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Research Article

The Effectiveness Of Cognitive Behavior Therapy For Treating Insomnia

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ABSTRACT

Insomnia is a prevalent sleep disorder characterized by difficulties initiating or maintaining sleep, which leads to dissatisfaction with sleep quality and duration, and is often accompanied by impairment in daytime functioning. This paper provides an overview of insomnia, its impact on lifestyle, diagnostic criteria, and the importance of treating it. We explore the cognitive-behavioral therapy for insomnia (CBT-I) as an effective treatment approach and discuss its mechanisms and components. Additionally, we examine the relationship between lifestyle factors and insomnia, highlighting how various lifestyle choices can interfere with sleep quality and patterns. Furthermore, we discuss the prevalence of insomnia in individuals with neurological disorders, emphasizing the need for early detection and intervention. Finally, we present an overview of the diagnostic criteria for insomnia disorder and discuss its implications for individuals' well-being and quality of life. Overall, this paper underscores the importance of addressing insomnia, both from a clinical and public health perspective, given its significant impact on individuals' physical health, mental well-being, and overall quality of life. Understanding the mechanisms underlying insomnia and implementing effective treatment strategies such as CBT-I can help alleviate symptoms and improve outcomes for individuals affected by this sleep disorder. Moreover, promoting healthy lifestyle habits and addressing comorbid conditions can contribute to the prevention and management of insomnia, enhancing overall sleep health and well-being.

Keywords: insomnia, sleep disorder, cognitive-behavioral therapy, lifestyle factors, neurological disorders, treatment, diagnostic criteria, mental health, well-being, quality of life

Introduction

Sleep is a common function of living species. It occupies one-third of human life, and it is shown to be essential for health and for emotional, physical, and cognitive wellbeing. (Pavlova &Latreille 2018; Nissen et al., 2021; Tempesta et al., 2018). Poor or insufficient sleep is associated with a wide range of dysfunctions that involve different body systems, such as the endocrine, metabolic, and immune systems, thus compromising the higher cortical functions, cognitive performance, mood, and post physical activity recovery. Sleep disturbance can affect both the duration and the quality of sleep, and when it occurs, it reduces the functionality and quality of life (QoL) of the person. Additionally, it represents a risk factor for secondary diseases and medical conditions. Sleep quantity and quality can be affected by age, physical and psychological conditions, and environmental factors. (Troynikov, 2018; Dyken et al., 2012; Pasic et al., 2011; Shen & Liu 2018). Several studies have shown that sleep disorders i.e, insufficient sleep, excessive amount of perceived sleep, abnormal movements during sleep are common among the non-motor symptoms in patients with neurological disorders.

This strategy is used to restore normal homeostatic sleep drive by restricting the amount of time spent in bed (Spielman et al., 1987). A specific set of instructions has been proposed in implementing sleep restriction (Edinger & Means, 2005; Wohlgemuth & Edinger, 2000). The first step in this process is to reduce the amount of time spent in bed to the estimated average total sleep time, which is calculated based on a sleep diary. An additional 30 minutes is added to this time to allow for normal nocturnal wakefulness time, and the initial time in bed prescription is typically not set below 5 hours. The second step is to adjust time in bed up

or down in 15 to 30 minute increments based on individuals' sleep performance. By restricting the amount of time allotted for sleep each night, the goal is for the time in bed to eventually match individuals' sleep needs in order to improve sleep quality and efficiency (i.e., percentage of time asleep relative to time in bed) (Wohlgemuth & Edinger, 2000).

Sleep disorders are frequently identified following traumatic brain injury (TBI); poor sleep efficiency, short sleep duration, long sleep onset, hypersomnia, and sleep-related breathing disorders have been reported (Albrecht & Wickwire, 2020; Wolfe & Attarian, 2018). Sleep apnea, insomnia, restless legs syndrome, and daytime sleepiness are common in stroke survivors, affecting not only the activities of daily living and quality of life of both patients and caregivers but also representing a high risk of further cerebrovascular events (Perez-Carbonell & Bashir, 2020; Mims & Kirsch, 2016). Several neurological disorders are frequently complicated by comorbid insomnia. Insomnia may influence the severity of both epilepsy and headache, and its treatment may improve seizure and headache frequency (Strambi,2020) Insomnia may be a potentially modifiable risk factor for Alzheimer's disease(Wallace, Wohlgemuth & Trotti, 2020) Insomnia symptoms have been reported in up to 80% of patients with Parkinson's disease (PD), but according to the diagnostic criteria of insomnia disorder' the prevalence rate is 43% At least 40% of subjects affected by multiple sclerosis (MS) have chronic insomnia, (Siengsukon, Alshehri, Drerup & Lynch, 2020) and the prevalence could be higher in relation to underdiagnosis16 Moreover, insomnia is frequently associated with sleep breathing disorder. Indeed, up to 58% of patients with sleep apnoea report symptoms indicative of comorbid insomnia (Sweetman & Catcheside, 2017).

Importance of treating insomnia

The prevalence of acute insomnia symptoms in the general population is estimated to be up to 37% per annum (Perlis & Ellis, 2020). The prevalence of chronic insomnia is about 10%–20% and is more prevalent in women, older adults and individuals of lower socioeconomic status (Ellis, Espie & Bastien, 2012) Although insomnia shows high prevalence, it is seldom adequately assessed (Gureje, Oladeji & Makanjuola, 2011; LeBlanc, Savard & Baillargeon, 2009).

Insomnia disorder is the second most prevalent mental disorder (Wittchen, Jacobi & Rehm, 2010) and is the most common sleep complaint Insomnia is defined by difficulties initiating or maintaining sleep, subjectively experienced to have adverse consequences for daytime functioning and occurring despite appropriate circumstances and opportunity for sleep. If the complaints occur at least three times a week and last for at least 3 months, the diagnostic criteria for insomnia disorder are met. Importantly, according to both the International Classification of Sleep Disorder third edition (ICSD) (American Academy of Sleep Medicine, 2014) and the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM) (Diagnostic and Statistical Manual of Mental Disorders, 2013) the distinction between primary and secondary insomnia was removed in favour of an umbrella category for insomnia disorder which can be used also when insomnia is comorbid with other conditions. This modification reflects understanding that, although insomnia frequently accompanies other disorders, it can also precede the comorbid condition, (Riemann, Nissen & Otte, 2015) persist despite effective treatment of the comorbid condition, or aggravate the symptoms of the comorbid condition.

About 30% of adults will suffer from sleep difficulties during the course of a year, including about one third (10% of the population) who will report chronic difficulties in falling or staying asleep (Ford & Kamerow, 1989).Insomnia is more prevalent among women, older adults, and among persons suffering from medical (Blais, Morin, Boisclair, Grenier, & Guay, 2001; Hohagen et al., 1993) or psychological conditions (Buysse et al., 1994).

How insomnia impacts lifestyle

The term "sleep quality," which has just been introduced in the field of sleep medicine, refers to a variety of characteristics, such as consistency, happiness, alertness and timing, efficiency, and duration. Overall, the findings indicate that a variety of lifestyle factors, regardless of age, significantly affect the outcome of sleep health. Findings, however, suggest that some factors—like regularity, exercise, or dieting—are connected to the health of sleep for people of all ages.

an additive interaction between lifestyle and insomnia disorder on the likelihood of activity-limiting spinal pain; that is, individuals with the worst lifestyle score and insomnia disorder had a risk ratio of three for activity-limiting spinal pain, in comparison to participants without the disorder and with the highest lifestyle score. A RR of 1.56 was seen in people with a sleeping disorder and the best lifestyle score, while 1.56 was seen in persons with insomnia disorder and the lowest lifestyle score.

The impact of lifestyle factors on insomnia might be substantial. Sleep schedule and quality can be affected by unhealthy lifestyle patterns and behaviors, such as working late into the night, playing video games, or utilizing electronics (Shocha, 2012). Insomnia can also result from taking a late-afternoon nap, using the bed for purposes other than sleeping, eating large, spicy, or caffeine- or nicotine-containing meals, and drinking alcohol right before bed. (Suni and Suni, 2024) In addition, certain lifestyle choices—such as shift employment, jet lag, and irregular sleep schedules—can disturb the circadian rhythm and make insomnia worse. .(Blafoss et al., 20109) It has been discovered that sedentary workers with sleep issues participate in less high-intensity physical activity during their free time, suggesting a possible vicious cycle between

insufficient sleep and decreased physical activity. (Asp, 2022). These lifestyle-related factors can create a challenging environment for maintaining healthy sleep patterns and quality. (Sleep and Mental Health, n.d.)
Lifestyle factors can significantly disturb sleep, leading to insomnia, by affecting various aspects of sleep quality and patterns. Here's how different lifestyle choices can interfere with sleep:

- Alcohol Consumption: Alcohol, especially when consumed close to bedtime, can disrupt sleep. While it may help you fall asleep quickly, it can lead to sleep fragmentation and disruption during the night (Breus, 2020)
- Caffeine Intake: Caffeine is a stimulant that can stay in your system for hours, making it harder to fall asleep and potentially contributing to insomnia when consumed in the afternoon or evening (Suni & Suni, 2024)
- Diet: Consuming heavy meals or spicy foods late in the evening can disrupt your digestive process and lead to sleep disturbances (Suni & Suni, 2024d)
- Electronic Devices: Keeping the brain stimulated until late in the evening, such as by working late, playing video games, or using other electronic devices, can interfere with your sleep (Zwarensteyn, 2024)
- Napping Habits: Napping late in the afternoon can throw off your sleep timing and make it hard to fall asleep at night. Sleeping in later to make up for lost sleep can confuse your body's internal clock and make it difficult to establish a healthy sleep schedule (Suni & Suni, 2024e)
- Age: Stress, physical ailments, mental health problems, and poor sleep habits can cause insomnia at any age, but teens and older adults may be especially susceptible due to specific life circumstances (Dzierzewski et al., 2021b)
- Daytime Functioning: Sleepiness, exhaustion, and low alertness throughout the day can result from insomnia, which can have an impact on everyday activities, employment, and education. This may lead to lower quality of life, missed deadlines, and diminished productivity. (Professional, n.d.-b)
- Mental Health: Anxiety, depression, and mood disorders are among the mental health conditions that are frequently linked to chronic insomnia. Insomnia can aggravate these disorders by increasing stress and worry, which feeds a vicious cycle in which mental health problems make it more difficult to sleep, and sleep problems make mental health problems worse. (O'Connell, 2022)

Overview of cognitive behavior therapy

In understanding the treatment mechanisms of CBT-I, an explanation of the processes underlying insomnia is first warranted. (Spielman, Caruso, and Glovinsky,1987) proposed a theoretical model of insomnia based on three factors — predisposing factors, precipitating factors, and perpetuating factors. Predisposing factors precede the onset of sleep difficulties and increase individuals' vulnerability to insomnia;The cognitive mechanisms underlying insomnia have also been a focus of the literature (Harvey, 2002, 2005; Kaplan, Talbot, & Harvey, 2009). According to the cognitive model of insomnia (Harvey, 2002), individuals with insomnia experience increased worry and rumination about a range of issues, including their inability to sleep and the impact of their sleep disturbance on daily functioning. As a result of this anxiety, their attention becomes focused on sleep-related threats, both internal (e.g., bodily sensations) and external (e.g., environmental noises).
Although CBT-I and pharmacotherapy demonstrate comparable efficacy in the treatment of insomnia (Morin, Colecchi, Stone, Sood, & Brink, 1999; Morin et al., 2009), CBT-I has been recommended as a first line treatment given its long-term efficacy (Espie, 2009). CBT-I was developed as a psychological intervention to target the perpetuating factors of insomnia. It is a short-term, multi-component treatment, comprised of behavioral and cognitive techniques (Morin & Espie, 2003; Perlis & Lichstein, 2003). CBT-I is typically conducted over the course of four to eight sessions (Morin et al., 2006), with a focus on psycho-education, behavioral and cognitive strategies (Edinger & Carney, 2008). Treatment often includes: stimulus control, sleep restriction, cognitive therapy, sleep hygiene, and relaxation training (Edinger & Means, 2005). Each CBT-I component involves distinct skills and strategies intended to target specific mechanisms of insomnia.
Cognitive therapy for insomnia is designed to target the cognitive hyperarousal that perpetuates insomnia (Harvey, 2002, 2005; Harvey, Sharpley, Ree, Stinson, & Clark, 2007). Through psycho-education and cognitive restructuring, individuals are taught to correct their dysfunctional beliefs and attitudes about sleep. Similar to cognitive therapy for depression, techniques typically involve thought records to challenge maladaptive thoughts, behavioral experiments to test and disconfirm unrealistic expectations, and Socratic questioning to facilitate individuals' learning and self-efficacy (Harvey, 2002, 2005; Harvey et al., 2007).Primary insomnia a diagnostic term specific to the American Psychiatric Association's sleep disorder nosology outlined in recent versions of its Diagnostic and Statistical Manuals. This diagnostic category first appeared as a formal insomnia diagnosis in the revised, third edition of the Association's Diagnostic and Statistical Manual (American Psychiatric Association, 1987) and has been maintained through subsequent revisions of this text (American Psychiatric Association, 1994, 2000).

Understanding Insomnia

One of the most common complaints to the doctor is insomnia. According to Ford and Mellinger (1989), the prevalence in the population as a whole varies from 9% for persistent sleep disorders to 27% for sporadic

insomnia. Valid tools are required to support medical professionals in evaluating symptoms of sleeplessness. Sleeplessness is among the most frequent symptoms made to a doctor. In the general population, the prevalence of sleep disorders ranges from 9% for persistent sleep disorders to 27% for spontaneous insomnia, according to Ford and Mellinger (1989). To assist medical practitioners in assessing symptoms of insomnia, reliable instruments are needed.

About one-third of adults report having trouble falling or staying asleep, or getting up too early, which results in poor sleep quality on a weekly basis (Ohayo, 2002). For the majority, these sleep issues are momentary or unimportant. Prolonged insomnia, however, is frequently linked to significant distress, impairment in daytime functioning, or both. An insomnia disorder diagnosis is justified in these circumstances. Chronic insomnia is linked to a number of negative outcomes, including decreased quality of life and perceived health (Roth et al., 2011), an increase in occupational injuries and absenteeism (Kyle and Morgan, 2010), and even fatal injuries (Shahly, Coulouvrat et al., 2012). Symptoms of insomnia may also, independently of depression, be a risk factor for suicide attempts and fatalities.(Gutierrez & Ribeiro, 2012) Neuropsychological evaluations identify deficiencies in

Weekly poor sleep quality is caused by almost one-third of persons reporting difficulty falling or staying asleep, or waking up too early (Ohayo, 2002). Most people's sleep problems are either transient or insignificant. On the other hand, prolonged insomnia is often associated with severe distress, impairment in daily functioning, or both. In these cases, a diagnosis of insomnia disorder is warranted. Many unfavorable consequences are associated with chronic insomnia, such as a decline in perceived health and quality of life (Roth et al., 2011), an increase in work-related injuries and absenteeism (Kyle and Morgan, 2010), and even fatal injuries (Shahly, Coulouvrat et al., 2012). In addition, sleeplessness symptoms may independently increase the risk of suicide attempts and fatalities.(2012) Gutierrez and Ribeiro neuropsychological assessments.

Diagnostic criteria of Insomnia Disorder

A predominant complaint of dissatisfaction witli sleep quantity or quality, associated with one (or more) of the following symptoms:

1. Difficulty initiating sleep. (In children, this may manifest as difficulty initiating sleep without caregiver intervention.) 2. Difficulty maintaining sleep, characterized by frequent awakenings or problems returning to sleep after awakenings. (In children, this may manifest as difficulty returning to sleep without caregiver intervention.) 3. Early-morning awakening with inability to return to sleep.

B. The sleep disturbance causes clinically significant distress or impairment in social, occupational, educational, academic, behavioral, or other important areas of functioning.

C. The sleep difficulty occurs at least 3 nights per week.

D. The sleep difficulty is present for at least 3 months.

E. The sleep difficulty occurs despite adequate opportunity for sleep.

F. The insomnia is not better explained by and does not occur exclusively during the course of another sleep-wake disorder (e.g., narcolepsy, a breathing-related sleep disorder, a circadian rhythm sleep-wake disorder, a parasomnia).

G. The insomnia is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication).

H. Coexisting mental disorders and medical conditions do not adequately explain the predominant complaint of insomnia.

The research explored the multifaceted aspects of insomnia, its impact on lifestyle, cognitive-behavioral therapy as an effective treatment approach, and the diagnostic criteria associated with the disorder. Here are the key conclusions drawn from the research:

1. **Prevalence and Impact**: Insomnia is a prevalent sleep disorder affecting a significant portion of the population, with estimates ranging from 9% to 27%. Chronic insomnia is associated with distress, impairment in daytime functioning, decreased quality of life, and increased risk of occupational injuries and absenteeism. Furthermore, it may independently contribute to mental health issues such as depression and even suicide attempts.
2. **Diagnostic Criteria**: The diagnostic criteria for insomnia disorder involve dissatisfaction with sleep quantity or quality, along with specific symptoms such as difficulty initiating sleep, maintaining sleep, or early-morning awakenings. These symptoms must occur at least three nights per week for a duration of at least three months, despite adequate opportunity for sleep. Additionally, the disorder cannot be solely attributed to other sleep disorders, substance use, or underlying medical or mental health conditions.
3. **Impact of Lifestyle Factors**: Various lifestyle factors can significantly influence the development and exacerbation of insomnia. These include alcohol consumption, caffeine intake, diet, electronic device usage, napping habits, age-related changes, and irregular sleep schedules. Addressing these factors is crucial in managing and preventing insomnia.
4. **Cognitive-Behavioral Therapy for Insomnia (CBT-I)**: CBT-I is recommended as a first-line treatment for insomnia due to its long-term efficacy. It targets the perpetuating factors of insomnia

through a combination of behavioral and cognitive techniques. Components of CBT-I include stimulus control, sleep restriction, cognitive therapy, sleep hygiene, and relaxation training. By addressing dysfunctional beliefs and attitudes about sleep, CBT-I helps individuals develop healthier sleep habits and improve sleep quality.

5. **Neurological Disorders and Insomnia**: Insomnia is frequently comorbid with various neurological disorders such as traumatic brain injury, stroke, epilepsy, Parkinson's disease, and multiple sclerosis. Addressing insomnia in these populations is essential as it can exacerbate existing symptoms and negatively impact overall well-being.

In conclusion, insomnia is a complex sleep disorder with significant implications for individuals' mental and physical health, as well as their overall quality of life. Recognizing the interplay between lifestyle factors, cognitive processes, and neurological conditions is crucial in effectively managing and treating insomnia. Cognitive-behavioral therapy stands out as a promising intervention for addressing the underlying mechanisms of insomnia and promoting better sleep outcomes. Further research is warranted to explore the long-term effectiveness and scalability of CBT-I interventions, especially in diverse populations and clinical settings.

The implications of the research findings on insomnia extend to both individuals and society as a whole:

1. **Individual Implications**:
   - Improved Quality of Life: Effective management of insomnia through interventions like cognitive-behavioral therapy can lead to better sleep quality, reduced distress, and improved daytime functioning, ultimately enhancing individuals' overall quality of life.
   - Mental Health Benefits: Addressing insomnia can have positive effects on mental health, reducing the risk of depression, anxiety, and other mood disorders that are often exacerbated by sleep disturbances.
   - Enhanced Well-being: By adopting healthier sleep habits and addressing lifestyle factors that contribute to insomnia, individuals can experience increased well-being, resilience, and overall satisfaction with life.
2. **Societal Implications**:
   - Reduced Healthcare Costs: Effective treatment of insomnia can lead to fewer medical visits, hospitalizations, and medication prescriptions, thereby reducing healthcare costs associated with treating comorbid conditions and sleep-related disorders.
   - Increased Productivity: Improving sleep quality and reducing insomnia-related impairments in cognitive functioning can enhance workplace productivity, decrease absenteeism, and promote economic growth.
   - Public Health Impact: Addressing insomnia at a population level can have significant public health benefits, reducing the burden of mental health disorders, improving overall health outcomes, and enhancing community well-being.
3. **Clinical Implications**:
   - Treatment Guidelines: The research underscores the importance of incorporating cognitive-behavioral therapy into clinical practice guidelines for the management of insomnia, highlighting its effectiveness as a first-line treatment option.
   - Screening and Assessment: Healthcare professionals should routinely screen for insomnia symptoms and assess contributing lifestyle factors, neurological conditions, and mental health comorbidities to tailor interventions effectively.
   - Multidisciplinary Approach: Collaborative care models involving primary care physicians, sleep specialists, psychologists, and other healthcare providers can optimize the management of insomnia and address its multifaceted nature.
4. **Research Implications**:
   - Further Investigation: Future research should explore the long-term effectiveness, scalability, and cost-effectiveness of cognitive-behavioral therapy interventions for insomnia across diverse populations and settings.
   - Mechanistic Insights: Investigating the underlying neurobiological mechanisms linking insomnia to neurological disorders and mental health conditions can provide valuable insights into potential therapeutic targets and personalized treatment approaches.
   - Intervention Development: Continued research efforts are needed to develop innovative interventions, digital health tools, and telemedicine platforms to improve access to evidence-based treatments for insomnia and facilitate self-management strategies.

Overall, addressing insomnia comprehensively requires a multifaceted approach that integrates individualized treatment strategies, public health initiatives, and ongoing research efforts to promote sleep health and well-being for all.

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