

Comparative study on treatment strategies for insomnia

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Abstract. Insomnia is a common sleep disorder that affects the typical quality of life of people. Different treatment strategies are required for insomnia caused by specific factors, such as environment and genetics. Currently, the two main categories of insomnia treatments are cognitive behavioral therapy for insomnia (CBT-I) and pharmacotherapy. However, each treatment has distinctive limitations. CBT-I lacks accessibility and certified facilitators, while pharmacotherapy is more prone to result in negative side effects, addiction, and physiological tolerance. To get over these limitations, it is necessary to come up with new alternative therapies to deal with insomnia effectively. This review is intended to summarize the different causes of insomnia and the latest existing treatments for insomnia. Based on previous studies, this study provides new ideas for future insomnia treatments.

Keywords: Insomnia, Treatments, Cognitive Behavioral Therapy For Insomnia (CBT-I), Pharmacotherapy.

1. Introduction

A common sleep disorder called insomnia makes it difficult for people to stay asleep, fall asleep, or wake up too early and not back to sleep [1]. Along with its negative effects on mood and energy levels, insomnia also has negative effects on health, productivity, and quality of life. Various pathological responses of insomnia make this illness a global issue. Many different specific factors can lead to insomnia, such as environment and genetics. Different treatment methods are required for insomnia caused by specific factors. Inquiring into the patient's sleep history, disease history, and medication history is crucial for the effective treatment of insomnia [2]. The goal of effective insomnia treatment is to improve sleep quality by reducing sleep delays, early waking, and daytime impairments [3]. By reducing sleep delays, early waking, and daytime impairments, effective insomnia therapy strives to enhance sleep quality. The selection of insomnia treatment strategy is decided by different symptoms, severity, and susceptibility to adverse effects of drugs [3]. The two major categories of the most popular insomnia treatment methods nowadays are cognitive behavioral therapy for insomnia (CBT-I) and pharmacotherapy. However, CBT-I sometimes is inaccessible and lacks certified facilitators [4]. Additionally, pharmacotherapy has drawbacks such as side effects, addiction, and physiological tolerance [5]. Given the limitations of existing treatment, it is necessary to come up with new alternative therapies to deal with insomnia effectively. By analyzing the different causes and categories of insomnia and evaluating the merits and drawbacks of existing treatments, this research aims to provide new ideas for future insomnia treatments.

2. Causes of insomnia

To effectively treat insomnia, analyzing the specific causes of insomnia disorder is significant. There are a wide range of causes contributing to insomnia disorder.

Common causes of chronic insomnia include age, sex, and stress. Especially the stress, some negative emotional events that are connected to family, job school, and work are the most frequent causes of acute bouts of insomnia [6].

The usage of some medications or other health issues can also cause insomnia. Numerous prescription medicines, including antidepressants, decongestants, stimulants, and treatments for blood pressure or asthma, can disrupt sleep [6, 7].

According to the most recent diagnostic nomenclatures, insomnia is comorbid with other diseases rather than being an a priori secondary disorder [8]. Some sleep-related disorders, cancers, mental disorders and cardiovascular commonly co-exist with insomnia [8]. Additionally, obstructive sleep apnea syndrome (OSAS) and insomnia are substantially comorbid [9].

The control of sleep-wake features is also influenced by genetic factors [10]. Many pieces of evidence imply that several genes involved in the control of arousal and sleep-wake cycles are linked to insomnia [10].

Overall, the causes of insomnia can be internal or external factors. Some insomnia caused by external factors can improve a lot when these events such as stressful things get solved. Hence, for these insomnia, finding a solution to change the negative emotions of patients is a priority instead of medication treatment. While for insomnia caused by genetic factors, given the difficulty of radical cure, it is vital to use a safe and effective treatment to process long-term treatment, which reduces the severity of symptoms as much as possible.

3. Classification of insomnia

Understanding the specific types of distinct insomnia contributes to the successful treatment of insomnia. The categorization of insomnia condition was prompted by the necessity for accurate diagnosis.

The first categorization was used by Kleitman. He categorized insomnia into three types: initial insomnia, middle insomnia, and terminal or late insomnia [11].

According to DSM-5, insomnia disorder is subdivided depending on its persistence of symptoms. In terms of DSM-5, insomnia disorder is divided into episodic insomnia disorder, persistent insomnia disorder, and recurrent insomnia disorder [12]. ICSID-3 specifically subtyped insomnia disorder into three types: chronic, short-term, and other [13]. Transient sleep disturbances that do not fully match the diagnostic criteria for insomnia belong to other insomnia [13].

These three classification methods all have the common characteristics of insomnia, which include waking up earlier than expected having trouble falling asleep, and maintaining sleep [14]. More study is needed to improve the categorization system's accuracy, which helps better match patients with appropriate therapies.

4. Treatments for insomnia disorder

4.1. Cognitive behavioral therapy for insomnia(CBT-I)

Sleep education, behavioral therapies including bedtime limitation and sensory management, relaxation techniques, and cognitive therapy are all included in CBT-I, a multi-pronged treatment [15]. Daytime symptoms, sleep onset delay, and waking time following sleep onset can all be decreased rather well with CBT-I [16]. Additionally, CBT-I was shown to be more successful for individuals with mental comorbidity than medical comorbidity [17].

The effectiveness of CBT-I varies from case to case. The immediate benefits of CBT-I are as good as or better than pharmacotherapy, and they can even last for about 3 years follow-up. CBT-I can deeply enable people to use less treatment drugs [16]. The time commitments, the effort needed to change sleep patterns and behaviors, and deeply established detrimental views about sleep might all

contribute to the impacts of CBT-I [18]. Hence, not every patient with insomnia improves sufficiently from CBT-I. CBT-I is occasionally ineffective since there aren't enough sessions to address deeply ingrained ways of understanding sleep in patients [17, 18].

The notion that some behavioral treatments may be better suited for different phenotypes of insomnia is an important consideration for CBT-I [19]. For instance, while sleep restriction, which increases the pressure for sleep such that it inevitably comes without attention, purpose, or effort, may help both sleep maintenance and sleep onset, relaxation may be more beneficial for sleep onset [19].

CBT-I can be used for particular populations. For instance, pregnant women frequently experience insomnia [20] because of changes in their hormones, anatomy, and physiology. CBT-I is a more suitable and preferable treatment for insomnia during pregnancy, lactation, and the postpartum period since both patients and doctors are likely to be concerned about the side effects of using sleep medications [20].

According to both objective actigraphic and subjective assessments, CBT-I was found to significantly enhance sleep onset latency, sleep efficiency, sleep duration, and wake after sleep onset at the end of therapy in one research [21]. Both complaints of insomnia and signs of persistent sleep loss also diminished. Furthermore, these enhancements persisted during the follow-up period [22].

The application of CBT-I in clinical practice is limited by several factors [18]. For instance, a scarcity of providers or financial restrictions prevents all patients from having access to CBT-I [18]. However, using digital CBT-I may help to improve accessibility [23]. Some online CBT-I examples give evidence that digital CBT-I delivery may be a complement to in-person therapy and a viable alternative [23]. Additionally, digital CBT-I considerably decreased the intensity of insomnia in a recent meta-analysis [24].

The effectiveness of CBT-I mostly is determined by accessibility. It is a long-term treatment with slow remission which may cause mental issues with negative emotions in patients during the treatment. However, CBT-I can be the only choice of some specific populations, such as the old and pregnant who have contraindications to medication. Hence, the improvement of CBT-I is significant. Hopefully, the development of digital CBT-I is promising and will increase accessibility to a certain extent. And some approaches of CBT-I with internet applications can also be potential facilitators of the treatment.

4.2. Pharmacotherapy for insomnia disorder

Several drugs may be used to treat insomnia. Pharmacotherapy needs to take into account the costs, dangers, and advantages of using medications [25]. The clinician must be familiar with these medication characteristics to select the drugs that have the lowest treatment risk-benefit ratio for each patient, taking into account both those patients' particulars and the distinctive features of their insomnia [14]. Opioids, barbiturates, and painkillers have all been used pharmacologically to treat sleep disturbances [26]. The US Food and Drug Administration (FDA) has approved many pharmaceutical medications for the treatment of insomnia, including benzodiazepines (BZDs) and non-BZD, suvorexant, melatonin, and doxepin [27].

The AASM offers recommendations about the use of particular pharmacologic treatments for the management of sleep maintenance and sleep onset [26]. Both insomnia subtypes can be treated with a variety of drugs, including several BZD receptor agonists and BZDs [26]. The melatonin agonist ramelteon, the BZD receptor agonist zaleplon, and the BZD triazolam are all prescribed treatments for sleep onset, whilst suvorexant and doxepin are prescribed treatments for sleep maintenance [26]. Low-dose doxepin needs to be taken into consideration for people who have trouble staying asleep [27].

Benzodiazepines are a class of medications that work therapeutically to promote sleep by allosterically modulating the GABA type A receptor complex [25]. Benzodiazepines can have a wide range of inhibitory effects on brain activity including [25]. However, benzodiazepines are not widely advised due to their high abuse potential, which has the availability of superior substitutes [27]. A class of drugs known as "non-benzodiazepines" improves GABA-mediated inhibition by allosterically modulating the GABA type A receptor complex [28]. Additionally, these substances are useful for

aiding fall asleep. However, the side effects of BZDs and non-BZDs are common among patients, such as anxiety, sedation, sleepwalking, and influenced balance [26]. The majority of these side effects are dose-related, while some are linked to the pharmacokinetics of certain drugs [25]. Age may also have an impact on the severity of the side effects. Some old patients with insomnia have more side effects than benefits after treatment with drugs of BZDs or non-BZDs. The additional adverse effect includes returning insomnia after treatment [29].

Melatonin receptors are responsible for the therapeutic effects of melatonin [28]. Because of its high safety profile [29], patients frequently use melatonin, and for others, even serves as their preferred form of treatment. In older persons, controlled-release melatonin is advised as the first line of treatment [29]. Moreover, apart from sedation, melatonin hardly has side effects.

Healthcare practitioners are reluctant to use drugs as the treatment, especially BZDs and non-BZD hypnotics, due to worries about safety and dependence [30]. The elderly should avoid BZDs and non-BZD hypnotics due to increased sensitivity and risk of cognitive impairment, delirium, and falls [30].

Although pharmacotherapy is a quick effective treatment, the negative effects brought by the treatment cannot be ignored, such as side effects. Considering the pharmacological action of each kind of prescribed medication is vital before treatment. Therefore, applying pharmacotherapy requires extra caution about patients' disease, medication, or immune situations.

Recently, combining behavioral treatment with pharmacotherapy can provide a wider treatment patient population, which has a complementary effect on insomnia treatment. However, the maintenance of the effectiveness of this combined treatment needs further studies.

5. Conclusion

This study briefly analyzed common causes of general insomnia disorder. Based on this, the study evaluates the effectiveness and the deficiencies of the most common two types of treatments: cognitive behavioral therapy for insomnia(CBT-I) and pharmacotherapy.

Both CBT-I and pharmacotherapy have some shortcomings. CBT-I treatment lacks trained facilitators and sometimes isn't available. Pharmacological treatment which should strictly control the dose of the drug has different kinds of common side effects during the treatment for insomnia, such as somnolence, dizziness, poor motor coordination, drowsiness, and addiction. Besides, pharmacotherapy is not appropriate to treat some specific groups of people, like pregnant women, and patients with certain comorbid conditions. Given these limitations of current treatments for insomnia, developing new effective strategies for future treatment is necessary.

Digital CBT-I is a well-known potential remedy to improve accessibility. Digital CBT-I was comparable to face-to-face delivery in terms of effectiveness in reducing the severity of insomnia.

Therefore, digital-CBT-I is a promising treatment that may be the most prevail therapy. Also, combining newly accessible pharmacologic therapies with nonpharmacologic ones may become a novel, effective, and safe strategy. However, if the new treatment needs to be widely applied, there are still many issues about the combination of treatments that need to be studied to increase safety and effectiveness.

However, this review makes a conclusion just based on a small number of previous studies and is lack of practical specific research. Moreover, clinical survey and research is another drawback. Hence, to get more robust conclusions about treatments for insomnia disorder, there is still a lot of research work to be done.

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