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Exploring the Treatment of Insomnia in Traditional Chinese Medicine from the Perspective of Yin-Yang Deficiency and Excess

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Abstract. This study aims to explore effective approaches and methods of treating insomnia in Traditional Chinese Medicine (TCM) through the theoretical framework of Yin–Yang deficiency and excess. By conducting a comprehensive literature review, it systematically examines the intrinsic connection between the Yin–Yang theory and insomnia, as well as the treatment strategies in TCM derived from this framework. In addition, clinical case analyses are employed to further verify the practical efficacy of these theoretical applications. The findings indicate that the Yin–Yang deficiency–excess theory plays a pivotal role in TCM approaches to insomnia. It not only provides a solid theoretical basis for syndrome differentiation and treatment but also demonstrates that therapeutic methods grounded in this theory—such as herbal prescriptions, acupuncture, and massage—yield remarkable clinical efficacy. These interventions offer safe and effective therapeutic options for patients with insomnia, highlighting the unique advantages and significant value of TCM in this field.

Keywords: Yin-Yang deficiency and excess theory, Traditional Chinese Medicine, insomnia, syndrome differentiation and treatment

1. Introduction

With the rapid development of the social economy and the acceleration of modern lifestyles, insomnia has become a common sleep disorder in contemporary society. Epidemiological surveys show that the prevalence of insomnia reaches 9.4% among individuals aged 18–59, and rises to 21.9% among those aged 60 and above [1]. Insomnia not only severely impairs sleep quality but may also lead to daytime functional decline, mood disturbances, and weakened immune function, thereby exerting a profound impact on patients' quality of life and social functioning [2]. Modern medicine primarily relies on sedative-hypnotic drugs for treatment. However, these medications are often associated with adverse effects such as dependence, drug tolerance, and residual drowsiness, which limit their long-term use [3]. In contrast, TCM demonstrates distinct advantages in treating insomnia. Centered on holistic regulation and individualized syndrome differentiation, TCM therapies are characterized by minimal side effects, absence of dependency, and high patient compliance, making them an increasingly important option for insomnia management [4]. Among the core theories of TCM, the concept of Yin–Yang deficiency and excess provides a crucial

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theoretical foundation for explaining the pathogenesis of insomnia. Against this backdrop, a deeper investigation into the guiding significance of Yin–Yang theory in TCM treatment of insomnia is especially important. This study seeks to systematically elucidate the relationship between Yin–Yang theory and insomnia, while exploring corresponding TCM therapeutic strategies, with the aim of providing a scientific basis for enhancing clinical efficacy in the treatment of insomnia.

2. Theoretical foundations of Yin–Yang deficiency and excess

As one of the core ideas of ancient Chinese philosophy, the doctrine of Yin–Yang serves as a fundamental cornerstone of the theoretical framework of Traditional Chinese Medicine (TCM). Its connotations are primarily reflected in three interrelated principles: opposition and unity, mutual dependence, and waxing–waning balance. The opposition and unity of Yin and Yang emphasize that all things and phenomena in nature embody two opposing attributes. These attributes, however, do not exist in isolation but instead interact to form an integrated whole. The Yellow Emperor's Inner Canon states: "Yin and Yang are named but formless," revealing that the concept of Yin-Yang is a philosophical abstraction rather than a tangible entity, serving as a high-level generalization of relative properties of phenomena [5]. The principle of mutual dependence between Yin and Yang highlights their inseparability; neither can exist independently of the other. As the classical saying goes, "Solitary Yin cannot give birth, solitary Yang cannot grow," illustrating that the mutual generation and promotion between Yin and Yang constitute the essential driving force of life activities [6]. Furthermore, the balance of waxing and waning reflects the dynamic process of change in all things. Yin and Yang continuously increase and decrease in relation to one another within a certain range, thereby maintaining a state of relative stability in the whole system.

The concept of deficiency and excess in TCM mainly reflects the waxing and waning of "righteous qi" (zhengqi) and "pathogenic qi" (xieqi). Righteous qi refers to the body's capacity to sustain life activities and resist external pathogens, while pathogenic qi broadly denotes all disease-causing factors. Changes in deficiency and excess essentially describe the outcomes of the struggle between these two forces. Excess syndromes generally indicate an overabundance of pathogenic qi, with the body's righteous qi still strong enough to resist it. Clinically, this may manifest as conditions such as phlegm-heat disturbance or excessive liver fire. Deficiency syndromes, on the other hand, often result from insufficiency of righteous qi, leaving the body too weak to resist pathogens. Common presentations include dual deficiency of the heart and spleen or disharmony between the heart and kidney [7]. This differentiation between deficiency and excess not only provides critical diagnostic criteria but also lays the foundation for formulating therapeutic principles. As stated in Plain Questions: "When pathogenic qi flourishes, there is excess; when essence and qi are depleted, there is deficiency," thus clarifying the standards for judging deficiency and excess, and guiding later physicians in adopting the principles of "supplementing deficiency" and "reducing excess."

3. Research progress on insomnia and the Yin–Yang deficiency–excess theory

Insomnia, categorized under the disorder of "sleeplessness" in TCM, has etiologies and pathogenesis closely linked to the theory of Yin–Yang deficiency and excess. Ancient physicians had already developed a profound understanding of this connection. The Yellow Emperor's Inner Canon explained the mechanism of sleep through the theories of Yin–Yang, nutritive qi (yingqi), defensive qi (weiqi), and visceral function, noting: "When Yang qi is exhausted and Yin qi is abundant, the eyes close; when Yin qi is exhausted and Yang qi flourishes, one awakens." This reveals that the

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balance of Yin and Yang is crucial for normal sleep [8,9]. Furthermore, Miraculous Pivot: Oral Questions emphasized that emotional disturbances, prolonged illness with debility, or imbalance between work and rest could all lead to excessive Yang and deficient Yin, or disconnection between Yin and Yang, thereby inducing insomnia. Modern research has built upon these classical insights and made significant advances, particularly in treatment methods for insomnia guided by the Yin–Yang deficiency–excess framework. Professor Zhong Jingbai argued that dysregulation of qi dynamics is a key factor in Yin–Yang imbalance, proposing that harmonizing qi movement is an effective means to restore Yin–Yang equilibrium and thereby alleviate insomnia symptoms [2]. Based on the studies of Professor Wang Qi, which integrate Yin–Yang theory, nutritive–defensive theory, and the doctrine of the heart as the ruler of mental activities, it is emphasized that failure of the heart spirit (shen) to be nourished is the fundamental pathogenesis of insomnia. Accordingly, he advocated therapeutic strategies that nourish the heart spirit and harmonize nutritive and defensive qi [3].

In recent years, with the application of modern scientific methods, research on insomnia and the Yin–Yang deficiency–excess theory has become increasingly refined. Modern physicians, drawing on the "Ministerial Fire Theory" summarized from the clinical experience of the renowned physician Yang Zhen, have pointed out that discord between sovereign fire (junhuo) and ministerial fire (xianghuo) constitutes an intrinsic cause of insomnia. The unchecked activity of ministerial fire disturbing sovereign fire and disrupting the flow of defensive qi has been identified as a key pathological mechanism of sleeplessness, providing new perspectives for clinical treatment.

4. TCM analysis of insomnia from the perspective of Yin–Yang deficiency and excess

4.1. Yin–Yang theory and insomnia

4.1.1. Yin–Yang balance and sleep

A normal sleep state in the human body is the concrete manifestation of Yin–Yang balance, a concept thoroughly elaborated in classical TCM texts. The Yellow Emperor's Inner Canon states: "When Yang qi is exhausted and Yin qi prevails, the eyes close; when Yin qi is exhausted and Yang qi flourishes, one awakens." This highlights the decisive role of the waxing and waning of Yin and Yang in the regulation of the sleep–wake cycle. In traditional TCM philosophy, Yin and Yang are regarded as the fundamental laws governing the movement and transformation of all things in nature. Their unity, opposition, and mutual transformation permeate every aspect of human physiological function. As an essential component of life activities, sleep is likewise regulated by the dynamic balance of Yin and Yang. Specifically, when Yin qi predominates within the body, physiological functions become quiescent, facilitating the onset of sleep. Conversely, as Yang qi gradually gains ascendancy, the body transitions to a waking state. This alternation of Yin and Yang not only reflects the stability of the body's internal environment but also demonstrates TCM's profound understanding of natural rhythms within its holistic framework. Furthermore, modern research has confirmed that the body's circadian rhythm aligns closely with the day–night cycle described in Yin–Yang theory, thereby lending strong scientific support to the validity of the Yin–Yang balance concept.

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4.1.2. Insomnia induced by Yin–Yang imbalance

Yin–Yang imbalance is one of the core pathological mechanisms underlying insomnia, manifesting in diverse forms such as hyperactive Yang with deficient Yin or Yin deficiency with excessive Yang. Plain Questions: On Counterflow records: "When the stomach is disharmonious, one cannot sleep peacefully," underscoring the crucial role of Yin–Yang disequilibrium in the pathogenesis of insomnia [10]. Hyperactive Yang with deficient Yin refers to a state where Yang qi is excessively strong while Yin qi is relatively insufficient, disturbing the heart spirit (shen) and leading to difficulty in falling asleep. Emotional trauma, chronic debility, and prolonged illness are among the factors that may result in excessive Yang, thereby provoking insomnia symptoms [11]. Yin deficiency with hyperactive Yang, on the other hand, arises when Yin qi is depleted and thus unable to restrain Yang qi. As a result, Yang qi floats outward, agitating the heart spirit and ultimately causing sleeplessness. Patients with this pattern often present with hallmark Yin-deficient symptoms such as vexation in the palms and soles, tidal fever, and night sweats. From the TCM perspective, Yin–Yang imbalance not only undermines sleep quality but also exacerbates visceral dysfunction, creating a vicious cycle. For instance, stagnated liver qi transforming into fire may lead to exuberant internal heat, consuming Yin fluids and evolving into a Yin-deficiency–Yang-hyperactivity state. Similarly, spleen–stomach disharmony may engender internal phlegm-dampness, obstructing the movement of qi, hindering the harmonious interaction of Yin and Yang, and thereby contributing to insomnia [12]. Hence, restoring Yin–Yang equilibrium constitutes a fundamental principle in TCM treatment of insomnia.

4.2. The concept of deficiency and excess in insomnia

4.2.1. Excess-type insomnia

Excess-type insomnia primarily results from an overabundance of pathogenic qi, with phlegm-heat and liver fire being the most common pathological factors. According to TCM theory, when pathogenic factors invade the viscera or disrupt the circulation of defensive qi, the heart spirit is disturbed, giving rise to insomnia [9]. Phlegm-heat disturbing the interior is a typical manifestation of excess-type insomnia. Its mechanism lies in spleen–stomach dysfunction impairing fluid transformation, leading to dampness accumulation and phlegm formation, which over time generates heat. This phlegm-heat then agitates the heart spirit, causing difficulty in initiating or maintaining sleep. Patients of this type often exhibit chest oppression, restlessness, bitter taste in the mouth, dry mouth, red tongue with yellow greasy coating, among other symptoms. Another common subtype is liver fire disturbing the heart, often resulting from emotional frustration and stagnated liver qi transforming into fire. Excessive liver fire not only directly agitates the heart spirit but may also consume Yin fluids, further aggravating insomnia. Clinical manifestations typically include irritability, anger, dizziness, red eyes, and a wiry rapid pulse. Moreover, excess-type insomnia often correlates with lifestyle and environmental factors, such as dietary irregularities or chronic sleep deprivation, which may precipitate or worsen the condition [13]. Therefore, treatment of excess-type insomnia should focus on purging excess, primarily by clearing phlegm-heat and calming liver fire to restore tranquility of the heart spirit.

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4.2.2. Deficiency-type insomnia

Deficiency-type insomnia arises fundamentally from insufficiency of righteous qi, with common patterns including dual deficiency of heart and spleen, and disharmony between heart and kidney. The essential pathogenesis lies in the failure to nourish the heart spirit, resulting in insomnia [4]. Dual deficiency of heart and spleen frequently occurs due to overthinking and excessive labor that impair both organs. Since the heart governs blood and the spleen is the source of qi and blood, their joint deficiency leads to inadequate qi and blood, leaving the heart spirit malnourished. Symptoms typically include insomnia with excessive dreaming, forgetfulness, and fatigue. Disharmony between heart and kidney is another prevalent type, usually stemming from kidney Yin deficiency, which fails to ascend to nourish the heart. Consequently, unrestrained heart fire disturbs the heart spirit, leading to insomnia. Such patients often present with lumbosacral weakness, tinnitus, seminal emission, vexation, and persistent sleeplessness. The occurrence of deficiency-type insomnia is closely associated with age and constitution. Elderly individuals and those with inherently weak constitutions are particularly prone to this type of disorder [14]. Clinically, these patients often exhibit systemic signs of debility, such as a sallow complexion, pale tongue, and thready pulse. These not only reflect the insufficiency of righteous qi but also provide critical reference for syndrome differentiation and treatment. Accordingly, therapeutic approaches for deficiency-type insomnia emphasize supplementation, aiming to calm the heart and settle the mind by tonifying the heart and spleen, or harmonizing the heart and kidney.

5. TCM therapeutic methods for insomnia based on the theory of Yin–Yang deficiency and excess

5.1. Herbal formula therapy

5.1.1. Formulas for regulating Yin–Yang

In TCM treatment of insomnia, restoring Yin–Yang balance constitutes one of the core strategies. Huanglian Ejiao Tang (Coptis and Donkey-Hide Gelatin Decoction) is a representative prescription for nourishing Yin and subduing fire, primarily used for Yin-deficiency fire-excess insomnia. Its components include Huanglian (Coptis chinensis), Huangqin (Scutellaria baicalensis), Shaoyao (Paeonia lactiflora), egg yolk, and Ejiao (donkey-hide gelatin) [8]. In this formula, Huanglian and Huangqin clear heat and drain fire, directly counteracting excessive heart fire; Shaoyao and Ejiao nourish Yin and enrich the blood, replenishing Yin fluids; while egg yolk harmonizes the heart and kidney, ensuring the mutual coordination of water and fire, thereby calming the spirit. Modern studies have demonstrated that Huanglian Ejiao Tang exerts its therapeutic effects by modulating neurotransmitter levels and improving hypothalamic–pituitary–adrenal (HPA) axis function, thus achieving significant efficacy in treating insomnia [15]. Clinically, it shows both safety and effectiveness, particularly suitable for patients suffering from Yin-deficiency fire-excess insomnia induced by prolonged psychological stress.

Another classic prescription for harmonizing Yin and Yang is Jiaotai Wan, consisting of Rougui (Cinnamon bark) and Huanglian. It is mainly used for insomnia due to disharmony between the heart and kidney. Rougui warms and supports kidney Yang, while Huanglian clears heart fire. Together, they facilitate communication between heart and kidney. Experimental studies [16] confirm that Jiaotai Wan can significantly improve sleep architecture, prolong deep sleep duration,

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and reduce nighttime awakenings. These formulas epitomize the holistic approach of TCM: correcting Yin–Yang imbalance to restore normal sleep function.

5.1.2. Formulas for supplementing deficiency and reducing excess

For insomnia patterns differentiated as deficiency or excess, TCM adopts syndrome-based strategies of supplementation or reduction. Guipi Tang (Restore the Spleen Decoction) is a classic formula for treating heart–spleen deficiency insomnia. It is composed of Dangshen (Codonopsis), Baizhu (Atractylodes macrocephala), Huangqi (Astragalus membranaceus), Danggui (Angelica sinensis), Yuanzhi (Polygala tenuifolia), among others [10]. Dangshen, Baizhu, and Huangqi strengthen the spleen and replenish qi, serving as the foundation for blood production; Danggui nourishes the blood to benefit the heart; combined with Yuanzhi, which calms the spirit, the formula effectively tonifies the heart and spleen, enriches blood, and tranquilizes the mind. Clinical studies have shown that Guipi Tang not only alleviates insomnia symptoms but also relieves comorbid anxiety and depression, improving overall quality of life. For excess-type insomnia, Longdan Xiegan Tang (Gentiana Decoction to Drain the Liver) is a commonly used prescription, especially in cases of liver-fire disturbing the heart. The formula consists of Longdancao (Gentiana), Zhizi (Gardenia jasminoides), Huangqin (Scutellaria), Chaihu (Bupleurum chinense), and others. It clears and drains liver fire, disperses liver qi stagnation, and relieves agitation. Longdancao directly enters the liver meridian to purge excess fire; Zhizi and Huangqin reinforce heat-clearing effects; Chaihu soothes the liver and regulates qi. Experimental evidence [8] indicates that Longdan Xiegan Tang reduces restlessness by inhibiting inflammatory responses and regulating the neuroendocrine system, thereby alleviating insomnia caused by exuberant liver fire. In addition, Xuefu Zhuyu Tang (Drive Out Stasis in the Mansion of Blood Decoction) is frequently prescribed for insomnia due to blood stasis obstructing the channels. By promoting blood circulation, removing stasis, regulating qi, and relieving pain, it unblocks meridians and calms the spirit, improving sleep. The flexible application of these formulas exemplifies TCM's precision in syndrome differentiation and its individualized approach to supplementation and reduction.

5.2. Acupuncture and tuina therapy

5.2.1. Acupuncture for regulating Yin–Yang deficiency and excess

Acupuncture is an important modality in TCM insomnia treatment. By stimulating specific acupoints with tailored needling techniques, it effectively regulates Yin–Yang deficiency and excess. Shenmen (HT7), located at the ulnar end of the wrist crease on the Heart meridian, has the function of calming the mind and spirit, often used for insomnia due to heart Yin deficiency or hyperactive heart fire [17,18]. Sanyinjiao (SP6), on the medial side of the lower leg, is the intersection point of the Spleen, Liver, and Kidney meridians. It tonifies the liver and kidney, regulates qi and blood, and is especially suited for Yin-deficiency hyperactivity of Yang insomnia. Balanced reinforcing–reducing methods are usually applied to harmonize Yin and Yang and unblock meridians. Baihui (GV20), at the vertex of the head, a key point of the Governing Vessel, lifts Yang, stabilizes the spirit, and is indicated for insomnia due to insufficient Yang qi or Yin–Yang imbalance. Taichong (LR3), located on the dorsum of the foot between the first and second metatarsals, belongs to the Liver meridian and is effective in soothing the liver, regulating qi, and calming hyperactive liver Yang, suitable for liver-fire–induced insomnia [19,20]. Rational combination of these acupoints,

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together with appropriate needling techniques based on individual conditions, enables acupuncture to regulate Yin–Yang while alleviating insomnia and improving sleep quality.

5.2.2. Tuina for unblocking meridians

Tuina (Chinese therapeutic massage) alleviates insomnia by stimulating specific regions to unblock meridians and regulate the circulation of qi, blood, Yin, and Yang. Common manipulations include kneading, pressing, and rubbing, primarily applied to points on the head, face, and back. Kneading and pressing Yintang (EX-HN3) helps relax frontal tension and promote local circulation. Stroking the eyebrow ridges relaxes ocular muscles and relieves visual fatigue. Pressing Fengchi (GB20) clears wind, refreshes the brain, and calms the spirit. Rolling along the Bladder meridian on the back stimulates organ-associated points to regulate visceral functions, especially effective for insomnia due to visceral disharmony. Rolling is often combined with rubbing to induce warmth, open meridians, and enhance qi–blood circulation. Abdominal massage, performed in gentle clockwise movements, strengthens the spleen and stomach, harmonizes qi and blood, and is particularly beneficial for insomnia caused by heart–spleen deficiency. Research [11] has shown that tuina activates cutaneous receptors through mechanical stimulation, thereby modulating autonomic nervous system function to exert sedative and calming effects. Compared with acupuncture, tuina is non-invasive, simple to perform, and more easily accepted by patients. When combined with internal herbal therapy, its efficacy is further enhanced, achieving the goal of comprehensive treatment.

6. Conclusion and future prospects

Although the theory of Yin–Yang deficiency and excess has already achieved remarkable results in the treatment of insomnia with Traditional Chinese Medicine (TCM), the complex and evolving etiologies of insomnia in modern society call for continuous innovation and development. Future research should focus on the following areas: First, at the theoretical level, modern scientific technologies—such as neuroimaging and genetic testing—should be integrated to further elucidate the mechanisms by which Yin–Yang deficiency–excess theory contributes to the treatment of insomnia, thereby providing more scientific evidence for clinical practice. Second, in terms of therapeutic techniques, it is essential to actively explore the integration of TCM with modern technologies to develop more precise and personalized treatment strategies. For example, artificial intelligence can be employed to optimize the process of syndrome differentiation and treatment, enhancing both diagnostic accuracy and efficiency; meanwhile, nanotechnology may be harnessed to develop novel herbal formulations with improved targeting and bioavailability. Third, with respect to clinical practice optimization, it is necessary to establish a comprehensive and feasible system of standardized efficacy evaluation criteria, so as to regulate clinical operations and improve the comparability and reliability of treatment outcomes. Finally, at the societal level, public health education should be strengthened to disseminate knowledge on the prevention and treatment of insomnia through TCM. By fostering correct treatment concepts among patients, these efforts can promote the broader application and development of TCM in the field of insomnia therapy. Through such endeavors, the effectiveness of TCM in treating insomnia is expected to be further advanced, ultimately providing higher-quality medical services for insomnia patients worldwide.

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