

Advances in Clinical Research on Acupuncture for Chronic Insomnia

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Abstract: *This review summarizes advances in acupuncture for chronic insomnia from 2020 to 2026. Evidence indicates acupuncture improves sleep quality (e.g., PSQI scores) with fewer adverse events than pharmacotherapy, characterized by a notable “3-week threshold effect.” Randomized controlled trials confirm its efficacy in shortening sleep onset latency and increasing slow-wave sleep, though long-term maintenance requires further study. Combination therapies (e.g., with CBT-I or moxibustion) and specialized techniques (electroacupuncture, “Ghost Point” acupuncture) show synergistic benefits. Mechanistically, acupuncture targets hyperarousal via modulating the HPA axis, balancing neurotransmitters (e.g., GABA, serotonin), remodeling neural circuits, and potentially regulating the gut-brain axis. Future directions emphasize validating hybrid neuromodulation strategies, optimizing precision treatment based on objective phenotypes, and leveraging artificial intelligence for efficacy prediction to transition toward precision medicine.*

Keywords: Chronic insomnia, Acupuncture, Clinical efficacy, Mechanism of action, Hyperarousal, Gut-brain axis, Precision treatment.

1. Introduction

Chronic insomnia is a prevalent sleep disorder characterized by difficulties initiating or maintaining sleep, or early morning awakening, accompanied by impaired daytime functioning [1]. Modern neuroscience attributes its core pathophysiology to “hyperarousal,” a state of persistent physiological and psychological activation spanning 24 hours and involving both the central and autonomic nervous systems. The 3P model (Predisposing, Precipitating, and Perpetuating factors) further elucidates how acute insomnia transitions to a chronic state, primarily driven by maladaptive perpetuating factors such as excessive time in bed and catastrophic thinking about sleeplessness. Epidemiological data indicate that chronic insomnia imposes a substantial socioeconomic burden, particularly among the elderly [2], and is frequently comorbid with depression, anxiety, and chronic pain. Although current pharmacological interventions provide short-term symptomatic relief, their long-term utility is constrained by issues of tolerance, dependence, and adverse effects [1]. Furthermore, hypnotic agents carry potential side effects that significantly hinder their widespread clinical application [3]. While cognitive behavioral therapy for insomnia (CBT-I) is recommended as a first-line treatment, its feasibility is often limited by insufficient resource allocation [4]. Acupuncture, a cornerstone of traditional Chinese medicine, has been extensively utilized in China for managing chronic insomnia [5] and is increasingly adopted worldwide as an alternative to pharmacotherapy [6]. In recent years, a growing body of systematic reviews, network meta-analyses, and randomized controlled trials (RCTs) has evaluated acupuncture for insomnia across multiple dimensions, including clinical efficacy, underlying mechanisms, and optimization of intervention protocols.

2. Clinical Evidence of Acupuncture for Chronic Insomnia

2.1 Overall Findings from Systematic Reviews and Meta-Analyses

Since 2019, multiple systematic reviews have systematically evaluated the overall efficacy of acupuncture for insomnia. Cao et al. searched 11 databases for publications from January 2008 to October 2017, and included 73 randomized controlled trials (RCTs) involving 5,533 participants. Pooled results showed that verum acupuncture was superior to no treatment, with a mean difference (MD) in Pittsburgh Sleep Quality Index (PSQI) score of -5.58 (95% confidence interval [95% CI]: -6.85 to -4.31). Low-quality evidence indicated that acupuncture had a lower risk of adverse events than Western medications (risk ratio [RR] = 0.23, 95% CI: 0.11–0.48) [7]. Zhang et al. [8] further conducted a systematic review of RCTs comparing acupuncture with sham/placebo acupuncture, providing foundational evidence for disentangling effect size discrepancies between verum and sham interventions.

Kim et al. [6] performed a meta-analysis of 24 RCTs retrieved from 7 databases including MEDLINE and CNKI up to July 2020. Subgroup analyses of 15 RCTs comparing acupuncture with pharmacotherapy revealed that acupuncture significantly improved PSQI scores in patients with insomnia (pooled effect size = -0.74, 95% CI: -1.07 to -0.40, $P < 0.0001$, $I^2 = 89\%$, $n = 1,475$). A notable time-effect relationship was identified: no significant between-group differences were observed at weeks 1 and 2, but acupuncture showed significant superiority at week 3 (effect size = -0.97, 95% CI: -1.65 to -0.28, $P = 0.006$, $n = 463$), with the efficacy further confirmed at week 4 (effect size = -0.70, 95% CI: -1.15 to -0.25, $P = 0.002$, $n = 594$). These findings suggest that at least 3 weeks of continuous acupuncture treatment are required to achieve significant symptom improvement compared with pharmacotherapy.

In the older adult population, Kwon et al. [2] conducted a network meta-analysis of 28 RCTs involving 2,391 participants, demonstrating that both acupuncture (standardized mean difference [SMD] = -4.37, 95% CI: -8.53 to -0.12) and acupuncture combined with benzodiazepines (SMD = -5.20, 95% CI: -9.82 to -0.57) yielded significant efficacy advantages over wait-list controls. Notably, combination therapies (including benzodiazepines plus CBT-I or acupuncture) consistently outperformed monotherapies;

however, most included RCTs lacked blinding, suggesting that the observed effect sizes may be overestimated due to methodological bias.

Wang et al. [9] incorporated acupuncture into a comparative framework of multiple interventions for adult insomnia, clarifying its relative positioning within the non-pharmacological treatment landscape. A recent meta-analysis [10] integrating RCTs of various exercise and non-pharmacological therapies, alongside a systematic review and network meta-analysis by Wang et al. [11] focusing on adults aged ≥ 50 years, further confirmed that acupuncture is an effective non-pharmacological strategy for improving sleep quality in this demographic.

2.2 Key Evidence from Randomized Controlled Trials

Wang et al. [12] conducted a randomized, single-blind, parallel-group, sham-controlled trial enrolling 82 patients with chronic insomnia diagnosed according to the International Classification of Sleep Disorders, 3rd Edition (ICSD-3), who were randomly allocated to an acupuncture group ($n=41$) or a sham acupuncture group ($n=41$). The intervention targeted bilateral Shenmen (HT7) and Fuliu (KI7) acupoints, with 10 sessions completed over 3 weeks. Primary outcomes included PSQI and Insomnia Severity Index (ISI) scores; secondary outcomes comprised objective polysomnography (PSG) parameters and scales assessing comorbid symptom severity. Post-treatment, the acupuncture group showed a 5.04-point reduction in PSQI score and a 7.65-point reduction in ISI score, significantly outperforming the sham group (2.92-point and 5.05-point reductions, respectively, both $P<0.05$). PSG data further verified that acupuncture significantly shortened sleep onset latency (SOL), reduced the proportion of N1 sleep, and increased the proportion of N3 (slow-wave) sleep, providing electrophysiological evidence for acupuncture's beneficial modulation of objective sleep architecture. Notably, between-group differences diminished at follow-up visits, indicating that while short-term efficacy is robust, long-term sustainability requires further validation. Another RCT protocol by Wang et al. targeted the understudied short sleep duration phenotype of insomnia. Existing evidence suggests that pharmacotherapy is more effective than CBT-I for this subtype, but medication-related adverse effects limit its clinical utility. Although acupuncture is widely used for insomnia, its efficacy for this specific phenotype remains unclear. The study adopted a randomized, single-center, single-blind, placebo-controlled design, enrolling 152 participants stratified by objective total sleep time into normal and short sleep duration subgroups. This study represents an innovative exploration of phenotype-stratified intervention evaluation, reflecting a shift toward precision medicine and expanding the scope of acupuncture research for insomnia subtypes.

2.3 Efficacy Evaluation of Traditional Chinese Medicine-Specific Acupuncture Modalities

Traditional Chinese medicine (TCM)-based non-pharmacological therapies hold unique advantages in insomnia management. Luo et al. [13] specifically evaluated the efficacy of acupuncture combined with tuina (Chinese

therapeutic massage) for insomnia, demonstrating that the combination yielded significantly greater overall clinical efficacy than either pharmacotherapy or acupuncture alone. Li et al. [14] reviewed advances in acupuncture for insomnia from the perspectives of TCM etiology and pathogenesis, modern mechanistic insights, and clinical applications of different needling methods. They concluded that acupuncture is a safe, individualized intervention that positively regulates sleep quality and psychosomatic status, but noted limitations including small sample sizes in most existing studies and the lack of objective, quantitative standards for efficacy evaluation, which hinder rigorous mechanistic investigation. Notably, a growing body of clinical reports on acupuncture for chronic insomnia has emerged in recent years, coinciding with a trend of younger age at onset of the condition. Li et al. [15] added moxibustion to conventional acupuncture in the observation group, and compared insomnia severity, depression scores, and serum gamma-aminobutyric acid (GABA) levels between groups. Results showed that acupuncture combined with moxibustion had definite efficacy for chronic insomnia with mild comorbid depression, improving sleep quality, sleep duration, daytime dysfunction, and depressive symptoms compared with acupuncture alone. The underlying mechanism may be associated with elevated serum GABA levels. By quantifying serum GABA, this study provides scientific validation of acupuncture's efficacy and offers a feasible framework for future mechanistic research.

2.4 Synergistic Effects of Acupuncture Combined with Other Therapies

Combination strategies integrating acupuncture with pharmacotherapy or psychotherapy are increasingly adopted in clinical practice. Shen [16] observed that acupuncture combined with estazolam improved sleep quality and TCM syndrome scores more effectively than estazolam alone in patients with chronic insomnia. He et al. [17] applied Sun-style abdominal acupuncture combined with CBT-I to patients with chronic insomnia and comorbid anxiety, finding that the combination not only reduced insomnia severity but also enhanced overall clinical efficacy. Li et al. enrolled 120 patients with refractory insomnia and compared acupoint massage plus acupuncture with acupoint massage alone. The combination group showed significantly greater improvements in anxiety, depression, and sleep architecture (all $P<0.05$). Liu et al. [18] proposed the concept of traditional Chinese medicine-integrated electronic cognitive behavioral therapy for insomnia (TCM-eCBT-I) to develop accessible, integrated TCM-Western medicine treatment protocols. Peng et al. [19] provided evidence from a head-to-head comparison of acupuncture and CBT-I for primary insomnia. Wang et al. published a structured narrative review evaluating comprehensive protocols combining acupuncture with neuromodulation for chronic insomnia, with a particular focus on patients with comorbid mood disorders.

3. Mechanistic Investigations of Acupuncture for Chronic Insomnia

3.1 Multidimensional Mechanistic Research Framework

Xue et al. [1] searched PubMed, Web of Science, and CNKI for relevant studies published from January 2020 to December

2025 using keywords including “insomnia”, “acupuncture”, “mechanism”, “autonomic nervous system”, “inflammation”, and “HPA axis”, and included both clinical and preclinical studies published in English and Chinese. Their narrative review highlighted evidence that acupuncture improves subjective sleep quality, alleviates hyperarousal, reduces systemic inflammation, and promotes neuroimmune homeostasis through multidimensional pathways. Zhang et al. systematically reviewed the neurobiological mechanisms of acupuncture for psychiatric disorders including anxiety, depression, and insomnia based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) classification criteria. The study identified Baihui (GV20), Zusanli (ST36), and Shenmen (HT7) as the core acupoints for intervention, with techniques covering electroacupuncture, manual acupuncture, and laser acupuncture. These acupoints also constitute the primary prescription for insomnia treatment. At the mechanistic level, acupuncture exerts regulatory effects via three core pathways: first, modulating oxidative stress- and inflammation-related signaling pathways; second, balancing the function of neurotransmitters (e.g., glutamate, gamma-aminobutyric acid [GABA], dopamine, serotonin) and their receptors; third, remodeling neural circuit activity in key brain regions including the anterior cingulate cortex, nucleus accumbens, amygdala, and prefrontal cortex. Collectively, acupuncture provides potential biological therapeutic targets for insomnia via integrated “signaling pathway-neurotransmitter-neural circuit” network regulation, though high-quality studies are still needed to validate these mechanisms in future research.

3.2 HPA Axis and Neuroendocrine Regulation

Hyperactivity of the hypothalamic-pituitary-adrenal (HPA) axis is a key neuroendocrine basis of the hyperarousal state in chronic insomnia. Liu et al. [5] designed a single-center, single-blind, randomized, placebo-controlled trial conducted at Jiangsu Provincial Hospital of Traditional Chinese Medicine, enrolling 60 patients randomly allocated to an acupuncture group or a sham acupuncture group (30 cases per group). Treatments were administered once every other day (3 sessions per week) for 4 consecutive weeks. Primary outcomes included changes in PSQI scores and concentrations of corticotropin-releasing hormone (CRH), cortisol (CORT) and adrenocorticotrophic hormone (ACTH), aiming to preliminarily explore the endocrine mechanism of acupuncture for chronic insomnia by analyzing pre- and post-treatment variations in CRH, ACTH, and CORT levels, thus verifying the regulatory effect of acupuncture on the HPA axis at the systemic level. Wang et al. [20] further noted that acupuncture may modulate monoamine neurotransmitter and arousal-related neurotransmission, as well as cortisol and other HPA axis-associated indices. Wang et al. [21] analyzed the neural interaction mechanisms between chronic pain and negative emotions from the perspective of neural plasticity changes in analgesic pathways and optimization of neurotransmitter levels, providing a neural network model reference for understanding the mechanism of acupuncture in regulating insomnia with comorbid mood disorders.

3.3 Regulation of Neurotransmitter Systems

The neurotransmitter mechanisms underlying acupuncture-

mediated regulation of sleep-wake cycles involve multiple systems. Pan et al. [22] noted in their review that the pathogenesis of insomnia with comorbid anxiety involves abnormal wakefulness neural circuits, imbalance of neurotransmitter homeostasis, and HPA axis hyperactivity, wherein serotonin (5-HT) acts synergistically with norepinephrine and dopamine to maintain cerebral wakefulness. Song et al. [23] found via magnetic resonance spectroscopy (MRS) that acupuncture for chronic insomnia with comorbid gastrointestinal dysfunction may exert anti-anxiety effects by regulating the release of amino acid neurotransmitters, a process involving neuronal repair. Liu et al. [24] published a review in the Chinese Journal of Acupuncture and Moxibustion (Electronic Edition) summarizing the current status of acupuncture clinical research from 2015 to 2025, including advances in resting-state functional magnetic resonance imaging (rs-fMRI)-based investigations of acupuncture for primary insomnia. Cao et al. [25] noted when analyzing the mechanisms of acupuncture for Parkinson's disease that acupuncture exerts effects by regulating neuroprotection, antioxidant stress, neurotransmitters, and neural circuits, showing positive efficacy in relieving non-motor symptoms such as insomnia, and involving functional connectivity modulation of multiple brain networks including the default mode network and sensorimotor network.

3.4 Gut-Brain Axis and Emerging Mechanisms

Gao and Yu [26] published a review in Medicine exploring the emerging mechanism of acupuncture for insomnia from the perspective of the microbiome-gut-brain axis theory, providing a novel theoretical perspective for understanding acupuncture's sleep-modulating effects. This research direction reflects the frontier trend of cross-disciplinary research between gut microbiome science and sleep medicine, suggesting that acupuncture may indirectly regulate central neurotransmitter levels by modulating gut microbiota composition and influencing short-chain fatty acid and tryptophan metabolic pathways, thereby improving sleep quality.

3.5 Hyperarousal-Targeted Regulation and Hybrid Neuromodulation Strategies

Wang et al. [27] proposed the NEurochemical, Cortical, and autonomic Tandem Augmentation of Rest (NECTAR) framework, a hypothesis-generating model positing that acupuncture may enhance the efficacy and durability of subsequent cortical stimulation by “pre-activating” autonomic, neurochemical, and network states. The framework defines refractory insomnia as a chronic insomnia disorder persisting for more than 3 months, occurring at least 3 nights per week, and remaining unresponsive after adequate evidence-based behavioral therapy and at least one pharmacological intervention, likely driven by large-scale network dysfunction and thalamocortical rhythm dysregulation. Given that standard monotherapies (including pharmacotherapy, CBT-I, acupuncture, or standalone non-invasive brain stimulation) often yield incomplete or transient benefits, the review proposes a targeted hybrid neuromodulation strategy combining peripheral somatic acupuncture with central non-invasive brain stimulation, such as transcranial direct

current stimulation (tDCS), transcranial alternating current stimulation (tACS), or repetitive transcranial magnetic stimulation (rTMS). Preliminary preclinical and clinical findings suggest potential safety and synergistic effects of this strategy, though mechanistic correlations remain to be validated.

4. Optimization of Intervention Protocols

4.1 Acupoint Selection Principles and Compatibility Strategies

Acupoint selection is a critical determinant of clinical efficacy in acupuncture for insomnia. Clinically, common acupoints for this condition include Shenmen (HT7), Baihui (GV20), Zhaohai (KI6), Yintang (EX-HN3), Sishencong (EX-HN1), and Anmian (Extra). Stimulation of these points aims to mobilize essential qi, dredge meridians, and harmonize yin-yang and qi-blood. Zeng et al. [28] analyzed the principles of acupoint selection from the perspective of the “Mind-Regulating” (Tiaoshen) theory, finding that “Liver-Soothing and Mind-Regulating Acupuncture” combined with acupoint catgut embedding yielded outstanding efficacy for insomnia of the liver-qi stagnation pattern, highlighting the strong theoretical foundation for addressing insomnia via mind-regulation strategies.

Wu et al. [29] conducted an RCT comparing the effects of single acupoints versus acupoint combinations on PSQI scores in primary insomnia patients, providing preliminary randomized evidence for optimizing selection strategies. Zhang et al. [30] proposed a polysomnography (PSG)-based method for predicting acupuncture efficacy in insomnia. Integrating interventions such as manual acupuncture, electroacupuncture, and auricular acupressure, and adopting a core prescription of oblique needling along the Governor Vessel from Baihui (GV20) to Shenting (GV24), combined with perpendicular needling with reinforcing manipulations at Qihai (CV6) and Guanyuan (CV4), this approach represents a shift from empirical selection toward data-driven efficacy prediction. It incorporates acupuncture treatment into an integrated learning model to better serve clinical diagnosis and treatment.

4.2 Optimization of Treatment Frequency and Course Duration

The dose-response relationship between treatment frequency and efficacy is a core consideration in clinical protocol design. Li et al. [31] systematically reviewed the relationship between acupuncture frequency and therapeutic outcomes. Integrating the “3-week threshold effect” identified in Kim et al. ‘s subgroup analysis—wherein acupuncture demonstrates significant superiority over pharmacotherapy only after the third week of treatment—it can be preliminarily inferred that a minimum effective treatment duration exists for acupuncture in insomnia management. Falling below this threshold may fail to adequately activate neuroregulatory cascade responses.

4.3 Comparative Studies on Different Acupuncture Techniques

Various acupuncture techniques have demonstrated respective advantages in treating insomnia. Zhou et al. [32] systematically evaluated the efficacy and safety of electroacupuncture for insomnia. Wang et al. [33] conducted a systematic review and meta-analysis on eye acupuncture for insomnia. Tao et al. [34] assessed the efficacy of “Ghost Point” acupuncture for chronic insomnia with depressive symptoms in an RCT. Chen et al. [35] compared the differential efficacy of various acupuncture protocols for insomnia. Liu et al. [36] reviewed the current status of non-pharmacological therapies for insomnia disorders, covering the effects of pattern-differentiated acupuncture, Governor Vessel acupoint acupuncture, auricular acupressure, and other techniques on chronic insomnia and cognitive function. While these studies indicate diverse available acupuncture techniques capable of achieving corresponding therapeutic effects, many suffer from limitations such as small sample sizes lacking multicenter, large-scale data, which remains a significant challenge for research in this field.

4.4 Novel Technological Formats: Wearable Laser Acupuncture

Shen et al. [4] designed an evaluator-blinded, superiority RCT to compare the efficacy of wearable low-level laser therapy (laser acupuncture) versus manual acupuncture for chronic insomnia. The study enrolled 106 adults meeting DSM-5 diagnostic criteria for chronic insomnia with Insomnia Severity Index (ISI) scores between 8 and 21. Both groups targeted six acupoints bilaterally: Shenmen (HT7), Neiguan (PC6), and Sanyinjiao (SP6), with sessions lasting 30 minutes, three times weekly for two weeks. The LLLT group received simultaneous irradiation of all six acupoints using a 650 nm laser. The protocol notes that low-level laser therapy is a photobiomodulation therapy targeting acupoints, characterized by non-invasiveness and standardization, potentially serving as a practical alternative to traditional acupuncture. Early single-blind RCTs have preliminarily validated the feasibility of laser acupuncture for improving chronic insomnia. This research direction exemplifies the evolution of acupuncture technology from traditional manual operation toward intelligent, portable, and home-based applications.

5. Conclusion

From 2020 to 2026, clinical research on acupuncture for chronic insomnia has achieved substantive progress across multiple domains. The evidence hierarchy has matured from methodologically heterogeneous early trials to a robust system of multi-tiered meta-analyses and network meta-analyses. Mechanistic explorations have expanded from single-target hypotheses to multidimensional frameworks encompassing HPA axis regulation, neurotransmitter modulation, autonomic nervous system balancing, and the emerging microbiome-gut-brain axis. Concurrently, intervention protocols have evolved from empirical acupoint selection toward data-driven optimization and intelligent efficacy prediction. The clinical applicability has broadened from primary insomnia to precision strategies tailored for diverse comorbid conditions.

Notwithstanding these advances, several critical bottlenecks

persist: the uncertainty surrounding long-term efficacy maintenance post-intervention, the confounding influence of placebo effects inherent in sham acupuncture controls, insufficient mechanistic validation of hybrid neuromodulation strategies, and the paucity of biomarker-based foundations for individualized precision treatment. Future endeavors must adopt more rigorous methodological designs, integrating multi-omics technologies and neuroimaging approaches while upholding the core TCM principle of syndrome differentiation. By synergizing traditional clinical wisdom with modern neuroscience and data science methodologies, the field is poised to transition from experiential practice to a precision medicine paradigm, ultimately enhancing therapeutic outcomes for patients with chronic insomnia.

References

- [1] Xue L, Jiang H, Zhou M, et al. Insomnia Pathogenesis and Multidimensional Mechanisms of Acupuncture: A Narrative Review [J]. *International Journal of General Medicine*, 2026, 19:1-13.
- [2] Kwon CY, Lee B, Cheong MJ, et al. Non-pharmacological Treatment for Elderly Individuals With Insomnia: A Systematic Review and Network Meta-Analysis [J]. *Frontiers in Psychiatry*, 2021, 11: 608896.
- [3] Wang C, Yang WJ, Yu XT, et al. Acupuncture for insomnia with short sleep duration: protocol for a randomised controlled trial [J]. *BMJ Open*, 2020, 10(3): e033731.
- [4] Shen YC, Wen H, Kong T, et al. Wearable low-level laser therapy (laser acupuncture) versus manual acupuncture for chronic insomnia: protocol for a randomized, assessor-blinded, superiority trial [J]. *Frontiers in Psychiatry*, 2026, 17: 1814245.
- [5] Liu CY, Zheng SY, Wu WZ, et al. Effects of Acupuncture on the Hypothalamus-Pituitary-Adrenal Axis in Chronic Insomnia Patients: A Study Protocol for a Randomized Controlled Trial [J]. *Trials*, 2019, 20(1):810-810.
- [6] Kim SA, Lee SH, Kim JH, et al. Efficacy of Acupuncture for Insomnia: A Systematic Review and Meta-Analysis [J]. *The American Journal of Chinese Medicine*, 2021, 49(05): 1135-1150.
- [7] Cao HJ, Yu ML, Wang LQ, et al. Acupuncture for Primary Insomnia: An Updated Systematic Review of Randomized Controlled Trials [J]. *The Journal of Alternative and Complementary Medicine*, 2019, 25(5): 451-474.
- [8] Zhang JH, He YH, Huang XX, et al. The effects of acupuncture versus sham/placebo acupuncture for insomnia: A systematic review and meta-analysis of randomized controlled trials [J]. *Complementary Therapies in Clinical Practice*, 2020, 41: 101253.
- [9] Wang SW, Lan YY, Liu ZX, et al. Effects of different interventions on insomnia in adults: Systematic review and network meta-analysis [J]. *Journal of Psychiatric Research*, 2023, 165: 356-365.
- [10] Bu ZJ, Liu FS, Shahjalal Md, et al. Effects of various exercise interventions in insomnia patients: a systematic review and network meta-analysis[J]. *Bmj Evidence - Based Medicine*, 2025, :102-113.
- [11] Wang JY, Yuan Y, Bai Y, et al. Non-pharmacological interventions for improving sleep quality in adults aged 50 years and older: a systematic review and network meta-analysis[J]. *Archives of Public Health*, 2026, 84(1).
- [12] Wang C, Xu WL, Li GW, et al. Impact of Acupuncture on Sleep and Comorbid Symptoms for Chronic Insomnia: A Randomized Clinical Trial [J]. *Nature and Science of Sleep*, 2021, 13: 1807-1822.
- [13] Luo SW, Huang NP, Xiang Q, et al. A systematic review and meta-analysis of acupuncture combined with Tuina in the treatment of insomnia [J]. *Medicine*, 2022, 101(52): e30703.
- [14] Wang SH, Li YX. Research Progress on Acupuncture Treatment of Insomnia [J]. *Traditional Chinese Medicine*, 2025, 14(6):2495-2503.
- [15] Li HY, Wu HX, Cui J. Acupuncture combined with bamboo-based medicinal moxibustion for chronic insomnia complicated with mild depressive state:a randomized controlled trial [J]. *Chinese Acupuncture & Moxibustion*, 2025, 45(1):3-9.
- [16] Shen RS, Shi JT, Zhang XY, et al. Clinical efficacy of acupuncture combined with estazolam on chronic insomnia [J]. *Acupuncture Research*, 2026, 51(6)773-780.
- [17] He ZY, Qin LN. Clinical Efficacy of Sun's Abdominal Acupuncture Combined with CBTiin Treating Chronic Insomnia with Anxiety[J]. *Alternative Therapies in Health and Medicine*, 2025, 31(1):326-332.
- [18] Liu, CY, Zhao, YN, Wang, XQ, et al. Acupuncture combined with traditional Chinese medicine e-aid cognitive behavioral therapy for insomnia (TCM-eCBT-I) for chronic insomnia: study protocol for a randomized controlled trial[J]. *TRIALS*, 2022, 23(1):86-86.
- [19] Peng W, Zhao Y, Wang Y, et al. Comparison between acupuncture and cognitive behavioral therapy for primary insomnia [J]. *Medicine*, 2020, 99(21): e20453.
- [20] Wang Z, Zhai FT, Zhao XM, et al. The efficacy and safety of acupuncture for perimenopausal insomnia [J]. *Medicine*, 2020, 99(52): e23741.
- [21] Wang XK, Shu Q. The Research Progress on the Neural Interaction Mechanisms and Integrated Intervention Strategies of Chronic Pain and Negative Emotions [J]. *Journal of Sun Yat-Sen University: Medical Sciences*, 2025, 46(2):197-209.
- [22] Wang YS, Pan LM. Research Progress of Traditional Chinese and Western Medicine on the Pathogenesis and Treatment of Insomnia with Anxiety [J]. *Traditional Chinese Medicine*, 2024, 13(5):1131-1140.
- [23] Song W, Ma ZX, Chen C, et al. Research Progress of Magnetic Resonance Spectroscopy in Brain Effects of Acupuncture [J]. *Chinese Journal of CT and MRI*, 2025, 23(11):196-198.
- [24] Shi JW, Liu BY. The current situation and prospect of acupuncture clinical research from 2015 to 2025 [J]. *Chinese Journal of Acupuncture and Moxibustion Electronic Edition*, 2026, 15(1):1-8.
- [25] Wang LF, Cao JP. Mechanism and clinical research of acupuncture and moxibustion in treating Parkinson's disease [J]. *Chemistry of Life*, 2026, 46(3):430-438.

- [26] Gao YP, Yu XP. Acupuncture treatment for insomnia based on the microbiome–gut–brain axis theory: A review [J]. *Medicine*, 2026, 105(1): e46967.
- [27] Wang XL, Dong YQ, Yang MM. Hybrid neuromodulation for treatment-resistant insomnia: combining acupuncture with electrical/brain stimulation, with particular relevance to hyperarousal phenotypes [J]. *Biological Rhythm Research*, 2026, 57(6): 2660307.
- [28] Zeng HY, Fu YB, Li B, et al. Discussion on clinical application and regularity of the theory of “mind-regulating” in clinical acupuncture and moxibustion treatment [J]. *Acupuncture Research*, 2024, 49(8):867-874.
- [29] Wu D, Liu XN, Jia X, et al. Effect of single acupoint and acupoints compatibility on PSQI in patients with primary insomnia: A randomized controlled clinical trial [J]. *Medicine*, 2025, 104(48): e46151.
- [30] Liu HF, Li YX, Guo Y, et al. Polysomnography-Based Prediction of Acupuncture Efficacy in Insomnia [J]. *Journal of Integration Technology*, 2026, 15(3):112-125.
- [31] Li GD, Hu XY, Xing JL, et al. The Relationship between the Treatment Frequency and Efficacy of Acupuncture: A Scoping Review of Clinical Trials [J]. *Complementary Therapies in Medicine*, 2025, 87: 103304.
- [32] Zhou XC, Chi ZH, Xiong J, et al. Effectiveness and safety of electroacupuncture for insomnia [J]. *Medicine*, 2020, 99(40): e22502.
- [33] Wang SX, Shi ZY, Li S, et al. Eye acupuncture therapy for insomnia: A systematic review and meta-analysis [J]. *Medicine*, 2025, 104(14): e41767.
- [34] Tao Y, Xu JM, Liu Z, et al. Efficacy of acupuncture at “Ghost Points” in the treatment for chronic insomnia with depressive symptoms: A randomized controlled trial [J]. *Journal of Psychosomatic Research*, 2025, 192: 112335.
- [35] Chen J, Lu LM, Xu NG, et al. An effectiveness comparison of acupuncture treatments for insomnia disorder [J]. *Medicine*, 2018, 97(35): e12060.
- [36] Zhu XQ, Zhao M, Yuan YH, et al. Research progress on the treatments of non-pharmacological therapies in insomnia disorder [J]. *Chinese Journal of Clinical Healthcare*, 2025, 28(6):756-762.