

Epidemiological Characteristics of Insomnia and Research Progress on Its Comorbidities in Chinese and Western Medicine

LI Hangzhi, WANG Jiepeng, ZHANG Xiaoyi, FANG Chaoyi

2026-08-19

ChinaRxiv

View the original and related papers at

<https://chinaxiv.org/items/chinaxiv-202608.00014>

Source: ChinaXiv. Machine translation. Verify with the original.

Abstract

Insomnia is one of the most common clinical sleep problems. Epidemiological surveys show that the prevalence of insomnia in the general population worldwide has remained at a high level over the long term, and the same is true in China; the occurrence of insomnia is closely associated with factors such as age, sex, and stressful events. Modern medicine and traditional Chinese medicine have both provided systematic explanations of the diagnosis and comorbidity of insomnia, but at present there is a lack of systematic integration between the two. This article reviews and summarizes the understanding and research progress of Chinese and Western medicine regarding the epidemiological characteristics and comorbidities of insomnia, and analyzes the intersections between the two diagnostic and therapeutic approaches at the level of insomnia diagnosis and assessment. It is considered that the two have potential conceptual correspondences and theoretical complementarity, but these remain to be verified by evidence-based medical research. Chinese and Western medical diagnosis and treatment of insomnia can draw on each other and share an analytical framework for epidemiological risk factors, with complementary advantages in comorbidity management, thereby providing more comprehensive and complete diagnostic and therapeutic approaches for clinical practice.

Full Text

Epidemiological Characteristics of Insomnia and Research Progress on Its Comorbidities in Chinese and Western Medicine

LI Hangzhi¹, WANG Jiepeng¹, ZHANG Xiaoyi², FANG Chaoyi^{1*}

1. 050200 Shijiazhuang, Hebei Province, College of Traditional Chinese Medicine, Hebei University of Chinese Medicine

2. 100029 Beijing, College of Traditional Chinese Medicine, Beijing University of Chinese Medicine

* Corresponding author: FANG Chaoyi, Professor/Doctoral supervisor;
E-mail: fangchaoyi@hebcm.edu.cn

[Abstract] Insomnia is one of the most common sleep problems encountered in clinical practice. Epidemiological surveys show that the prevalence of insomnia in the general population worldwide has long remained at a relatively high level; the same is true in China. The occurrence of insomnia is closely associated with factors such as age, sex, and stressful events. Both modern medicine and traditional Chinese medicine have systematic interpretations of the diagnosis and comorbidities of insomnia, but at the present stage the two still lack systematic integration. This article reviews and summarizes the understanding and research progress in Chinese and Western medicine regarding the epidemiologi-

cal characteristics and comorbidities of insomnia, and analyzes the intersections between the two diagnostic and therapeutic approaches at the level of insomnia diagnosis and evaluation. It proposes that there are potential conceptual correspondences and theoretical complementarities between the two, but these remain to be validated through evidence-based medical research. Chinese and Western medical diagnosis and treatment of insomnia can draw on each other's strengths, share an epidemiological risk-factor analysis framework, and achieve complementary advantages at the level of comorbidity management, thereby providing more comprehensive and refined diagnostic and therapeutic thinking for clinical practice.

[Key words] Insomnia; sleep initiation and maintenance disorders; epidemiology; chronic disease comorbidity; integration of traditional Chinese and Western medicine; integrative medicine

[Chinese Library Classification No.] R 277.7 R 741 **[Document code]** A DOI: 10.12114/j.issn.1007-9572.2026.0203

Epidemiology and Comorbidities of Insomnia: Research Advances from an Integrated Chinese and Western Medical Perspective

LI Hangzhi¹, WANG Jiepeng¹, ZHANG Xiaoyi², FANG Chaoyi^{1*}

1. College of Traditional Chinese Medicine, Hebei University of Chinese Medicine, Shijiazhuang 050200, China

2. College of Traditional Chinese Medicine, Beijing University of Chinese Medicine, Beijing 100029, China

* Corresponding author: FANG Chaoyi, Professor/Doctoral supervisor; E-mail: fangchaoyi@hebcm.edu.cn

[Abstract] Insomnia is the most prevalent sleep disorders encountered in clinical practice. Epidemiological surveys indicate that the global prevalence of insomnia in the general population remains persistently high, a trend similarly observed in China, where the condition is closely associated with factors such as age, sex, and stressful life events. While both modern medicine and traditional Chinese medicine (TCM) offer systematic accounts of the diagnosis and comorbidities of insomnia, these two frameworks have yet to be systematically integrated. This article provides a comprehensive review of current knowledge and recent advances in the epidemiological characteristics, and comorbidities of insomnia from both the Western and TCM perspectives. It examines the intersections and interrelations between these two distinct diagnostic and evaluative paradigms, proposing that conceptual correspondences and theoretical complementarities exist between them, although these require further validation through modern evidence-based approaches. The integration of Chinese and Western medicine enables cross-referencing in the diagnosis and management of

insomnia, allows for a shared epidemiological risk-factor framework, and offers complementary advantages—particularly in the management of comorbidities—thus providing clinicians with a more comprehensive and integrated strategy for diagnosis and treatment.

[Key words] Insomnia; Sleep initiation and maintenance disorders; Epidemiology; Multiple chronic conditions; Integrated traditional Chinese medicine & Western medicine; Integrative medicine

Funded projects: FANG Chaoyi National Famous Traditional Chinese Medicine Expert Inheritance Studio Project (Letter of the Department of Human Resources and Education, National Administration of Traditional Chinese Medicine [2022] No. 75); National College Students' Innovation and Entrepreneurship Training Program Project (202414432002X)

Citation: Li Hangzhi, Wang Jiepeng, Zhang Xiaoyi, et al. Epidemiological characteristics of insomnia and research progress on its comorbidities in Chinese and Western medicine [J]. Chinese General Practice, 2026. DOI: 10.12114/j.issn.1007-9572.2026.0203. [Epub ahead of print] [www.chinagp.net]

Li H Z, Wang J P, Zhang X Y, et al. Epidemiology and comorbidities of insomnia: research advances from an integrated Chinese and western medical perspective[J]. Chinese General Practice, 2026. [Epub ahead of print]

© Editorial Office of Chinese General Practice. This is an open access article under the CC BY-NC-ND 4.0 license.

Insomnia, called *bumei* in Chinese medicine, refers to a subjective experience in which, despite having suitable opportunity and environment for sleep, an individual remains dissatisfied with sleep duration and/or sleep quality, resulting in impairment of daytime functioning^[1]. Insomnia may exist as an independent sleep disorder, and it often also appears as an accompanying symptom or comorbid condition of various somatic and mental illnesses, seriously compromising patients' quality of life, work efficiency, and physical and mental health^[2]. Modern sleep medicine, drawing on diagnostic systems such as the *International Classification of Sleep Disorders* (ICSD) and the *Diagnostic and Statistical Manual of Mental Disorders* (DSM), has established standardized procedures for the definition, diagnosis, assessment, and treatment of insomnia^[3-4]. At the same time, through several millennia of clinical practice, Chinese medicine—based on the theories of yin-yang and the five phases, as well as the zang-fu channels and collaterals—has developed a distinctive system of understanding and pattern differentiation-based treatment for the etiology and pathogenesis of *bumei*^[5]. The two systems interpret the same health problem from different theoretical frameworks; they differ, yet can also complement each other. From the perspective of integrated Chinese and Western medicine, this article reviews relevant guidelines and scientific findings in recent years, summarizes the epidemiological characteristics of insomnia and research progress concerning its complex comorbidities, and analyzes points of alignment between Chinese and Western medicine in conceptual correspondence, theoretical complementarity, and evi-

dence comparison, as well as existing research “shortcomings,” with the aim of providing reference for subsequent clinical and scientific research.

1 Literature Search Strategy

This article is a narrative review, aiming to integrate and analyze Chinese- and Western-medicine research progress concerning the epidemiology and comorbidities of insomnia. Computerized searches were conducted in PubMed, CNKI, the Wanfang Data Knowledge Service Platform, the Chinese Medical Journal Network, and other databases; the search period extended from database inception to March 2026. Chinese search terms included “insomnia,” “sleep disorder,” “epidemiology,” “comorbidity,” and “integrated Chinese and Western medicine”; English search terms included “Insomnia,” “Sleep disorder,” “Epidemiology,” “Multimorbidity,” “Comorbidity,” “traditional Chinese medicine,” and “Integrated traditional Chinese and Western medicine.” A search strategy combining subject terms and free-text terms was adopted, and the reference lists of included articles were also searched manually. All records initially retrieved were imported into EndNote software for automatic deduplication. Subsequently, two researchers with experience in literature screening independently performed secondary screening by reading titles, abstracts, and keywords one by one. Literature preliminarily excluded as not meeting the research topic, as well as literature for which screening judgments diverged, was jointly reviewed and determined by the two researchers through discussion.

Inclusion criteria: (1) studies focusing on the epidemiological characteristics, comorbidities, and integrated Chinese and Western medicine diagnosis and treatment of insomnia, covering research related to modern medicine and traditional Chinese medicine; (2) article types including original research, literature reviews, systematic reviews, expert opinions, and academic commentaries; (3) articles published in Chinese or English; (4) priority given to representative literature such as international/domestic authoritative guidelines, large epidemiological surveys, systematic reviews/Meta-analyses, and highly cited original studies; for the Chinese-medicine component, representative literature involving renowned-expert experience and pattern-type studies was also included, and some small-sample clinical observations and animal experiments were included as supplementary evidence for mechanism exploration (with the evidence level clearly indicated when cited). The search focused on high-quality domestic and international guidelines, large epidemiological surveys, and representative studies of Chinese-medicine expert experience and pattern types published in the past 10 years. Exclusion criteria: (1) literature whose content was unrelated to the topic of this study; (2) literature for which the full text could not be obtained; (3) literature with serious methodological flaws.

2 Symptomatology of Insomnia

2.1 Definition of Insomnia Symptoms in Modern Medicine

According to the *Guideline for the Diagnosis and Treatment of Insomnia Disorder (2025 Edition)*[¹] and ICSD-3[³], the core symptoms of insomnia include: difficulty initiating sleep (sleep latency in adults >30 min), difficulty maintaining sleep (number of awakenings () 2 times or difficulty falling back asleep after awakening), early-morning awakening, decreased sleep quality and reduced total sleep time (usually <6.5 h), and accompanying impairment of daytime functioning (fatigue, low mood or irritability, decreased attention or memory, daytime sleepiness, reduced work or learning ability, etc.). Short-term insomnia is also called adjustment insomnia or acute insomnia; it is often triggered by a clear stressor, usually lasts for several days or weeks, and has a course shorter than 3 months. When insomnia attacks occur () 3 times/week and the course lasts at least 3 months, chronic insomnia is diagnosed.

2.2 Chinese-Medicine Pattern-Differentiation Understanding of *Bumei*

Chinese medicine holds that sleep is a physiological process of “interaction between yin and yang.” The *Ling Shu · Kou Wen* states: “When yang qi is exhausted and yin qi is abundant, the eyes close; when yin qi is exhausted and yang qi is abundant, one awakens.” When the zang-fu organs of the human body are harmonized, qi and blood are sufficient, the mind-spirit is settled, and defensive yang can enter yin, then “yin is level and yang is secure,” and at night *bumei* naturally settles[⁶]. If factors such as improper diet, emotional abnormalities, dysregulation from overwork or leisure, or constitutional deficiency in old age cause yang not to enter yin and the spirit to lose its residence, *bumei* may occur[⁵]. Its pathogenesis is generally attributed to disharmony between yin and yang and is closely related to abnormal ascent and descent of qi movement. Liu Yao et al.[⁷] believe that insomnia is often caused by deficiency of kidney water, which is unable to ascend to nourish heart fire, resulting in exuberant heart fire; they used modified Jiaotai Anshen decoction in treatment and obtained preliminary clinical efficacy. Lian Chunyu et al.[⁸] proposed differentiating insomnia from the perspective of “liver yang-lung yin,” holding that excessive ascent of liver yang, insufficient depurative descent of lung yin, and yang qi floating upward without interacting with descending kidney water can also lead to yang not entering yin and thus insomnia. Their thinking of coordinating ascent and descent expands the understanding of the pathogenesis by which liver fire causes disease. The *Su Wen · Ni Tiao Lun* states: “If the stomach is not harmonized, lying down is not peaceful.” The spleen and stomach are the pivot of qi movement ascent and descent; if the spleen fails to ascend the clear and the stomach fails to descend the turbid, *bumei* may also occur. Zhou Liyan et al.[⁹], using acupoint buried thread combined with auricular-point plaster therapy to treat spleen-stomach disharmony-type insomnia, observed positive results, thereby enriching the theoretical and therapeutic thinking that

insomnia is caused by spleen-stomach qi movement disorder. It can thus be seen that Chinese-medicine pattern differentiation for insomnia is not confined to the patient's sleep symptoms themselves; rather, starting from the whole, it examines symptoms within the interaction of the patient's qi, blood, yin, and yang, thereby providing multidimensional thinking for the treatment of insomnia.

2.3 Comparison and Integration of Chinese- and Western-Medicine Understanding of Symptoms

Combining existing guidelines and research findings shows that modern medicine's description of insomnia symptoms emphasizes objective indicators of the sleep-wake process (such as time parameters) and the overall impact on daytime functioning, with relatively strong standardization and operability. By contrast, Chinese-medicine symptomatology pays greater attention to holism, association, and dynamics, placing sleep problems within the framework of imbalance among zang-fu organs, qi, blood, yin, and yang, and carrying out refined pattern differentiation through the integration of the four diagnostic methods. Taking the chief complaint of "difficulty initiating sleep" as an example, at the Western-medicine level it may indicate increased physiological arousal or delay of the circadian rhythm;

In traditional Chinese medicine, it may be differentiated as "exuberant heart-liver fire" (excess heat), "disharmony between the heart and kidney" (deficiency heat), or "disadvantageous pivot," with marked differences in the corresponding accompanying symptoms, treatment principles, prescriptions, and medicinals. The authors believe that although there are potential conceptual correspondences and associations between Chinese- and Western-medicine symptomatology, a clear mapping relationship between "pattern type and objective indicators" cannot yet be established. This issue remains an unverified hypothesis and requires systematic, high-quality empirical studies for validation. From the perspectives of clinical application and future research directions, integrating the two may help to elucidate more deeply the individualized pathophysiological mechanisms and psychological characteristics of insomnia.

3 Epidemiological Characteristics of Insomnia

Insomnia is a global public health problem. A meta-analysis in China that included 17 studies showed that the prevalence of clinically significant insomnia in the general Chinese population was approximately 15%^[10]. During the coronavirus disease 2019 (COVID-19) pandemic, the global prevalence of insomnia increased significantly, with reported data ranging from 20% to 45%^[11]; the result of an online survey in China was 29.2%^[12]. Although the scales and guidelines used for diagnosing insomnia differed to some extent across the literature, the core diagnostic criteria for insomnia and dissatisfaction with sleep were largely consistent; therefore, the above data are comparable.

In recent years, several large-scale epidemiological surveys have revealed the

stratified distribution characteristics of insomnia in the Chinese population. A large-sample survey published in *The Lancet* in 2026, covering 46,207 residents aged ()15 years in seven geographic regions of China, showed that the weighted prevalence of poor sleep quality (Pittsburgh Sleep Quality Index score >5) was 23.9%^[13]. In terms of age strata, the prevalence was 11.3% among those aged 15–24 years and rose to 41.0% among those aged ()65 years, showing a significant increasing trend with age. At the regional and urban-rural levels, the weighted prevalence of poor sleep quality was highest in rural areas (26.2%); in the central region, the risk of poor sleep quality among people aged 45–60 years was significantly lower than that in the eastern region among people aged 45–60 years^[13]. Another meta-analysis of the prevalence of sleep disorders among older adults showed that the prevalence among rural older adults (44.0%) was higher than that among urban older adults (41.5%), and the prevalence in the central region (63.3%) was higher than that in the eastern (37.2%) and western regions (43.3%)^[14]. At the sex level, the risk of disease in women was approximately 1.4 times that in men, and this value increased to 1.7 times among those aged >45 years^[1]; the incidence of insomnia in perimenopausal women increased markedly, fluctuating between 13.2% and 65.1%^[15]. The above stratified data indicate that the epidemiological distribution of insomnia is influenced by differences in age, sex, region, and urban-rural status, and that the risk characteristics of different subgroups differ substantially.

Demographic characteristics such as female sex, advanced age, and poor socioeconomic status, as well as psychological health problems, a history of insomnia, and susceptibility to sleep, are all risk factors for insomnia^[13]. Traditional Chinese medicine theory holds that women take the liver as the congenital basis; menstruation, pregnancy, childbirth, and lactation all readily consume and injure yin-blood. Individuals with a tendency toward “yin-deficiency constitution” or “qi-stagnation constitution” are more likely to experience disturbed sleep during periods of hormonal fluctuation. Gao Qiang et al.^[16] suggested that the incidence of insomnia in perimenopausal women may reach 40%–60%, and that the pattern type is often closely related to “disharmony between the heart and kidney.” Multiple epidemiological studies have confirmed that the incidence of insomnia among older adults is significantly higher than that among children and adolescents^[13–14, 17]. From the perspective of susceptibility based on traditional Chinese medicine constitution, older adults have depletion of kidney essence and exhaustion of the source of essence and blood, which may lead to insufficiency of heart blood and malnourishment of the heart; older adults with characteristics of “yin-deficiency constitution” or “special constitution” are more likely to develop insomnia because of insufficiency of heart blood and malnourishment of the heart^[5]. Social factors such as economic hardship, social isolation, negative life events (bereavement, divorce, etc.), and low educational level, as well as stress reactions such as anxiety and depression, are definite risk factors for insomnia^[18–19]. Among them, the incidence of insomnia is highest in populations with comorbid mental disorders or substance use disorders^[14]. From the perspective of TCM pathogenesis, most of the above

circumstances fall under “injury of the emotions” and “loss of regulation due to overstrain and ease,” which cause liver qi constraint, and subsequently transform into fire, generate phlegm, and disturb the spirit. A history of insomnia, family history, hyperarousal constitution, and “stress-related sleep reactivity” (i.e., an individual’s susceptibility to sleep interruption under stress) can all increase the risk of insomnia[^{20–21}]. In addition, Chinese medicine holds that individuals with characteristics of “yin-deficiency constitution,” “qi-stagnation constitution,” “phlegm-dampness constitution,” or “special constitution” are more likely to develop insomnia under stress[²²]. Although the “individual susceptibility to sleep interruption under stress” described by “stress-related sleep reactivity” has a potential conceptual correspondence with the description in TCM constitution theory that populations with “yin-deficiency constitution” and “qi-stagnation constitution” are prone to unease when the emotions are injured, the relationship is similar to other epidemiological concepts and currently derives only from theoretical inference. There remains a lack of empirical research that simultaneously assesses TCM constitution type and psychometric stress-related sleep reactivity within the same population and compares their predictive validity for the occurrence of insomnia.

A review of Chinese- and Western-medicine literature shows that modern medicine mostly identifies problems from a statistical perspective and attempts to explain the phenomenon from the levels of individual physiological and psychological changes as well as socioeconomic factors; Chinese medicine, in contrast, tends more to combine individual symptoms with the overall characteristics of the population, using constitution theory to interpret individual differences in disease onset. Both recognize that some populations have congenital or acquired susceptibility to insomnia. The TCM “yin-deficiency constitution” and “qi-stagnation constitution” and the modern-medicine concept of “stress-related sleep reactivity” may point to similar clinical subgroups. Mutual interpretation at this theoretical level still requires empirical studies for corroboration. Incorporating TCM constitution classification as an independent predictor into prospective cohort studies of insomnia is a key pathway for testing this theoretical correspondence and is also an important direction for future integrative Chinese- and Western-medicine epidemiological research. Such mutual confirmation across theoretical systems may provide a theoretical basis for precise risk assessment and individualized prevention of insomnia.

4 Comorbidities of Insomnia

The management of insomnia comorbidities has received extensive attention in recent years. With the development of integrative medicine, the concept of comorbidity has been increasingly emphasized. Comorbidity refers to the simultaneous presence of multiple diseases in the same individual. Some of these coexisting diseases have no clear causal relationship, while others have bidirectional effects or share some pathogenic mechanisms. Current research increasingly tends to believe that the influence of multiple coexisting diseases on the body

involves complex associations; for example, insomnia may coexist with various psychiatric disorders, physical disorders, and other sleep disorders. Therefore, modern medicine no longer classifies “primary” and “secondary” insomnia solely according to whether concomitant diseases are present, but instead emphasizes the universality of comorbid states and the complexity of their mutual influences^[23]. At present, most studies of insomnia comorbidities still take specific diseases as the unit of observation, because their diagnostic criteria are clear, they are clinically operable, they can be connected with existing epidemiological evidence, and they facilitate clinical diagnosis and treatment as well as scientific research. In addition, although intersecting pathogenic mechanisms exist between insomnia and various types of diseases, pathological processes such as inflammatory responses, immunity, and metabolism appear in multiple diseases; using these as independent classification criteria...

logic is not rigorous. From the perspectives of the zang-fu meridians and the generation-restriction relationships of the Five Phases, Chinese medicine interprets this type of “comorbidity” phenomenon; the relevant views have also received preliminary confirmation in a number of recent clinical studies. The convergence and complementarity of the two diagnostic and therapeutic approaches provide more evidence and choices for the precise treatment of insomnia.

4.1 Comorbidity with Mental Disorders

Insomnia and mental disorders—especially mood disorders and anxiety disorders—show a high degree of comorbidity and bidirectional association^[24]. Research on the relationship between insomnia and mental disorders can be traced to the levels of growth and development and familial inheritance. A 40-year longitudinal prospective study followed 1,037 children in New Zealand from birth (1972–1973) to the age of 40 years and found that insomnia was highly comorbid with multiple mental disorders; after correction for contemporaneous comorbid factors, among people with a family history of depression/anxiety and onset of lifetime depression/anxiety in childhood, the risk of insomnia at age 38 was significantly increased^[25]. A two-sample Mendelian randomization study also showed that insomnia was associated with increased risk of attention-deficit/hyperactivity disorder (ADHD), major depressive disorder (MDD), and post-traumatic stress disorder (PTSD)^[26]. Current studies suggest that insomnia may serve as a precursor symptom of multiple mental illnesses. Compared with those without insomnia symptoms, individuals who self-report insomnia have a higher risk of developing a new mental disorder within 1 year or longer—especially MDD, generalized anxiety disorder (GAD), mental disorders, and alcohol use disorder; moreover, insomnia and reduced total sleep time are independent risk factors for suicide^[27].

4.1.1 Depressive Disorder

Approximately 40% of patients with insomnia have comorbid clinical depression; at the same time, insomnia is also one of the symptoms of MDD, and

up to 80% of patients with depression may have insomnia, with insomnia often occurring earlier than depression^[28]. The typical symptom of depression comorbid with insomnia is early-morning awakening, whereas younger patients more often present chiefly with difficulty falling asleep. In addition, some patients with depression complain of not sleeping all night, while sleep records only indicate shortened sleep duration. Studies show that patients with depression have shortened rapid eye movement (REM) sleep latency to varying degrees, including increased REM sleep in the first third of the night and increased total amount and intensity of REM sleep^[29]. From the perspective of Chinese medicine theory, stagnation of liver qi is the core pathogenesis of depression syndrome. Prolonged stagnation transforms into fire, and fire disturbing the spirit above may cause insomnia (liver fire disturbing the heart); depressive fire consuming and damaging yin-blood, with yin deficiency and exuberant fire, may also give rise to insomnia. This is the dialectical relationship in Chinese medicine between “internal causes leading to disease” and “disease leading to depression,” in which “liver depression” is a common pathogenesis leading to both insomnia and depression; it suggests that soothing the liver, relieving depression, and tranquilizing the mind may be one of the effective approaches for treating this comorbidity^[1].

4.1.2 Anxiety Disorder

Approximately 70% of patients with GAD have comorbid sleep disorders^[30]. Anxiety disorders such as GAD and PTSD can lead to subjective sleep disturbance, shortened total sleep time, and decreased sleep continuity^[31]. Li Na et al.^[32], from the perspective of Chinese medicine, classified this type of pattern as gallbladder depression with phlegm disturbance or deficiency of both heart and gallbladder qi, which can provide a reference for the clinical diagnosis and treatment of insomnia comorbid with anxiety disorder.

4.1.3 PTSD

A meta-analysis showed that the incidence of insomnia among patients with PTSD was 63%^[33]. Insomnia in patients with PTSD is often accompanied by nightmares and fear of falling asleep or falling asleep again; insomnia occurring before trauma also increases the risk of developing PTSD^[33].

4.1.4 Substance Use Disorder

Insomnia is not only an inducement for alcohol and drug abuse, but also a risk factor for their poor outcomes and recurrence^[14]. Chinese medicine attributes it to internal accumulation of toxic pathogens, consuming and damaging qi and yin, thereby leading to dual deficiency of heart and spleen, disharmony between heart and kidney, and loss of governance by the spirit-mind.

In summary, there is a potential association between modern medical descriptions of the comorbidity of insomnia and mental disorders and the Chinese

medical theory of pathogenesis evolution; however, this theoretical hypothesis still lacks empirical studies that conduct dynamic correlation analyses of the two. Although many of the above studies have confirmed that insomnia and mental disorders are highly comorbid and mutually causal, in clinical practice patients with insomnia often deny or understate the influence of mental illness when seeking care, creating obstacles to the clinical identification of psychiatric comorbidity. At the same time, insomnia may also exist independently; while attending to comorbid mental disorders, clinicians should also avoid overdiagnosis. At present, most studies on insomnia and mental disorders are cross-sectional in design, and there is still a lack of analyses of high-risk factors for their mutual influence and construction of predictive models.

4.2 Comorbidity with Organic Diseases

The comorbidity rate of insomnia among some patients with chronic diseases can reach 40%, whereas it is only 8% in the general control population^[34]. A 2023 systematic review included studies from 16 countries and 2 cross-national comparative studies, involving 481,862 subjects in total; the results suggested that insomnia is correlated with comorbidity with chronic diseases^[35].

4.2.1 Nervous System Diseases and Cognitive Disorders

Many nervous system diseases may be accompanied by insomnia, and insomnia is also a core symptom of some nervous system diseases; it is relatively common in epilepsy, dementia, Parkinson's disease, traumatic brain injury, stroke, and multiple sclerosis. The nervous system is the anatomical and biological basis of subjective consciousness; injury to the nervous system itself, accompanying symptoms of disease (such as pain and spasms), and therapeutic drugs (such as glucocorticoids and some antiepileptic drugs) can all interfere with sleep. In addition, persistent insomnia can induce nocturnal agitation, delirium, and wandering behaviors, increasing the proportion of stage 1 sleep and wakefulness, further aggravating brain injury and worsening damage to the nervous system. Approximately 25% of patients with Alzheimer's disease have insomnia; meanwhile, studies show that elevated levels of β -amyloid peptide and inflammation in patients with insomnia may increase the risk of dementia^[36]. From the perspective of Chinese medical pathogenesis, such "neurologic-sleep comorbidities" mostly belong to vacuity of the root and excess of the branch, with malnourishment of the heart and spirit. A study by Wang Xiaoyu et al.^[37] confirmed that acupuncture can improve sleep disturbances in elderly patients with mild vascular cognitive impairment, suggesting that Chinese medicine interventions have potential application in the management of neurologic-sleep comorbidity. The β -amyloid peptide deposition and neuroinflammatory responses that modern medicine focuses on have potential conceptual intersections with the Chinese medical pathomechanisms of "kidney essence depletion, insufficiency of marrow sea, and toxins damaging the brain collaterals"; the therapeutic effects of acupuncture in improving sleep may be realized in part by regulating

neuroinflammation, but the precise correspondence between the two remains to be further explored.

4.2.2 Cardiovascular Diseases

Studies have found that patients with hypertension, coronary heart disease, and heart failure have relatively high rates of insomnia^[34]. At the same time, insomnia can activate the sympathetic nervous system, causing circadian abnormalities in blood pressure (non-dipper blood pressure)^[38], increasing the risk of hypertension and cardiovascular events, and raising the overall risk of death in some patients; the difference remains significant even after adjustment for potential confounding factors^[39–42]. Cardiovascular disease—

disease and autonomic nervous function are directly related, and sleep is an important period for the restoration of autonomic nervous function; this is the basis for the reciprocal causality between cardiovascular disease and insomnia. Traditional Chinese medicine often understands this from the functional association between the heart governing the blood vessels and the heart governing the spirit; clinically, treatment is often based on the theory of disharmony of qi and blood, using methods such as moving qi and activating blood, and relieving constraint and calming the spirit. Yuan et al. [43] used Chaihu Shugan San combined with Xuefu Zhuyu Decoction with modifications, supplemented by rose flower and Albizia julibrissin bark, etc.; on the basis of activating blood and resolving stasis or supplementing qi and nourishing blood, they added spirit-calming medicinals to treat this type of insomnia. From a clinical perspective, this suggests the potential value of this line of thinking. Regulation of autonomic nervous function is a shared pathological pathway of cardiovascular disease and insomnia, suggesting that it may be a common target for TCM–Western medicine intervention in cardiovascular–insomnia comorbidity. However, integrated studies that simultaneously incorporate the evolution of TCM patterns and objective indicators of autonomic nerves are still needed to further verify the possible correspondence between TCM pathogenesis and autonomic nervous function.

4.2.3 Respiratory system diseases

Insomnia is present in 25%–50% of patients with pulmonary diseases [44]. Patients with chronic obstructive pulmonary disease and asthma often develop insomnia because of cough, dyspnea, and hypoxia, and insomnia may increase the risk of adverse respiratory outcomes in patients with chronic obstructive pulmonary disease [45]. Traditional Chinese medicine holds that the lung governs qi and is in charge of respiration; stagnation of lung qi or deficiency and impairment of lung qi may cause ancestral qi to be generated insufficiently, clear qi to fail to enter, and turbid qi to fail to exit, disturbing the mind. Alternatively, lung disease may reach the kidney, leading to failure of the kidney to receive qi, floating of deficient yang, and disturbance of the mind. Treatment should take into account both regulating the lung and kidney and calming the spirit. Insom-

nia related to respiratory system diseases is mainly caused by somatic symptoms that directly interfere with sleep. Whether insomnia can in turn affect respiratory function through neural reflexes or autonomic nervous pathways remains unclear. Subsequent studies may further explore the mechanisms of action of relevant Chinese medicines and enrich therapeutic approaches for this type of comorbidity.

4.2.4 Endocrine and metabolic diseases

People with diabetes, thyroid dysfunction, and perimenopausal status often develop insomnia [34]. More than 50% of patients with diabetes have insomnia; pain and increased nocturia caused by diabetic neuropathy are direct precipitants of insomnia [38,40]. A meta-analysis that included multiple cohort studies with a sample size exceeding 1 million adults with prediabetes showed that insomnia is an independent risk factor for progression from prediabetes to type 2 diabetes [46]. Insomnia interventions for patients with diabetes can not only improve sleep efficiency but also help with glycemic control. Traditional Chinese medicine holds that the basic pathogenesis of wasting-thirst is yin deficiency with dryness-heat, which over time may lead to deficiency of both heart and kidney yin and deficiency fire disturbing the heart, resulting in insomnia. This understanding potentially intersects with modern medical mechanistic interpretations of diabetes, but still requires more rigorous integrative mechanistic studies for verification. The endocrine system relies on hormones to regulate the coordinated operation of organs and systems throughout the body. Whether insomnia participates in disease occurrence by altering hormone levels currently lacks relevant mechanistic research.

4.2.5 Cancer

The prevalence of insomnia among patients with cancer is 30%–60% [47–48]. Insomnia is often caused by somatic symptoms such as cancer pain, emotional disorders, and changes in life rhythm due to hospitalization. Whether insomnia increases the risk of cancer has been reported in relevant studies: one meta-analysis included 8 cohort studies, with a total sample size of more than 500,000 cases; the results suggested that the risk of tumor onset increased by 24% in people with a history of insomnia [49]. Another meta-analysis showed that the relative risk of lung cancer increased by 11% in people with insomnia [50]. Tumorigenesis involves multiple factors, and immune evasion is an important component. Existing studies have confirmed an association between tumors and insomnia, but whether sleep participates in tumor occurrence and development through immune pathways, what the specific mechanisms are, and whether it can serve as a therapeutic target for tumors remain inconclusive.

4.2.6 Chronic pain

Approximately 75% of patients with chronic pain have symptoms of insomnia [51]. Pain, as a strong pathological signal, can continuously disturb the mind.

Traditional Chinese medicine proposes that “if there is no free flow, there is pain” and “if there is no nourishment, there is pain” ; treatment mainly focuses on freeing the collaterals to relieve pain or nourishing blood and enriching the sinews, so as to ensure smooth flow of the channels and vessels and abundant essence and blood. Chronic pain can lead to persistent stress and inflammatory responses, inducing atherosclerosis and immune dysregulation. Studies have suggested that short-term interventions targeting insomnia can likewise improve symptoms of chronic pain [51].

4.2.7 Others

Studies show that populations with rheumatic diseases, urinary system diseases, kidney diseases, skin diseases (such as pruritus), and digestive tract diseases (such as gastroesophageal reflux) have higher rates of insomnia [34].

In summary, the coexisting relationship between insomnia and the above chronic diseases is highly complex. In insomnia caused by organic diseases, the subjective and objective symptoms of many diseases directly affect sleep, such as pain, increased nocturia, and dyspnea; however, in diseases such as Alzheimer’s disease and Parkinson’s disease, insomnia itself is also one of the clinical symptoms of the disease. On the other hand, insomnia may disrupt autonomic nervous rhythms, affect hormone secretion, activate inflammatory pathways, and even interfere with immune function [52], thereby participating in the occurrence and progression of many diseases. However, most relevant evidence in modern medicine comes from observational studies or basic studies of single diseases. Although traditional Chinese medicine has theoretical advantages of holism in comorbidity management, most existing TCM literature consists of small-sample interventional clinical studies, with limited levels of evidence; comprehensive studies that synchronously evaluate insomnia and the pathophysiological mechanisms of multiple comorbidities in the same population remain scarce. Whether sleep can serve as a modifiable risk factor for chronic disease prevention and healthy aging still awaits further confirmation through research.

4.3 Comorbidity with other sleep disorders

ICSD-3 classifies sleep disorders into 7 major categories, and insomnia is only one of them [3]. In addition to hypersomnolence disorders, all other sleep disorders can coexist with insomnia. Clinicians need to pay attention to how to distinguish simple insomnia from insomnia combined with other sleep disorders based on patients’ chief complaints, and then implement targeted treatment.

4.3.1 Obstructive sleep apnea (OSA)

The incidence of insomnia among patients with OSA is 30%–50%, while 30%–40% of patients with insomnia may have comorbid OSA [53]. A study in New Mexico, USA, counted 1,210 patients with chronic refractory insomnia who visited a sleep medicine center over 8 years and found that the incidence of

sleep-disordered breathing was as high as 90% [54]. The microarousals and hypoxemia caused by OSA disrupt sleep continuity, while the excessive arousal present in patients with insomnia can aggravate upper airway muscle tone dysregulation and reduce adherence to continuous positive airway pressure (PAP) therapy. From the perspective of traditional Chinese medicine, such patients often present with a mixture of deficiency and excess: phlegm and stasis bind together to obstruct the qi mechanism, forming excess evil (corresponding to the airway obstruction in OSA), while at the same time they may have deficiency of both heart and spleen or a pattern of disharmony between heart and kidney (related to the state of insomnia), together forming a pattern of root deficiency with branch excess.

4.3.2 Restless Legs Syndrome (RLS) A study including 551 patients with RLS found that 88% of patients had at least one type of sleep disturbance, most often presenting as difficulty falling asleep or frequent nocturnal awakenings

55

. In Chinese medicine, such patients are often treated according to the theories of liver-blood insufficiency, loss of nourishment of the sinews and vessels, or damp-heat obstructing the collaterals

22

4.3.3 Circadian Rhythm Sleep-Wake Disorders Jet lag and night-shift work can both lead to insomnia. It should be noted, however, that in circadian rhythm sleep-wake disorders, sleep-wake timing is delayed or advanced, such that the circadian rhythm system is misaligned with the expected sleep time; this is often misdiagnosed as insomnia and should be carefully differentiated. Many Chinese medicine studies have used adjustment of work-rest schedules, light exposure at specific times, acupuncture, or herbal interventions to help correct deviations and restore normal alignment, in order to seek harmony between yin and yang. Yang Jinyue et al.

56

selected acupoints such as Shenmen, Neiguan, Baihui, and Anmian; these may harmonize yin and yang, calm the heart and spirit, and regulate qi dynamics. This small-sample study suggests that this therapeutic regimen may have a positive effect on adjusting sleep rhythms.

4.4 Comorbidity of Sleep Disorders Related to Medical Causes and Substances

Some insomnia may be caused directly by medications or by substance withdrawal. Common drugs that readily induce insomnia include central

nervous system stimulants (such as caffeine and methylphenidate), respiratory stimulants (such as aminophylline), appetite suppressants, antidepressants, β -receptor blockers (such as propranolol and metoprolol), glucocorticoids (such as prednisone and dexamethasone), and diuretics. In addition, insomnia may also occur after withdrawal of sedatives, hypnotics, glucocorticoids, and other drugs. Compared with other withdrawal symptoms, medication-related insomnia is particularly easy to overlook and confuse in clinical practice. Clinicians should carefully distinguish the timing of medication use from the onset of insomnia, and should combine this with the drug $t_{1/2}$ for identification.

4.5 Chinese Medicine Understanding and Interpretation of Insomnia Comorbidity

The holistic nature of Chinese medical diagnosis and treatment gives it a distinctive theoretical perspective in the field of insomnia comorbidity. Modern medicine often begins with the pathophysiological changes of a particular organ, whereas Chinese medicine establishes syndrome differentiation on the basis of an overall view of “zang-fu pattern identification,” and does not focus only on the sleep symptom itself. Chinese medicine holds that insomnia patterns generally do not go beyond the two poles of deficiency and excess, and are often treated from the heart, liver, kidney, spleen, and other zang-fu organs. The liver governs free coursing and regulates qi dynamics. In general, excess patterns are mostly caused by liver qi constraint or gallbladder phlegm-heat disturbing the heart, leading to insomnia; liver “disharmony of yin and yang (body and function)” may induce psychophysiological insomnia

57

. Xue Lian et al.

58

proposed that phlegm-heat is a key precipitating factor for coronary heart disease complicated by insomnia, and treatment emphasizes protecting the spleen and heart, using modified Lianxia Ningxin Formula as the basic prescription; clinical observation showed relatively good efficacy. Deficiency patterns are closely related to the heart, kidney, and spleen. When the heart governs the spirit brightly, the spirit is calm and insomnia does not occur; insomnia accompanying cardiovascular disease often takes “root deficiency with branch excess” as the basic pathogenesis, with blood stasis and obstruction as important pathogenic factors

59

. Based on the theory of “yin-yang and water-fire,” Ao Yuhan et al.

60

attributed the pathogenesis of insomnia combined with heart failure to exhaustion, imbalance, and disturbance of yin-yang, with treatment based on “restoring

the body' s yin-yang and water-fire." The kidney governs the storage of essence; if essence and blood are depleted internally and cannot moisten and nourish the heart spirit, insomnia may result. Animal experimental studies have shown that prepared Rehmannia can improve sleep by regulating the expression of the suprachiasmatic nucleus clock genes Clock and Bmal1, providing modern biological evidence for treating refractory insomnia from kidney yin

61

. The spleen governs the transport and transformation of water and grain essence; spleen deficiency and blood deficiency can likewise cause malnourishment of the heart spirit. Insomnia complicated by diabetes is often due to spleen-yin insufficiency; clinically, nourishing spleen yin is the principal therapy, and preliminary efficacy has been achieved

62

. Zhang Xinyu et al.

63

used acupuncture as an external intervention for the Chinese medicine pattern of "excessive wakefulness" in the type of insomnia characterized by simultaneous deficiency of the heart and spleen. This single-center, small-sample study obtained positive results, providing preliminary data for exploring the pathological mechanism of this pattern. The combination of Chinese herbal decoctions with Chinese medical internal-external integrated regimens such as wrist-ankle acupuncture likewise shows potential advantages in improving insomnia of the heart-spleen deficiency type

64

. In addition, insomnia caused by respiratory system diseases is closely related to lung qi obstruction or lung qi deficiency, and insufficiency of ancestral qi production; the Chinese medical pathogenesis of cancer-related insomnia is often attributed to "disharmony of the five zang and restlessness of the spirit" ; chronic pain with insomnia reflects the interactive influence of "when there is obstruction there is pain," "when there is lack of nourishment there is pain," and disturbance of the heart spirit. These studies demonstrate from different perspectives the potential value of Chinese medicine' s holistic theory in the management of insomnia comorbidity, and preliminarily embody the dialectical thinking of "treating different diseases with the same method" and "seeking the root in treatment." However, the above conclusions mostly come from small-sample, single-center efficacy observations or summaries of expert experience; animal mechanism studies are relatively scarce, and are not yet sufficient to fully validate the Chinese medical theoretical system. Subsequent work should conduct multicenter, large-sample, rigorously designed randomized controlled trials and mechanistic studies to further improve the level of evidence.

Viewed overall, across the above comorbidities involving various systems, common mechanisms exist between insomnia and multiple diseases, including

autonomic nervous dysfunction, activation of inflammatory pathways, and metabolic-endocrine dysregulation

36, 38, 46, 52

. These mechanisms intersect in multiple diseases, and may have potential corresponding relationships with basic Chinese medical pathomechanistic concepts such as “disharmony of yin and yang,” “yin deficiency with exuberant fire,” and “binding of phlegm and blood stasis.” At present, however, this correspondence mostly derives from observational or basic studies of a single disease, and there remains a lack of comprehensive study designs targeting the same comorbid patient population while simultaneously assessing Chinese medical patterns and multiple objective indicators of modern medicine. To verify this hypothesis, prospective studies are needed in which objective indicator testing and Chinese medical pattern determination are completed synchronously in the same comorbid patient population, so as to construct a research framework of “Western medical disease diagnosis + Chinese medical pattern/syndrome classification” and promote bidirectional, cyclic verification through theoretical interpretation in Chinese and Western medicine.

5 Summary and Prospects

Insomnia is not only a symptom, but also a health issue involving biological, psychological, and social dimensions. Modern medicine relies on refined objective assessment and standardized treatment, occupying a dominant position in insomnia management; Chinese medicine, through its holistic concept and pattern-differentiation treatment, realizes individualized diagnosis and therapy. On this basis, this article has systematically reviewed the epidemiological characteristics of insomnia and Chinese and Western medical understanding of its comorbidities, as well as frontier research progress; analyzed the intersections between the two diagnostic and therapeutic approaches in the diagnosis and evaluation of insomnia; and proposed that the two have potential conceptual correspondences and theoretical complementarity, although these still require empirical verification by modern evidence-based medicine. At the level of comorbidity mechanisms, this article specifically summarized Chinese and Western medical studies on risk factors such as female sex, older age, socioeconomic status, and psychological factors, analyzed the mechanisms of common insomnia comorbidities, and proposed that prospective studies can be conducted in the same comorbid patient population to synchronously complete objective indicator testing and Chinese medical pattern identification, thereby constructing a research framework of “Western medical disease diagnosis + Chinese medical pattern/syndrome classification,” and providing a theoretical foundation and new ideas for combined Chinese-Western medical intervention for insomnia and its comorbidities.

At the level of symptomatology, modern medicine’s objective reference for the core symptoms of insomnia is ...

boundaries, providing standardized tools for clinical diagnosis and efficacy evaluation; the advantage of Chinese medicine lies in judging symptoms against the background of individual ebb and flow of yin and yang and imbalance of visceral qi and blood, emphasizing individual differences under commonality. In recent years, progress has been made in the objectification of Chinese medicine pattern differentiation. Multi-channel sleep monitoring (PSG) results show that sleep architecture differs between the heart-kidney disharmony pattern and the liver-depression qi-stagnation pattern of insomnia^[65], and PSG parameters also differ statistically between the yin-deficiency fire-exuberance pattern and the dual deficiency of heart and spleen pattern of insomnia^[66]; however, the stable mapping relationship between patterns and objective sleep parameters still requires further empirical verification. At the epidemiological level, insomnia high-risk groups identified by modern medicine overlap considerably with susceptible constitution types such as “yin-deficiency constitution” and “qi-depression constitution” in Chinese medicine constitutional theory. The two may share a common basis of individual differences, but this theoretically inferred correspondence still requires confirmation through high-quality longitudinal studies. At the level of comorbidity management, the comorbid relationship between insomnia and multiple diseases has received multilayered evidentiary support. Chinese medicine, inheriting the idea of “treating different diseases with the same method,” has accumulated rich practical experience in the management of insomnia comorbidities^[67]. However, most existing Chinese medicine studies on comorbidities remain single-center, small-sample observations of therapeutic efficacy, and the level of evidence needs further improvement.

From symptomatology and epidemiology to comorbidity management, Chinese and Western medicine can draw on each other in the diagnosis and treatment of insomnia and share analytical frameworks for epidemiological risk factors. Especially at the level of comorbidity management, their advantages are complementary, enabling more comprehensive and integrated diagnostic and therapeutic thinking for clinical practice. Nevertheless, many issues remain to be further explored at the present stage: first, continued promotion of the objectification of Chinese medicine pattern differentiation, with full use of modern technologies such as PSG and wearable devices (including remote monitoring devices), to explore the correspondence between Chinese medicine patterns and objective sleep parameters, and to incorporate Chinese medicine constitution or pattern type as research variables into large-sample studies; second, high-quality randomized controlled trials of integrated Chinese and Western medicine should be conducted, avoiding merely simple comparisons of the efficacy advantages of Chinese medicine and Western drugs. In addition, to achieve a shift from “comorbidity management” to “prevention first,” the unique advantages of Chinese medicine’s preventive-treatment thinking for early intervention in high-risk insomnia populations should be fully leveraged. This likewise requires more large-sample, rigorously designed randomized double-blind trials to provide evidentiary support, promote the implementation of integrated Chinese and Western medicine from conceptually complementary approaches into clinical

cal practice, and obtain higher-level evidence from evidence-based medicine.

China is one of the countries where the integration of clinical practice in modern medicine and traditional medicine is relatively close. Chinese medicine has profound historical accumulation and a foundation of practice in China. Integrating research evidence from Chinese and Western medicine and promoting clinical collaboration can provide safer, more precise, individualized, and sustainable diagnostic and treatment plans for patients with insomnia.

Author contributions: Li Hangzhi was responsible for the conception and design of the article, literature search and data collection, drafting and revision of the initial manuscript; Wang Jiepeng was responsible for manuscript revision and review; Zhang Manyi was responsible for literature organization and data verification; Fang Chaoyi was responsible for proposing the research direction, review and quality control of the final manuscript, and overall responsibility for the article.

The authors declare no conflicts of interest.

Li Hangzhi iD <https://orcid.org/0009-0003-1786-0525>

Wang Jiepeng iD <https://orcid.org/0000-0003-1854-4420>

Zhang Manyi iD <https://orcid.org/0009-0007-5652-2560>

Fang Chaoyi iD <https://orcid.org/0000-0001-6661-5962>

References

- [1] Chinese Sleep Research Society. Guidelines for the diagnosis and treatment of insomnia disorder (2025 edition)[J]. Chinese Medical Journal, 2025, 105(34): 2960-2981. DOI: 10.3760/cma.j.cn112137-20250421-00981.
- [2] Riemann D, Espie C A, Altena E, et al. The European Insomnia Guideline: an update on the diagnosis and treatment of insomnia 2023[J]. J Sleep Res, 2023, 32(6): e14035. DOI: 10.1111/jsr.14035.
- [3] American Academy of Sleep Medicine. International Classification of Sleep Disorders, 3rd Edition: Text Revision[M]. 3rd ed. American Academy of Sleep Medicine, 2023.
- [4] Association A P. Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR)[M]. 5th ed. American Psychiatric Association, 2022.
- [5] Wu Mianhua, Shi Yan. Internal Medicine of Chinese Medicine[M]. 5th ed. Beijing: China Press of Traditional Chinese Medicine, 2021.
- [6] Li Cansong, Fang Chaoyi. Diagnostics of Chinese Medicine[M]. 6th ed. Beijing: China Press of Traditional Chinese Medicine, 2026.
- [7] Liu Yao, Qian Rui. Clinical experience of Professor Qian Rui in treating heart-kidney disharmony-type insomnia[J]. Yunnan Journal of Tra-

ditional Chinese Medicine and Materia Medica, 2026, 47(6): 129-133. DOI: 10.16254/j.cnki.53-1120/r.2026.06.026.

[8] Lian Fuzhi, Liu Yao, Fang Teng, et al. Professor Qi Wen-sheng' s experience in treating insomnia from the theory of "liver-yang-lung-yin" [J]. Hebei Journal of Traditional Chinese Medicine, 2025, 40(2): 67-70.

[9] Zhou Litou, Zhu Xiaoyun, Tao Shunping, et al. Clinical study of acupoint catgut embedding combined with auricular acupoint pressing in the treatment of stomach-disharmony insomnia[J]. Chinese Acupuncture & Moxibustion, 2017, 37(9): 947-950. DOI: 10.13703/j.0255-2930.2017.09.009.

[10] Cao X L, Wang S B, Zhong B L, et al. The prevalence of insomnia in the general population in China: a meta-analysis[J]. PLoS One, 2017, 12(2): e0170772. DOI: 10.1371/journal.pone.0170772.

[11] Becker P M. Overview of sleep management during COVID-19[J]. Sleep Med, 2022, 91: 211-218. DOI: 10.1016/j.sleep.2021.04.024.

[12] Shi L, Lu Z A, Que J Y, et al. Prevalence of and risk factors associated with mental health symptoms among the general population in China during the coronavirus disease 2019 pandemic[J]. JAMA Netw Open, 2020, 3(7): e2014053. DOI: 10.1001/jamanetworkopen.2020.14053.

[13] Sang Y C, Peng Z P, Zeng X Y, et al. Demographic and socioeconomic inequalities in sleep quality among Chinese aged 15 years and above: a national population-based study[J]. Lancet Reg Heal West Pac, 2026, 69: 101853. DOI: 10.1016/j.lanwpc.2026.101853.

[14] Wang Zhenjie, Zhao Meng, Chen Tingwei, et al. Meta-analysis of the prevalence of sleep disorders among older adults in China[J]. Chinese General Practice, 2022, 25(16): 2036-2043. DOI: 10.12114/j.issn.1007-9572.2022.0151.

[15] Chinese Preventive Medicine Association Menopause Health Branch, Women' s Endocrinology and Reproductive Health Promotion Committee of China Human Health Science and Technology Promotion Association, Menopause Professional Committee of Beijing Association of Integrated Traditional Chinese and Western Medicine. Chinese expert consensus on clinical management of menopause-related insomnia[J]. Chinese General Practice, 2023, 26(24): 2951-2958. DOI: 10.12114/j.issn.1007-9572.2023.0192.

[16] Gao Qiang, Zhao Jiaqi, Du Juan, et al. Reflections on the path of diagnosing and treating prodromal diseases and syndromes[J]. Jiangsu Journal of Traditional Chinese Medicine, 2020, 52(11): 11-13. DOI: 10.19844/j.cnki.1672-397X.2020.11.004.

[17] Endomba F T, Tchebegna P Y, Chiabi E, et al. Epidemiology of insomnia disorder in older persons according to the Diagnostic and Statistical Manual of Mental Disorders: a systematic review and

- [18] Porcheret K, Hopstock L A, Nilsen K B. Prevalence of insomnia in a general adult population cohort using different diagnostic criteria: the seventh survey of the Tromsø study 2015–2016[J]. *Sleep Med*, 2024, 119: 289–295. DOI: 10.1016/j.sleep.2024.05.002.
- [19] Rubi S, Monk J K, Shoemaker S, et al. Perpetuating and protective factors in insomnia across racial/ethnic groups of veterans[J]. *J Sleep Res*, 2024, 33(2): e14063. DOI: 10.1111/jsr.14063.
- [20] Morin C M, Jarrin D C. Epidemiology of insomnia: prevalence, course, risk factors, and public health burden[J]. *Sleep Med Clin*, 2022, 17(2): 173–191. DOI: 10.1016/j.jsmc.2022.03.003.
- [21] Palagini L, Geoffroy P A, Gehrman P R, et al. Potential genetic and epigenetic mechanisms in insomnia: a systematic review[J]. *J Sleep Res*, 2023, 32(6): e13868. DOI: 10.1111/jsr.13868.
- [22] Wang Qi. *Constitutionology of Traditional Chinese Medicine*[M]. Beijing: People's Medical Publishing House, 2005.
- [23] Riemann D, Benz F, Dressler R J, et al. Insomnia disorder: state of the science and challenges for the future[J]. *J Sleep Res*, 2022, 31(4): e13604. DOI: 10.1111/jsr.13604.
- [24] Hertenstein E, Benz F, Schneider C L, et al. Insomnia—a risk factor for mental disorders[J]. *J Sleep Res*, 2023, 32(6): e13930. DOI: 10.1111/jsr.13930.
- [25] Goldman-Mellor S, Gregory A M, Caspi A, et al. Mental health antecedents of early midlife insomnia: evidence from a four-decade longitudinal study[J]. *Sleep*, 2014, 37(11): 1767–1775. DOI: 10.5665/sleep.4168.
- [26] Sun X H, Liu B, Liu S T, et al. Sleep disturbance and psychiatric disorders: a bidirectional Mendelian randomisation study[J]. *Epidemiol Psychiatr Sci*, 2022, 31: e26. DOI: 10.1017/S2045796021000810.
- [27] Hertenstein E, Feige B, Gmeiner T, et al. Insomnia as a predictor of mental disorders: a systematic review and meta-analysis[J]. *Sleep Med Rev*, 2019, 43: 96–105. DOI: 10.1016/j.smrv.2018.10.006.
- [28] Ellis J G, Perlis M L, Bastien C H, et al. The natural history of insomnia: acute insomnia and first-onset depression[J]. *Sleep*, 2014, 37(1): 97–106. DOI: 10.5665/sleep.3316.
- [29] Arfken C L, Joseph A, Sandhu G R, et al. The status of sleep abnormalities as a diagnostic test for major depressive disorder[J]. *J Affect Disord*, 2014, 156: 36–45. DOI: 10.1016/j.jad.2013.12.007.
- [30] Belleville G, Cousineau H, Levrier K, et al. The impact of cognitive-behavior therapy for anxiety disorders on concomitant sleep disturbances: a meta-analysis[J]. *J Anxiety Disord*, 2010, 24(4): 379–386. DOI: 10.1016/j.janxdis.2010.02.010.

- [31] Cox R C, Olatunji B O. Sleep in the anxiety-related disorders: a meta-analysis of subjective and objective research[J]. *Sleep Med Rev*, 2020, 51: 101282. DOI: 10.1016/j.smrv.2020.101282.
- [32] Li Na, Wang Eryu, Shan Beibei, et al. Clinical study on TCM syndromes and anxiety severity in patients with insomnia accompanied by anxiety[J]. *Tianjin Journal of Traditional Chinese Medicine*, 2025, 42(1): 20-26. DOI: 10.11656/j.issn.1672-1519.2025.01.05.
- [33] Ahmadi R, Rahimi-Jafari S, Olfati M, et al. Insomnia and post-traumatic stress disorder: a meta-analysis on interrelated association (n=57 618) and prevalence (n=573 665)[J]. *Neurosci Biobehav Rev*, 2022, 141: 104850. DOI: 10.1016/j.neubiorev.2022.104850.
- [34] Taylor D J, Mallory L J, Lichstein K L, et al. Comorbidity of chronic insomnia with medical problems[J]. *Sleep*, 2007, 30(2): 213-218. DOI: 10.1093/sleep/30.2.213.
- [35] Nistor P, Chang-Kit B, Nicholson K, et al. The relationship between sleep health and multimorbidity in community dwelling populations: Systematic review and global perspectives[J]. *Sleep Med*, 2023, 109: 270-284. DOI: 10.1016/j.sleep.2023.07.002.
- [36] Sadeghmousavi S, Eskian M, Rahmani F, et al. The effect of insomnia on development of Alzheimer' s disease[J]. *J Neuroinflammation*, 2020, 17(1): 289. DOI: 10.1186/s12974-020-01960-9.
- [37] Wang Xiaoning, Wu Lin, Wu Liping, et al. Clinical study of acupuncture in the treatment of mild vascular cognitive impairment in the elderly complicated with sleep disorders[J]. *Hebei Journal of Traditional Chinese Medicine*, 2020, 35(4): 51-53. DOI: 10.16370/j.cnki.13-1214/r.2020.04.014.
- [38] Lanfranchi P A, Pennestri M H, Fradette L, et al. Nighttime blood pressure in normotensive subjects with chronic insomnia: implications for cardiovascular risk[J]. *Sleep*, 2009, 32(6): 760-766. DOI: 10.1093/sleep/32.6.760.
- [39] Li X Y, Sotres-Alvarez D, Gallo L C, et al. Associations of sleep-disordered breathing and insomnia with incident hypertension and diabetes. the hispanic community health study/study of latinos[J]. *Am J Respir Crit Care Med*, 2021, 203(3): 356-365. DOI: 10.1164/rccm.201912-2330OC.
- [40] Dean Y E, Shebl M A, Rouzan S S, et al. Association between insomnia and the incidence of myocardial infarction: a systematic review and meta-analysis[J]. *Clin Cardiol*, 2023, 46(4): 376-385. DOI: 10.1002/clc.23984.
- [41] Johnson K A, Gordon C J, Chapman J L, et al. The association of insomnia disorder characterised by objective short sleep duration with hypertension, diabetes and body mass index: a systematic review and meta-analysis[J]. *Sleep Med Rev*, 2021, 59: 101456. DOI: 10.1016/j.smrv.2021.101456.
- [42] Dai Y Y, Chen B X, Chen L, et al. Insomnia with objective short sleep

duration is associated with hypertension[J]. *J Sleep Res*, 2023, 32(4): e13833. DOI: 10.1111/jsr.13833.

[43] Yuan Yuan, Luo Bin. Treatment of insomnia from “phlegm and blood stasis”based on the ying-wei theory in the *Huangdi Neijing*[J]. *Global Traditional Chinese Medicine*, 2021, 14(5): 927-930.

[44] Du D R, Zhang G Y, Xu D, et al. Prevalence and clinical characteristics of sleep disorders in chronic obstructive pulmonary disease: a systematic review and meta-analysis[J]. *Sleep Med*, 2023, 112: 282-290. DOI: 10.1016/j.sleep.2023.10.034.

[45] Li S Q, Sun X W, Zhang L, et al. Impact of insomnia and obstructive sleep apnea on the risk of acute exacerbation of chronic obstructive pulmonary disease[J]. *Sleep Med Rev*, 2021, 58: 101444. DOI: 10.1016/j.smrv.2021.101444.

[46] Mostafa S A, Mena S C, Antza C, et al. Sleep behaviours and associated habits and the progression of pre-diabetes to type 2 diabetes mellitus in adults: a systematic review and meta-analysis[J]. *Diab Vasc Dis Res*, 2022, 19(3): 14791641221088824. DOI: 10.1177/14791641221088824.

[47] Büttner-Teleagă A, Kim Y T, Osel T, et al. Sleep disorders in cancer—a systematic review[J]. *Int J Environ Res Public Health*, 2021, 18(21): 11696. DOI: 10.3390/ijerph182111696.

[48] Cheng W H, Teo R H, Cheng L J, et al. Global prevalence of sleep disturbances among breast cancer survivors: a systematic review with meta-analysis[J]. *Sleep Health*, 2023, 9(5): 704-716. DOI: 10.1016/j.sleh.2023.04.004.

[49] Shi T T, Min M, Sun C Y, et al. Does insomnia predict a high risk of cancer? A systematic review and meta-analysis of cohort studies[J]. *J Sleep Res*, 2020, 29(1): e12876. DOI: 10.1111/jsr.12876.

[50] Zhou T, Wang Z C, Qiao C X, et al. Sleep disturbances and the risk of lung cancer: a meta-epidemiological study[J]. *BMC Cancer*, 2023, 23(1): 884. DOI: 10.1186/s12885-023-11392-2.

[51] Sun Y S, Laksono I, Selvanathan J, et al. Prevalence of sleep disturbances in patients with chronic non-cancer pain: a systematic review and meta-analysis[J]. *Sleep Med Rev*, 2021, 57: 101467. DOI: 10.1016/j.smrv.2021.101467.

[52] Szredzka A, Chwastowicz A, Pergoł J, et al. Circadian clocks and adaptive immune function: from mechanisms to therapeutic applications[J]. *Front Immunol*, 2025, 16: 1697854. DOI: 10.3389/fimmu.2025.1697854.

[53] Sweetman A, Farrell S, Wallace D M, et al. The effect of cognitive behavioural therapy for insomnia in people with comorbid insomnia and sleep apnoea: a systematic review and meta-analysis[J]. *J Sleep Res*, 2023, 32(6): e13847. DOI: 10.1111/jsr.13847.

- [54] Krakow B, Ulibarri V A, McIver N D. Pharmacotherapeutic failure in a large cohort of patients with insomnia presenting to a sleep medicine center and laboratory: subjective pretest predictions and objective diagnoses[J]. Mayo Clin Proc, 2014, 89(12): 1608–1620. DOI: 10.1016/j.mayocp.2014.04.032.
- [55] Hening W, Walters A S, Allen R P, et al. Impact, diagnosis and treatment of restless legs syndrome (RLS) in a primary care population: the REST (RLS epidemiology, symptoms, and treatment) primary care study[J]. Sleep Med, 2004, 5(3): 237–246. DOI: 10.1016/j.sleep.2004.03.006.
- [56] Yang Jinyue, Yuan Jun, Zhang Tianyou, et al. Patterns of acupoint compatibility in Professor Yuan Jun’ s acupuncture treatment of insomnia disorder based on complex network analysis[J]. Hebei Journal of Traditional Chinese Medicine and Pharmacology, 2024, 39(4): 39–44. DOI: 10.16370/j.cnki.13-1214/r.2024.04.013.
- [57] Wu Songlin, Liu Yan, He Qingying, et al. Exploring psychological-physiological insomnia from the liver theory based on the concept of “disharmony of yin and yang in the liver” [J]. Modern Clinical Medicine of Traditional Chinese Medicine, 2024, 31(2): 93–97. DOI: 10.3969/j.issn.2095-6606.2024.02.020.
- [58] Xue Lian, Li Ping, Yang Yang. Li Ping’ s experience in treating coronary heart disease complicated by insomnia from the perspective of phlegm-heat theory[J]. Hunan Journal of Traditional Chinese Medicine, 2024, 40(4): 42–44. DOI: 10.16808/j.cnki.issn1003-7705.2024.04.010.
- [59] Wang Yuxiang, Wang Yulong, Jiang Youqin, et al. Differentiated treatment strategies for coronary heart disease complicated by sleep disorders based on blood turbidity theory[J]. Clinical Journal of Chinese Medicine, 2026, 38(3): 455–459. DOI: 10.16448/j.cjctcm.2026.0308.
- [60] Ao Yuhan, Su Jianan, Zhang Mingxue, et al. TCM pathogenesis and treatment ideas for insomnia due to depletion of heart strength with turbid yin and deficient fire based on the theory of “deficient yin and hyperactive fire” [J]. Journal of Liaoning University of Traditional Chinese Medicine, 2024, 26(3): 69–74. DOI: 10.13194/j.issn.1673-842x.2024.03.016.
- [61] Yang Weili, Liu Yanhui, Wang Rui, et al. Effect of Dihuang on the expression of circadian clock genes Clock and Bmal1 in the suprachiasmatic nucleus of sleep-deprived mice[J]. Journal of Hebei Traditional Chinese Medicine and Pharmacology, 2022, 37(1): 32–36. DOI: 10.16370/j.cnki.13-1214/r.2022.01.012.
- [62] Hu Yanmin, Yi Na, Wang Wenying, et al. Treating diabetes mellitus complicated by insomnia from the spleen-yin theory[J]. Modern Clinical Medicine of Traditional Chinese Medicine, 2024, 31(4): 99–101. DOI: 10.3969/j.issn.2095-6606.2024.04.020.
- [63] Zhang Xinyu, Zhang Yirui, Liu Lu, et al. Clinical study of acupuncture in regulating the over-arousal state in chronic insomnia syndrome with dual defi-

ciency of heart and spleen[J]. Beijing Journal of Traditional Chinese Medicine, 2024, 43(7): 747-753. DOI: 10.16025/j.1674-1307.2024.07.007.

[64] Li Yujiao, Ren Shan, Dong Zhijie, et al. Pilot study of Chaiqi Ning Shen Anmian Decoction combined with wrist-ankle acupuncture for the treatment of chronic insomnia with dual deficiency of heart and spleen[J]. China Pharmacist, 2024, 27(6): 1055-1062. DOI: 10.12173/j.issn.1008-049X.202404158.

[65] Zhong Shuang, Yuan Caicai, Zhang Zhenzhong. Preliminary exploration of the sleep structure in chronic insomnia disorder with heart-kidney non-interaction syndrome and liver-depression qi-stagnation syndrome[J]. Chinese Journal of Modern Doctor, 2024, 62(13): 5-7, 20. DOI: 10.3969/j.issn.1673-9701.2024.13.002.

[66] Tan Yunxia, Ji Ke, Liu Fugui, et al. Correlation study between TCM syndrome types of chronic insomnia and multiple sleep EEG parameters[J]. Journal of Tianjin University of Traditional Chinese Medicine, 2022, 41(5): 574-578. DOI: 10.11656/j.issn.1673-9043.2022.05.07.

[67] Li W W, Wang Q X, Dang C, et al. Chinese herbal medicine for insomnia: a systematic review and network meta-analysis[J]. Medicine, 2025, 104(33): e43789. DOI: 10.1097/md.00000000000043789.

(Received: 2026-06-29; Revised: 2026-08-14)

(Editor: Wang Fengwei)

Note: Figure translations are in progress. See original paper for figures.

Source: ChinaXiv. Machine translation. Verify with the original.