

## Review Article

# The prevalence and impact of insomnia on patients with mental and physical health conditions

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## Abstract

A pervasive sleep disorder named insomnia has been increasingly recognized as a major factor leading comorbidity in individuals suffering with mental health problems. The review article

demonstrated the cause and impact of insomnia through literature on individuals who are already struggling with mental health issues. After a thorough database research, Studies evaluating the prevalence rates of insomnia across different mental health illnesses, such as anxiety, depression, schizophrenia, bipolar disorder, and post-traumatic stress disorder, were found. In addition to this, review article examines the duality of insomnia and mental health. It explains how insomnia worsens psychiatric symptoms while also exacerbating them. It also discusses how untreated insomnia can affect the development and prognosis of psychiatric disorders, as well as how treatment strategies can address both sleep disorders and psychiatric symptoms. Finally, it explores potential mechanisms that may be at play between insomnia and psychiatric disorders, including dysregulation of neurotransmitters, hypothalamic, pituitary, and adrenal functions, as well as cognitive and emotional processes. By understanding the complex relationship between insomnia and psychological health, holistic interventions can be developed that address both sleep disturbance and psychiatric symptoms, leading to improved well-being and overall quality of life.

## Key words

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Insomnia, Sleep disorder, Prevalence, Mental health disorders, Physical health conditions.

## Introduction

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Chronic insomnia is a condition characterized by difficulty initiating, maintaining, consolidating, or improving sleep quality. It occurs when there is a sufficient amount of opportunity for sleep but still some degree of daytime disturbance. Chronic insomnia is classified according to the DSM-5 and the ICD-10. Both DSM-5 and ICD-10 use similar diagnostic criteria to diagnose insomnia [1-3]. Additionally, 4% of people regularly take sleeping drugs [4]. Nevertheless, it has only been relatively recently that the relationship between sleeplessness and substantial medical morbidity has been investigated. As a result, from the standpoint of public health, insomnia and the related physical and mental health issues are now considered to be minor issues.

There is a large body of literature on the association of insomnia with common psychiatric disorders in adults [5], including anxiety [6], less epidemiological research has been conducted in less common disorders (e.g., autism, OCD, and schizophrenia). While insomnia may be considered transdiagnostic, the prevalence is unlikely to be uniform across psychiatric disorders [7]. One of the main limitations of this field is that there is no consensus definition of

insomnia, which makes it difficult to compare studies and disorders.

Unlike studies that have measured sleep quality in detail, there are only a few those have measured sleep quantity in detail? This is an important limitation because different conditions and disorders can cause different kinds of sleep problems. For example, John, et al. (2005) found that people with anxiety or depression were more likely to have short sleep duration [8]. A population-based study in Germany found that people with psychiatric disorders had both short and long sleep duration. In a national Korean study, Park, et al. (2010) found that there was a relationship between psychiatric disorders and very short sleep duration [9].

Although sleep disorders are commonly reported across a wide range of somatic disorders, the relationship between insomnia and physical health has received less attention compared to the relationship between sleep disorders and mental health disorders [10]. For example, research has shown that patients with: Cancer, Type 1 Diabetes, Asthma, Migraine, Short and Long Sleep Durations Disease and Heart disease [11-15].

The range of operationalization for sleep disorders complicates research on psychiatric disorders and makes it challenging to compare the variability of insomnia and sleep onset across conditions and diseases. Furthermore, there are few large-scale studies with sufficient statistical power to address the less common issues, and there are few studies that cover multiple disorders to compare conditions.

In light of these factors, the purpose of this research was to investigate the prevalence of insomnia as operationalized by the DSM-5 and variations in the average amount of time spent sleeping for a variety of mental and physical conditions. Men and women's associations were analyzed independently since prior research has indicated that although the prevalence of sleep issues and poor health varies, there may be gender variations in the strength of these relationships.

### **Socioeconomic impact of Insomnia**

Apart from coexisting mental and physical health issues, sleeplessness is linked to significant individual and community ramifications. According to a study that looked at how insomnia affected patients in primary care, those who suffered from insomnia missed twice as many days of work due to illness [16]. According to a different study, individuals with insomnia (22%) reported a lower quality of life than patients with no sleep difficulties (3%) [17]. Similar to chronic diseases like depression and congestive heart failure, insomnia has been demonstrated to have a negative impact on health-related quality of life [18].

The yearly cost was estimated to be between \$35 and \$107 billion when the economic expenses including increased alcohol intake due to insomnia, accidents, health care use, and absenteeism at work were taken into account [19, 20]. There is no evidence linking insomnia to a higher chance of passing away [21]. Insomniacs routinely utilize healthcare services at higher

rates than those without sleep issues, as evidenced by an increase in office visits and hospitalization rates [22, 23]. Regardless of age, insomniacs experience higher direct expenses from pharmaceutical, inpatient, outpatient, and emergency department utilization [24]. According to a 1995 assessment, the direct medical expenses associated with insomnia were estimated to be \$13.9 billion in the US and \$2.1 billion in France [25, 26]. Workplace function is also adversely impacted. Good sleepers miss work twice as frequently as insomniacs do, with men and blue-collar workers being the most absentee [27]. Employers then pay the additional expense of workers missing work due to sleeplessness, which results in lower productivity and salary replacement [28].

### **Insomnia and medical conditions**

Numerous physical disorders and insomnia have also been linked to one another. In a community-based sample, Taylor and colleagues [29] discovered that chronic insomniacs had higher rates of cardiovascular illness, hypertension, chronic pain, and increased respiratory, gastrointestinal, neurological, and urine issues. It was also demonstrated that the opposite was true, with participants reporting sleeplessness more frequently than those who did not have these conditions, including hypertension, chronic pain, respiratory, gastrointestinal, and urine issues [29]. Others have similarly discovered higher odds ratios for sleeplessness in a range of illnesses, from hip impairment to congestive heart failure [30].

Ancoli-Israel [31] highlighted the various ways that chronic medical diseases and insomnia may be related to one another. For example, sleep disturbances may be a sign of an illness such as increased arousals, gastric reflux disease, congestive heart failure, and Cheyne-Stokes respiration. In other instances, a disorder's aetiology, such as diabetes mellitus, may include insomnia [31]. Particular consideration should be given to the link between sleeplessness and

cardiovascular disease. A risk ratio of 1.5 to 3.9 has been shown between having trouble falling asleep and coronary heart disease, after controlling for age and coronary risk factors [32]. It was also demonstrated that men who had trouble going asleep had a threefold increased chance of dying from coronary heart disease [33].

Another association of considerable therapeutic importance is that between sleeplessness and chronic pain. More than 40% of insomniacs in one study said they suffered from at least one persistently bothersome medical ailment. Furthermore, chronic pain was linked to shorter sleep durations and a reduced capacity to return to sleep after arousal [34]. Tang and colleagues [34] discovered that, in contrast to 3% of individuals without pain, 53% of patients with chronic pain had scores indicative on the Insomnia Severity Index of clinical insomnia [35].

### **Insomnia and Psychiatric Morbidity**

Numerous studies have shown that sleeplessness increases the likelihood of developing despair, anxiety, and suicidal thoughts and behaviours. It also has a strong correlation with psychiatric diseases [36]. Nevertheless, it is unclear by what processes sleeplessness predates the onset of mental illnesses like depression. A recent study from the Penn State Adult Cohort found that insomnia with objectively short sleep duration was linked to a psychological profile that was typical of medical outpatients and included depression, exhaustion, worries about one's physical and general health, somatically focused anxiety, and poor health status [37]. On the other hand, insomnia with normal sleep duration was linked to psychological characteristics such as depression, rumination, anxiety, intrusive thoughts, and inadequate coping mechanisms, as well as sleep misperception [37].

Based on these data, we propose that both subtypes of insomnia are linked to psychiatric

disorders or put them at risk of developing them; however, the reasons for this relationship may be due to distinct pathophysiological processes [38]. For instance, it's likely that psychological factors like ruminative tendencies and inadequate coping strategies, as well as biological factors like hyperactivity of the HPA axis, contribute to the development of depression in insomniacs who have objectively short sleep durations. These theories still need to be tested, though.

### **Insomnia and Neurocognitive Morbidity**

Many people who struggle with insomnia report difficulty focusing, shortness of memory, and difficulty staying focused. However, research using objective neuropsychological tests has produced mixed results, leading to questions about the true nature of insomnia-related cognitive impairments and whether daytime complaints may be rooted in heightened worries about the consequences of poor sleep [39, 40].

Objective sleep measures play a role in the connection between insomnia and neurocognitive dysfunction [41]. For example, a recent study in the Penn State adult Cohort found that people with insomnia (defined as those with subjective complaints) did not differ significantly from controls in PSG (prolonged-release-of-gamma) variables, nor did they differ significantly from those with no insomnia at all. On the other hand, there were significant interactions between insomnia and objective-assessed short sleep duration, (less than 6 hours). Specifically, people with insomnia with objectively defined short sleep duration showed poorer performance in tasks that measured processing speed and attention switching, as well as short-term memory, compared with control groups that slept for normal or short lengths of time [41].

What's interesting is that those with insomnia and a normal sleep duration showed no significant deficits compared with controls. This suggests that when insomnia is combined with an objective short sleep duration, attention-

switching skills, a key component of executive attention control, may be affected. What's even more interesting is that by including good sleepers with a short sleep duration, it suggests that the deficits in executive attention may be due to underlying physical hyperarousal (a common symptom of chronic insomnia) rather than to the short sleep duration itself [42].

In another study, Edinger et al. compared the performance of individuals with and without primary insomnia on response time tasks to those who were well screened for normal sleep. The results showed that people with primary insomnia with a mean onset latency of more than 8 minutes showed reduced night time sleep efficiency and a greater wake-up time after sleep onset. These findings are consistent with 24-hour physiology, especially in people with primary insomnia. In addition, there was a strong correlation between insomnia and increased mean onset latency in MSLT. People with primary insomnia with delayed MSLT onset showed a higher rate of error in attention switching tasks compared with normal sleepers who had similar MSLT profiles and showed no significant deficits. This suggests that physiological hyperarousals in insomnia may increase daytime alertness while also predisposing people to attention switching problems.

A meta-analysis recently highlighted that people with insomnia may have mild to moderate cognitive impairment in several cognitive areas, including working memory, short-term memory, and some executive function [43]. However, one aspect of this association that is often neglected in meta-analysis is the association between insomnia and objectively measured sleep disruption severity. Existing evidence suggests that cognition may be impaired in people with insomnia when sleep disturbances are objectively measured, whereas studies using only subjective diagnostic criteria to diagnose insomnia tend to produce less consistent results [44].

Overall, these results suggest that objectively measured short sleep duration may play a predictive role in improving cognitive function. Further research should investigate whether insomnia associated with objectively measured short sleep could be a pre-existing risk factor for MCI and dementia.

### **Insomnia and Cardio metabolic Morbidity**

Until recently, there was no definitive link between chronic insomnia and significant medical complications, such as cardiovascular disease. However, several studies have shown a strong association between difficulty getting or staying asleep and cardiovascular disease [45-47]. For example, chronic complaints of sleep problems have been associated with an increased risk of high blood pressure (hypertension), acute heart attack (heart attack), and an increased risk of type 2 diabetes (type 2 diabetes). However, these early studies, which did not include PSG (procedure for controlling sleep-disorder breathing) or any other sleep pathology, often reported small effect sizes, which led to skepticism from clinicians and researchers about their methodological reliability. At least one report showed a lower mortality rate among patients with sleep problems after six years of follow-up [48-50].

Hypotension characterized by objectively measured short sleep duration was hypothesized to be associated with significant cardiovascular risk factors such as hypertension, diabetes and metabolic syndrome [51, 52]. The association between hypertension, diabetes and mortality is well-established, and recent epidemiological questions from the Pennsylvania Adult Cohort including in-lab PSSG have confirmed the association between insomnia characterized by objectively defined short sleep duration with increased risk for hypertension, diabetes and cardiovascular mortality.

It is important to note that people with insomnia who sleep 5 hours or less have a higher risk of



developing hypertension or diabetes than normal sleepers who sleep at least 6 hours a night. Furthermore, insomnia predicts incident hypertension, suggesting that insomnia may play a role in the development of cardiovascular ailments. Importantly, longitudinal studies reveal that people with non-obesity chronic insomnia, despite having objectively short sleep durations, do not have a significantly higher risk of obesity. In fact, they are less likely to develop obesity than their peers. These findings suggest that objectively short sleep duration can affect cardiometabolism through mechanisms that are not related to weight gain, such as stress system activation or inflammation processes [53-57].

In addition, longitudinal data showed a significantly increased mortality risk in men with insomnia, and a shorter sleep duration, especially in those with diabetes or high blood pressure. On the other hand, mortality in women was not significantly affected by insomnia and a shorter duration of sleep, possibly because of differences in follow up time.

Similar to population-based studies, recent research has revealed physiological alterations in insomnia patients, such as increased systolic (high blood pressure) blood pressure during the night, variability of heart rate, shortened pre-electrolyte period, and impaired glucose metabolism indices. Taken together, these findings indicate that objective short-term sleep duration may be predictive of chronic insomnia medical severity.

## **Conclusion**

In conclusion, this review has shed light on the complex relationship between insomnia and various aspects of health, such as mental health and cardiovascular health. The evidence suggests that insomnia exacerbates psychiatric conditions and vice versa. Furthermore, objective sleep measures (e.g., short sleep duration) have been found to play a significant role in predicting cognitive impairment and cardiovascular disease

in individuals with insomnia. Findings from population studies, particularly from the Pennsylvania Adult Cohort, suggest a strong causal link between objective short sleep duration and increased risk of hypertension, diabetes and mortality. These associations were not affected by traditional risk factors (e.g., obesity), suggesting novel mechanisms that underlie the association between insomnia and cardiovascular health. In addition, new research has uncovered the physiological underpinnings of these associations, such as dysregulation of the stress system and inflammatory mechanisms. However, more research is needed to better understand the exact mechanisms through which insomnia increases cardiometabolic disease and mortality. Based on this evidence, healthcare providers should treat insomnia in a holistic manner, treating both sleep disorders and underlying psychiatric conditions. Integrative interventions that focus on sleep hygiene, CBT-I, and pharmacotherapy may help improve sleep quality and reduce associated health risks. Overall, this review emphasizes the importance of diagnosing insomnia as a public health issue and emphasizes the need for multi-disciplinary approaches to treatment. By treating sleep disorders holistically, clinicians can improve patient outcomes and reduce the burden of underlying health conditions. More research into the mechanisms of insomnia and its impact on health outcomes is needed to inform more personalized interventions and improve the quality of life for those affected.

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