [40].

Implications for future work

Among population with chronic medical conditions (i.e., hypertension, diabetes, coronary heart disease, depression, symptoms of sleep disorders) are more likely to occur. Generally, insomnia can be divided into 2 type, that is chronic and acute insomnia. The former is induced by complex causes and with and a dual influence of psychology and behavior, requiring a more systematic and comprehensive treatment program [41]; In contrast, the latter can be recovered quickly in most cases. At present, hypnotic drug therapy and cognitive behavioral therapy are commonly used for the treatment of insomnia. Nonetheless, on the one hand, hypnotic drugs show immediate effects; On the other, their long-term medication may lead to dependence and abuse. Moreover, psychiatric drugs can easily cause energy imbalance in human body. More importantly, long-term use of psychiatric agents will make insomnia linger despite short-period efficacy for insomnia. Furthermore, cognitive behavioral therapy that a more complicated and less feasible choice is another effective treatment. With the emerging of TCM treatments, increasing patients do benefit from these therapeutics. On the basis of TCM theory, syndrome identification of pathogenesis of insomnia is usually classified into categories: 1) Heart and gallbladder deficiency; 2) Liver fire disturbing the heart; 3) Phlegm and heat disturbing the heart; 4) Stomach qi disorder; 5) Blood stasis and internal obstruction; 6) Heart and spleen deficiency; 7) Heart and kidney incompatibility. For an example, Professor Huang [42] insisted diet is of benefit to insomnia because of promotion of balance between Yin and Yang. Similarly, as a result of syndrome identification, CHM-prescriptions can reconcile the energy of the five zang organs, and auricular point sticking can balance qi and blood, in order to intervene insomnia. And another randomized single-blind controlled clinical trial showed that auricular acupuncture was useful and safe for patients who had suffered primary insomnia for a short or long period, which is proven to be more effective than monotherapy of desxipipitone [43]. As the same time, CHM-pillow and CHM-foot-bath can comprehensively stimulate the head and neck skin, meridians and acupoints, orifices, and other parts, where smell of CHMs is absorbed into body via skin and nasal mucosa for soothing the liver, relieving depression, regulating qi and blood [44, 45]. And some clinical studies indicated that Baduanjin and Taijiquan can adjust the subjects’ cognitive function by adjusting the spontaneous activity of the temporal lobe, for the purpose of relieving the patients’ fatigue state and exerting a good effect on the quality of sleep [46–48]. As we know, ET can accelerate the metabolism of the body by activating qi and blood, which promotes better absorption of drug use and keeps cheerful emotion, but it works relatively slowly [49–51]. Simultaneously, some investigators reported that aerobic exercise can release cardiovascular sympathetic tone, improve vagal excitability as well as regulation ability of the circulatory system, and stimulate secretion of endogenous endorphins so as to relieve mental stress [52], towards improvement of sleep quality. Although both mono-used CHMs and ET alone have a significant effect on insomnia, our study showed that the total PSQI score in the CHM-ET group was 3.04 lower than that in CHMs alone group, and 2.44 lower than that in the ET alone group. With the popularization of modern information technology, people can learn scientific health exercises such as Baduanjin and Taijiquan by themselves, whose

![Figure 4 Forest plot of the Total scores in PSQI.](https://doi.org/10.53388/TMRNDO23012)
Figure 5 Forest plot of the subgroup in the Total Scores in PSQI.

Figure 6 Publication bias test for PSQI
corresponding teaching manuals are offered in many hospitals. And this exercise method is increasingly accepted in clinical practice, and when supplemented with symptomatic CHM, it is believed that the clinical treatment of insomnia may be more effective. On this situation, CHM-ET, an integrated therapy for insomnia, should be encouraged in future clinical encounter.

Strengths and limitations

Considering the complete organism, fitness cannot be obtained through medication alone. Taking the long view, restoring a bodily self is the most fundamental treatment method. We are the first to evaluate the efficacy of CHM-ET in intervening insomnia, which preliminarily demonstrated that combination of CHM and ET therapy was more beneficial to the population with insomnia than monotherapy. And this approach promisingly provides insight into clinical practice of insomnia.

Despite our rigorous attempts to identify the entire current evidence, there were a couple of limitations. First and foremost, significant heterogeneity was observed in the meta-analysis, which may be caused by including various types of ET and CHM-treatments; Secondly, trials without double-blinding had an unavoidable risk of bias and methodological limitations may affected our findings. Lastly, since all RCTs were carried out in China, people’s living habits and preference-based thoughts were distinct from others. Thus, more RCTs based on diverse races from different countries are required to complement our findings to further verification for CHM-ET treating insomnia.

Conclusions

Based on low-and-moderate-level evidence, our findings indicated that CHM-ET may have a bearing on improving sleep quality, compared with hypnotics, monotherapy with CHMs or ET.

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