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# Comparative Study of Acupressure and Pharmacological Therapy for Insomnia

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**Abstract**
Insomnia is one of the most prevalent sleep disorders worldwide, characterized by difficulty initiating or maintaining sleep, early morning awakening, and impaired daytime functioning. Conventional pharmacological therapies, including benzodiazepines and non-benzodiazepine hypnotics, are widely prescribed and often provide rapid symptomatic relief. However, long-term use is frequently associated with tolerance, dependency, cognitive impairment, residual daytime sedation, and rebound insomnia. These concerns have prompted growing interest in non-pharmacological and complementary interventions such as acupressure. the effectiveness of acupressure and pharmacological therapy in improving sleep quality, sleep duration, sleep latency, and overall well-being among individuals with chronic insomnia. Acupressure, derived from traditional East Asian medicine, involves applying manual pressure to specific acupoints believed to regulate physiological balance and promote relaxation. From a biomedical perspective, it may influence autonomic nervous system activity, enhance melatonin secretion, reduce stress hormones, and stimulate endogenous relaxation responses.
**Keywords:** Insomnia; Sleep Disorders; Acupressure Therapy; Pharmacological Treatment

## Introduction

Insomnia is one of the most common sleep disorders, affecting a substantial proportion of the global population across different age groups. It is characterized by persistent difficulty in initiating sleep, maintaining sleep, or experiencing restorative sleep despite adequate opportunity. Chronic insomnia, typically defined as symptoms occurring at least three times per week for three months or longer, is associated with impaired daytime functioning, reduced concentration, mood disturbances, and diminished quality of life. Conventional management of insomnia primarily relies on pharmacological therapy. Benzodiazepines and non-benzodiazepine hypnotics are frequently prescribed due to their rapid onset of action and short-term effectiveness in reducing sleep latency and nighttime awakenings. However, prolonged use is often accompanied by adverse effects such as tolerance, dependence, cognitive impairment, residual daytime drowsiness, and rebound insomnia after discontinuation. These limitations raise concerns regarding long-term safety and sustainability of drug-based treatment strategies. In response to these concerns, non-pharmacological and complementary therapies have gained increasing attention. Acupressure, a technique rooted in traditional East Asian medicine, involves the application of manual pressure to specific acupoints along meridian pathways. It is believed to restore physiological balance and promote relaxation. From a

modern physiological perspective, acupressure may regulate autonomic nervous system activity, reduce stress-related cortisol levels, enhance melatonin secretion, and stimulate endogenous mechanisms associated with sleep regulation. Given the widespread prevalence of insomnia and the limitations associated with pharmacological therapy, a comparative evaluation of acupressure and drug-based treatments is clinically relevant. Understanding their relative efficacy, safety profiles, and long-term outcomes may guide healthcare professionals in developing integrated, patient-centered approaches to insomnia management. This study aims to examine and compare the therapeutic effectiveness of acupressure and pharmacological therapy in improving sleep quality and overall well-being among individuals with chronic insomnia.

**Epidemiology and Societal Impact of Insomnia**

Insomnia is one of the most prevalent sleep disorders worldwide, affecting individuals across different age groups, cultures, and socioeconomic backgrounds. Epidemiological studies estimate that approximately 30–35% of adults report occasional insomnia symptoms, while 10–15% meet the criteria for chronic insomnia disorder. The prevalence tends to increase with age and is generally higher among women compared to men. Older adults, shift workers, individuals with chronic medical conditions, and those experiencing psychological stress are particularly vulnerable.

Regional variations in prevalence are influenced by lifestyle factors, occupational demands, urbanization, and access to healthcare services. Rapid technological advancement, increased screen exposure, irregular work schedules, and heightened stress levels in modern societies have contributed to a growing burden of sleep disturbances. In both developed and developing countries, insomnia is increasingly recognized as a significant public health concern.

The societal impact of insomnia extends beyond nighttime sleep difficulties. Persistent sleep disruption is associated with impaired cognitive performance, reduced attention span, memory deficits, irritability, and mood disorders such as anxiety and depression. Daytime fatigue and decreased alertness increase the risk of workplace errors, reduced productivity, and occupational accidents. In safety-sensitive professions, insufficient sleep can have serious consequences for public safety.

From an economic perspective, insomnia generates substantial direct and indirect costs. Direct costs include medical consultations, diagnostic procedures, pharmacological treatments, and psychological therapies. Indirect costs arise from absenteeism, presenteeism, reduced work efficiency, and increased healthcare utilization due to comorbid conditions. Studies have demonstrated that individuals with chronic insomnia incur significantly higher healthcare expenditures compared to good sleepers.

Moreover, insomnia often coexists with chronic conditions such as cardiovascular disease, metabolic disorders, and mental health problems, further amplifying its overall burden. The bidirectional relationship between sleep disturbance and psychological stress contributes to a self-perpetuating cycle that complicates treatment and recovery.

Given its high prevalence and wide-ranging consequences, insomnia represents not only a clinical issue but also a broader societal challenge. Understanding its epidemiological patterns

and socioeconomic implications is essential for developing effective prevention strategies and balanced treatment approaches, including both pharmacological and complementary therapies such as acupressure.

**Mechanism of Action of Hypnotic Medications**

Hypnotic medications are commonly prescribed to manage insomnia by facilitating sleep initiation, improving sleep continuity, or both. Their therapeutic effects are primarily mediated through modulation of central nervous system neurotransmitters that regulate the sleep–wake cycle. The most widely used classes include benzodiazepines, non-benzodiazepine receptor agonists (often called "Z-drugs"), melatonin receptor agonists, and certain sedating antidepressants.

**1. Benzodiazepines**

Benzodiazepines exert their effects by enhancing the activity of gamma-aminobutyric acid (GABA), the primary inhibitory neurotransmitter in the brain. They bind to specific sites on the GABA-A receptor complex, increasing the frequency of chloride channel opening. This action hyperpolarizes neurons and reduces neuronal excitability, producing sedative, anxiolytic, muscle relaxant, and anticonvulsant effects.

By amplifying inhibitory signaling, benzodiazepines decrease sleep latency and increase total sleep time. However, they may alter normal sleep architecture by reducing slow-wave and rapid eye movement (REM) sleep.

**2. Non-Benzodiazepine Hypnotics (Z-Drugs)**

Non-benzodiazepine receptor agonists, such as zolpidem and eszopiclone, also act on the GABA-A receptor but bind more selectively to specific subunits associated with sedation. Their targeted action tends to produce fewer muscle relaxant and anticonvulsant effects compared to benzodiazepines.

These agents are effective in reducing sleep onset latency and nighttime awakenings. While they generally have a shorter half-life and lower risk of dependence than traditional benzodiazepines, tolerance and withdrawal symptoms can still occur with prolonged use.

**3. Melatonin Receptor Agonists**

Melatonin receptor agonists mimic the action of endogenous melatonin by binding to MT1 and MT2 receptors in the suprachiasmatic nucleus of the hypothalamus, the brain's central circadian clock. Activation of these receptors helps regulate circadian rhythms and promote sleep initiation.

Unlike GABAergic medications, melatonin-based agents typically have minimal effects on sleep architecture and are associated with a lower risk of dependency.

**4. Sedating Antidepressants and Other Agents**

Certain antidepressants with sedative properties act by modulating serotonin, histamine, or norepinephrine pathways. Antihistamines, though commonly available over the counter, produce sedation by blocking H1 histamine receptors in the brain. These medications may be used in specific clinical contexts but are not always recommended for long-term insomnia management due to side effects.

**5. Effects on Sleep Architecture and Neurophysiology**

While hypnotics can improve subjective and objective sleep parameters, they may alter normal sleep stages. Some agents suppress REM sleep or deep sleep phases, which can affect restorative sleep quality. Additionally, chronic use may downregulate GABA receptors, contributing to tolerance and reduced efficacy over time.

hypnotic medications primarily function by enhancing inhibitory neurotransmission or regulating circadian rhythms. Although they provide rapid symptomatic relief for insomnia, their neurochemical actions can lead to alterations in sleep structure and potential adverse effects with long-term use. Understanding these mechanisms is essential when comparing pharmacological therapy with non-pharmacological interventions such as acupressure.

**Physiological Mechanisms of Acupressure in Sleep Regulation**

Acupressure is a non-invasive therapeutic technique that involves applying manual pressure to specific acupoints along meridian pathways. In the context of insomnia, acupressure is believed to promote relaxation, regulate circadian rhythms, and improve overall sleep quality. Although rooted in traditional East Asian medicine, several physiological mechanisms have been proposed to explain its effects within a modern biomedical framework.

**1. Modulation of the Autonomic Nervous System**

One of the primary mechanisms associated with acupressure is its influence on autonomic balance. Insomnia is often linked to hyperarousal, characterized by increased sympathetic nervous system activity. Stimulation of specific acupoints, such as HT7 (Shenmen) and SP6 (Sanyinjiao), has been shown to enhance parasympathetic activity while reducing sympathetic dominance.

This shift toward parasympathetic predominance promotes relaxation, lowers heart rate, reduces blood pressure, and prepares the body for sleep initiation.

**2. Regulation of Neurotransmitters and Hormones**

Acupressure may influence neurotransmitters involved in sleep regulation. Research suggests that stimulation of acupoints can enhance the release of endogenous substances such as gamma-aminobutyric acid (GABA), serotonin, and endorphins. Increased GABA activity supports inhibitory neural processes, facilitating calmness and sleep onset.

Additionally, acupressure may support melatonin secretion from the pineal gland. Melatonin plays a central role in regulating circadian rhythms and signaling the body's transition from wakefulness to sleep.

**3. Reduction of Stress and Cortisol Levels**

Chronic stress is a major contributor to insomnia. Elevated cortisol levels disrupt normal sleep patterns and maintain a state of physiological alertness. Acupressure has been associated with reduced cortisol concentrations and decreased stress-related symptoms. By attenuating the stress response, acupressure may help break the cycle of hyperarousal that interferes with sleep.

**4. Improved Circulation and Muscle Relaxation**

Physical tension and muscular discomfort can interfere with sleep quality. Acupressure enhances local blood circulation and promotes muscle relaxation, which may alleviate somatic

discomfort that contributes to sleep disturbance. Relaxed musculature and improved peripheral circulation create favorable physiological conditions for restful sleep.

**5. Neuromodulation and Brain Activity**

Emerging evidence from neuroimaging studies suggests that acupoint stimulation may modulate activity in brain regions associated with emotional regulation and sleep control, including the hypothalamus and limbic system. By influencing neural circuits involved in arousal and relaxation, acupressure may support normalization of disrupted sleep–wake patterns.

acupressure appears to regulate sleep through a combination of autonomic modulation, neurotransmitter balance, hormonal regulation, stress reduction, and neuromodulation. These mechanisms collectively contribute to improved sleep initiation and maintenance, offering a physiological basis for its use as a complementary or alternative therapy in the management of insomnia.

## Conclusion

Insomnia remains a widespread and clinically significant disorder that affects physical health, emotional stability, cognitive performance, and overall quality of life. Conventional pharmacological therapies offer rapid symptomatic relief and are often effective in the short term. However, concerns related to tolerance, dependency, altered sleep architecture, and residual side effects limit their suitability for prolonged use. These challenges highlight the importance of exploring safer and more sustainable treatment options. Acupressure presents a promising non-pharmacological intervention grounded in both traditional practice and emerging physiological evidence. By modulating autonomic nervous system activity, enhancing neurotransmitter balance, supporting melatonin secretion, and reducing stress-related arousal, acupressure addresses key mechanisms underlying insomnia. Unlike hypnotic medications, it carries minimal risk of adverse effects and can empower individuals to participate actively in their own care. The comparative analysis suggests that while pharmacological therapy may be beneficial for acute symptom control, acupressure offers potential advantages in long-term management and overall well-being. An integrative approach that combines short-term medical treatment with complementary therapies may provide optimal outcomes, particularly for individuals seeking non-drug-based or holistic care strategies. Further large-scale randomized controlled trials with standardized protocols are necessary to strengthen the evidence base and clarify long-term comparative effectiveness. Nonetheless, acupressure represents a safe, accessible, and cost-effective option that can contribute meaningfully to comprehensive insomnia management.

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