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INSOMNIA: A COMPREHENSIVE STUDY OF FACTORS AND SOLUTIONS

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DOI: 10.35631 / IJEPC.1061098This work is licensed under [CC BY 4.0](#)**Abstract:**

Insomnia is a prevalent sleep disorder characterized by difficulty in falling asleep or maintaining sleep. It could significantly impair daily functioning and also could have an impact on a long-term health risk. This literature review aims to explore the current issues of insomnia in physiological psychology by highlighting its underlying mechanism, the contributing factors, and solutions based on the evidence from past studies. By using theories like hyperarousal theory, the cognitive model, and the 3P model, this review examines the physiological, cognitive, and emotional dimensions of insomnia. The finding shows that heightened physiological arousal, dysfunctional belief about sleep, and maladaptive behavior are the perpetuating factors for this issue. In addition, this writing found that interventions like Cognitive Behavioral Therapy for Insomnia and Mindfulness-Based Stress Reduction are identified as effective approaches in order to solve the issue of insomnia. The Islamic perspective is integrated into this writing, including Islamic CBT, prophetic sleep etiquettes, and mindfulness practices in order to balance the solutions along with the physiological and psychological factors. By referring to past research and contextualizing its relevance, this writing highlights the importance of being comprehensive and culturally inclusive to mitigate the rising prevalence of insomnia.

Keywords:

Insomnia, Sleep Disorder, Neuropsychological Factors, Interventions, Literature Review

Introduction

Insomnia is a common sleep disorder, characterized by difficulty falling asleep, staying asleep, or getting good quality sleep. According to the third edition of the International Classification of Sleep Disorders (ICSD-3), insomnia is defined as continuous difficulty in sleep initiation, duration, or consolidation that occurs even when the person has an adequate environment and time to sleep. The symptoms could be either difficulties with sleep onset or returning to sleep after waking up during the night or earlier in the morning (Someren, 2021). Beyond the disruption of sleep itself, insomnia can significantly impair daily functioning, which affects learning, focus, and the ability to respond effectively to environmental stimuli.

The prevalence of insomnia is alarming, making it a pressing global health concern. Studies found that approximately 30% to 35% of the global population experience insomnia symptoms, while the prevalence of insomnia disorders ranges from 3.9% to 22.1% (Poon et al., 2021). Among specific demographics such as students, these numbers are often high due to their academic stress, erratic schedules, and lifestyle choices. Research has shown that sleep disturbance among students can easily affect their academic performance, as it can result in a lower GPA among students (Turner et al., 2021).

This disorder not only can cause a short-term inconvenience but also a long-term health risk. By leaving this disorder untreated, it could be linked to severe consequences such as impaired cognitive performance and chronic fatigue. Additionally, this issue can be associated with physical health conditions in the long term such as cardiovascular disease, heart failure, and cerebral infarction (Grandner et al., 2023). Therefore, it is important to understand the

underlying causes of insomnia in order to develop and adopt practical solutions and interventions.

This literature review aims to analyze past research on insomnia, focusing on its physiological basis, contributing factors, and solutions to this issue that need to be focused on. By establishing the scope of past studies and contextualizing their relevance, this review seeks to bridge the gaps in understanding and provide a framework for future studies and research to find an adequate solution to this issue.

Methodology

The compilation strategy used for this review was comprehensive and systematic, focusing on recent literatures. The search was done through the online academic databases, namely Google Scholar, Wiley Online Library, National Library of Medicine and Oxford Academic database. To ensure focus on related topics and discussion, several keywords were used; "insomnia and sleep disorder," "sleep-related cognitive factors," "hyperarousal state," "sleep quality" and "REM sleep instability." Boolean operators (AND, OR) were applied during the search to expand and limit the research field according to the objective of study.

Inclusion and Exclusion Criteria

Recent publications were included in this review, published between January 2021 to December 2024. Additionally, the review focused on papers with original findings and systematic review papers with English medium. Accordingly, all publications in other languages were excluded from the review to avoid misinterpretation and misunderstanding. This review also excluded grey literature, thesis papers, and dissertations from the discussion.

Data Extraction

A specifically developed form was utilized to extract relevant information from the compiled publications. This form, standardized and thorough, allowed for a synthesis of data into meaningful comparisons and critics. The information extracted was several, including the key findings of theory, explanation of mechanism and research conducted. The data was then organized in a meaningful narrative.

Findings

Hyperarousal Theory

The hyperarousal theory suggests that insomnia results from increased physiological, cognitive, and emotional arousal, which disturbs sleep regulation and negatively affects one's overall well-being (Riemann et al., 2023). A key aligned finding that supports this theory is the concept of hyperarousal as a continuous 24-hour phenomenon. Studies by Dressle and Riemann (2023) and Riemann et al. (2023) have demonstrated high cortisol levels, heightened metabolic rates, and increased cognitive activity among individuals with insomnia during both day and night. Similarly, Jang et al. (2023) found longer sleep latency in the Multiple Sleep Latency Test (MSLT), showing that hyperarousal continues even during rest times.

Physiological evidence strongly supports the hyperarousal theory. Individuals with insomnia reported having increased sympathetic nervous system activity, characterized by elevated heart rate and body temperature during nighttime sleep (Dressle & Riemann, 2023). Moreover, studies highlighted high-frequency EEG power, particularly in the beta and gamma bands,

during both NREM and REM sleep phases, which relates to hyperactivity in the brain (Dressle & Riemann, 2023; Jang et al., 2023). This ongoing brain activity disrupts sleep, leading to fragmented and non-restorative sleep patterns (Riemann et al., 2023).

Cognitive and emotional hyperarousal also closely align with the theory. Individuals with insomnia frequently experience excessive rumination and worry, especially before going to sleep. These conditions are often worsened by maladaptive beliefs about sleep, such as fears of being unable to sleep, which causes increased arousal and sleep disruption (Dressle & Riemann, 2023). The combination of cognitive distortions and emotional distress, not only causes sleep disturbance but can also result in mental health issues such as anxiety and depression (Riemann et al., 2023).

It is important to note that while these studies explain hyperarousal theory in depth, most of these studies are cross-sectional research, focusing on short-term outcomes rather than explaining the changes in long-term sleep-related issues throughout a person's life. Additionally, due to the nature of such a design, both the studies from Riemann et al. (2023) and Jang et al. (2023) lack causal inferences and only focus on correlational conclusions.

Cognitive Model

According to Vaziri et al. (2021), the cognitive model of insomnia focuses on cognitive and emotional factors as the reasons underlying the rise of insomnia and its maintenance. This model could be broken down into several key aspects including dysregulated beliefs, attentional biases, and emotional arousal. Dysfunctional beliefs about sleep, such as the need for perfect sleep or fears about sleep deprivation, play a crucial role in perpetuating insomnia. Rateb et al. (2023) confirmed that these unhealthy beliefs produce anxiety and significant worry, which then cause sleep disturbance. These ideas generate a cycle of insomnia-anxiety-insomnia, in which the anticipation of an inability to sleep is made worse by anxiety and, in turn, the sleep quality of the individual decreases even more. In alignment with previous studies, Tang et al. (2023) also point out that worry during sleep is more directly related to insomnia than everyday worry, stressing the role of negative sleep beliefs.

Attentional biases are also a major component of the cognitive model. Insomnias are characterized by a focus of attention toward sleep-related danger, for example, worrying about loss of sleep, thus raising the level of cognitive arousal. Vaziri et al. (2021) note that this heightened fear due to negative bias towards sleep problems leads to further distress and reinforces the view that insomnia is not treatable. Rateb et al. (2023) confirmed this by referring to Harvey's model, which suggests that individuals with insomnia engage in the excessive monitoring of sleep-related cues, such as clock watching, which results in increased anxiety and poor sleep quality.

Emotional arousal, particularly the anxiety and frustration associated with sleep, are involved in these cognitive mechanisms. Vaziri et al. (2021) describe how negative emotional arousal increases attentional biases thereby contributing to the maintenance of insomnia. Cognitive distortion and emotional distress work together to form a vicious cycle that is difficult to break out from, making insomnia less likely to resolve. Norell-Clarke et al. (2021) further demonstrate that pre-sleep somatic arousal when accompanied by safety conditions at the onset of sleep will increase the likelihood of insomnia. Due to the linkage of these cognitive

distortions, and emotional dysregulation, insomnia is considered a complex issue that is quite challenging to address.

Even though Vaziri et al. (2021) and Rateb et al. (2023) offer an important perspective on insomnia, their studies require further refinements. Offering mainly hypothesis and theory, the study by Vaziri et al. (2021) can benefit from a future empirical support with original research findings to compliment the already-dense framework. The study by Rateb et al. (2023) can be further developed into a dense biologically integrated study focusing not only the cognitive aspects of sleep disturbances but also the circadian or hormonal dysregularities related to insomnia. Therefore, this pioneer studies provide an important step towards a better understanding of insomnia as an integrated issue beyond one framework.

3P Model

The 3P model of Insomnia refers to Predisposing, Precipitating, and Perpetuating Factors. This model structure covers the physiological, cognitive, and emotional perspectives. According to the study of Riemann et al. (2022), predisposing factors refer to early life stress which affects the individual brain function and personality. Ellis et al. (2021) stated that traits such as neuroticism, insomnia vulnerability, and arousal predisposition have a positive significance on the individual's insomnia occurrence. This study is also supported by Madrid-Valero et al. (2023) who stated that there is an interaction between genetic predisposition and environmental stressors in predicting insomnia symptoms among adolescents. Those with higher genetic predisposition are more exposed to negative life events than those with lower genetic risk.

Second, precipitating factors are the immediate triggers or events that can cause insomnia. For example, stressful life events like job loss or health diagnoses. Psychological stressors like uncertain careers and physical stressors such as acute illness or pain can initiate insomnia. This can be proved through the study from Madrid-Valero et al. (2023) who found a positive result that stressful events are predictors of insomnia symptoms, and it is also related to genetic vulnerability. Moreover, a study by Ellis et al. (2021) depicts that anxiety and perceived stress were the predictors to the cause of acute insomnia.

Third, perpetuating factors related to maladaptive behaviors. For instance, irregular sleep schedules and sleep effort which the individual actively tries to sleep leads to increasing frustration and arousal. Perpetuating factors also can occur because worry and anxiety create a heightened state of arousal, increase the heart rate and cortisol level, and activate the sympathetic nervous system to maintain the wakefulness state (Riemann et al., 2022). Studies from Han and Son (2024), aimed to investigate the levels of sleep quality and identify the predictors of sleep quality among community-dwelling older adults depict that pre-sleep arousal, especially cognitive arousal, has a stronger association with insomnia.

Critical Analysis

The hyperarousal, cognitive, and 3P models give important insights into the complex concept of insomnia, although each has its limitations. First, the hyperarousal theory focuses on the persistent physiological and emotional arousal that disrupts sleep, but it may overlook the role of genetics or environmental stressors in insomnia. In contrast, while the cognitive model highlights how negative beliefs and concerns about sleep contribute to the problem, it focuses more on mental processes and does not fully explain the physiological aspects of insomnia. In addition, the 3P model offers a broader perspective by including predisposing, precipitating,

and maintaining factors, but this model may be too general and requires further explanation of how these factors interact with each other over time. As a result, these theories prove that insomnia is a complex issue to understand using a single theory, thus, there is a need for a more holistic and integrative approach that explains how all of these different biological, cognitive, emotional, and environmental factors work together. Therefore, future research should further explore ways to combine this knowledge to develop more effective treatments that address not just the specific component of the disorder, but the whole aspect of a person.

A critical view of the reviewed studies points to further directions for improvement. Specifically, most studies mentioned focus on adult-dominant samples, rendering the data non-generalizable to other populations such as children, adolescents and older adults. In the same issue of limited generalizability, most samples are from the educated samples of the western countries which prove a challenge to understand people with different sleep norms, climates and working cultures. Another important restriction of sleep-related issues can be traced back to hormonal changes, which is more vulnerable to the female population. This angle, however, is often overlooked in studies including the aforementioned studies. There are no studies explicitly examining sex-specific effects on sleep disturbances, discounting hormonal cycles or menopausal effects on sleep changes. Along this line, a longitudinal study related to sleep disturbances is crucial to understand the hormonal, biological and physical changes that happen throughout human developmental lifespan. Taken together, further studies should focus on diverse population subjects to increase generalizability, gender specific differences related to sleep disturbances and longitudinal study design to ensure in-depth exploration and better causal references.

Discussion

Current Issue: Post-COVID-19 Insomnia

The pandemic of COVID-19 has had a profound impact on mental and physical health with one of the most significant effects being a sharp increase in insomnia. A study by Batool-Anwar et al. (2023) reveals that sleep disturbances related to insomnia are common and become more severe post-COVID-19 infection. Similarly, the research found that 78.58% of respondents through online surveys experienced sleep issues, such as insomnia, breathing-related sleep disorders, hypersomnolence, circadian rhythm disruptions, parasomnias, and movement-related sleep disorders (Tedjasukmana et al., 2023). These findings from the current issue underscore the urgency of addressing sleep disturbance, particularly insomnia, as a significant public health concern in the post-pandemic era. Based on the three theories mentioned which are cognitive theory, hyperarousal theory, and 3P Model of Insomnia, there are several effective strategies and interventions that can be suggested to address insomnia.

Evidence-Based Interventions (CBT-I & MBSR)

Firstly, Cognitive Behavioral Therapy for Insomnia (CBT-I), is an effective approach to addressing insomnia. According to Riemann et al. (2022), accumulated scientific evidence from literature over the past five years by all published guidelines confirmed that CBT-I is the primary treatment for insomnia. CBT-I integrates principles from cognitive and behavioral theories to address the underlying mechanisms that perpetuate sleep difficulties. There are five components of this CBT-I which are Sleep Restriction Therapy (SRT), Stimulus Control Therapy (SCT), Sleep Hygiene (SH), and Cognitive Restructuring and relaxation technique (Rossman, 2019). The activities in this therapy typically include evaluating the individual's

sleep patterns, explaining the rationale behind the treatment approaches, delivering personalized interventions, managing adherence to the prescribed techniques, and developing strategies for relapse prevention (Tang et al., 2023).

The SRT and SCT both elevate perpetuating factors that keep people awake at night, as discussed through the 3P Model, by restricting the use of bed to only during bedtime, targeting to limit emotional and cognitive arousal surrounding sleep anxiety. In this sense, these two components of CBT-I automatically lessen cognitive and emotional stimuli, coinciding with the hyperarousal theory, to mitigate the risk of sleep disturbances. Additionally, Cognitive restructuring therapy targets the cognitive model of insomnia by neutralizing dysfunctional beliefs, simultaneously lessening the perpetuating cognitive factors related to overthinking before bedtime, as proposed by the 3P Model. Further, the relaxation techniques mitigate cognitive factors that can cause hyperarousal before bedtime, by integrating breathing exercises and progressive muscle relaxation. These techniques will help lower sleep tension and sleep-related overthinking. Taken together, these steps used in CBT-I work integratively to mitigate different causes of insomnia-related symptoms, emphasizing the importance of theories and models explaining different aspects of the same issue.

Research by Muench et al. (2022) proved the significance of CBT-I in addressing insomnia by indicating that CBT-I significantly improves sleep, with reductions in sleep latency (23 minutes), wake after sleep onset (39 minutes), and symptom severity (50%). Furthermore, 70% to 80% of patients respond positively to treatment, and these effects persist for up to 24 months (Muench et al., 2022). This treatment is conducted in six to eight sessions which are around 30-90 minutes per session. During these sessions, the therapist first assesses the individual's sleep patterns and identifies any cognitive and behavioral factors that contribute to the problem (Riemann et al., 2022). The therapist then educates the patient about sleep hygiene and the importance of consistent sleep habits, which is a critical part of the therapy. Through this therapy, the patients will learn relaxation techniques to help manage physiological arousal that interferes with sleep. By the end of the therapy, patients should have a clear understanding of how to manage their sleep habits and use cognitive strategies to prevent relapse.

Even though this intervention has recorded positive outcomes, it depends highly on adherence to the behavioral changes and cognitive restructure, which may prove to be a challenge for some individuals with stressful lifestyle, irregular work schedule and who are physically unwell. Additionally, CBT-I mainly focuses on the psychological aspects of insomnia-related symptoms with minimal intervention on the biological irregularities such as dysregulated hormonal and neurotransmitter secretion, genetic predisposition or circadian-rhythm abnormalities. Due to this limitation, more research related to the biological mechanisms of sleep difficulties must be explored so that suitable treatments can be developed for patients with such conditions. Another concern regarding this therapy is the limited resources and accessibility for treatment, especially since positive outcomes can only be detected and maintained over the span of six to eight sessions with the certified professionals. In this sense, patients facing financial constraints and limited healthcare access, will be unable to commit for the sessions, while shortage of trained CBT-I experts might restrict the amount of people getting treatment. Therefore, more efforts are needed to provide suitable and accessible care for the individuals experiencing insomnia-related symptoms.

The second effective intervention solution for insomnia is Mindfulness-Based Stress Reduction (MBSR) which can be applied to alleviate stress that has been the main factor for insomnia. MBSR is therapy designed to foster non-judgmental awareness of the present moment encompassing both internal (thoughts, emotions) and external (sensory details) stimuli through practices such as meditation, mindful breathing, and yoga (Gupta, 2023). As highlighted by hyperarousal theory, insomnia is excessive mental and physical activation including persistent anxious thoughts and heightened stress response underscoring the importance of MBSR in managing these challenges. This application of therapy can improve mindfulness by effectively reducing nighttime cognitive activation which facilitates better sleep quality (Kalmbach et al., 2023).

In biology, mindfulness practice has been found to decrease the activity of the amygdala, the brain's stress-response area, and boost the regulatory function of the prefrontal cortex which leads to calmness for better sleep (Doll et al., 2016). It was proved in research by Kim et al. (2024) that individuals experiencing high perceived stress altered connectivity between the amygdala and prefrontal regions which was associated with lower mindfulness compared to individuals that have lower stress in life. MBSR has significantly improved sleep quality in individuals with insomnia. This was supported by Kim et al. (2024) in their meta-analysis involving 497 participants indicating that MBSR helps in improved sleep quality significantly with a standardized mean difference of -0.69 compared to the control groups. In addition, according to Kalmbach et al. (2023), after eight weeks of the MBSR program, 57.9% of treatment-resistant insomnia patients achieved remission. MBSR offers evidence-based intervention for insomnia, particularly for those whose sleep difficulties are linked to high stress and hyperarousal. This approach enhances sleep through heightened mindfulness and regulation of stress. Thus, MBSR is an important tool in the treatment of insomnia. However, as with CBT-I, MBSR therapy has its limitations, especially taking into consideration individual receptiveness to mindfulness-based activities. Even though it is an important tool for individuals who respond well with such activities, this therapy can differ for individuals with higher levels of stress perception and lower ability to regulate emotions, proving that individual differences is a crucial factor in developing treatment plans.

In conclusion, the rise in insomnia following the COVID-19 pandemic highlights an urgent need for effective interventions dealing with the sleep disturbances of many today. The increased stress, anxiety, and uncertainty throughout the pandemic are all cumulative factors to sleep difficulties, making insomnia a major public health issue in post-pandemic time. Therefore, Cognitive Behavioral Therapy for Insomnia and Mindfulness-Based Stress Reduction have gained much momentum as two of the most promising evidence-based treatments for insomnia. In this post-pandemic world, when mental health and sleep disturbances continue to pose big challenges, the application of CBT-I and MBSR proves timely, effective, and accessible responses to the need for care. This is an approach toward reducing insomnia to make our population healthier and more resilient.

Integration with Islamic Perspective

In Islam, sleep is a form of small death as the Quran mentions that Allah takes human souls during sleep (Quran, 6:62). The Quran also mentions the role of sleep according to Islam (Quran 25:47), emphasizing that sleep is indeed the best form of rest for the human body after being tired from daily activities (Nor et al., 2018). In this sense, sleep disorders such as insomnia are considered abnormal as someone who does not sleep at night is not in line with

human nature. Therefore, integrating Islamic views in understanding and treating insomnia could complement how Muslims approach this problem as secular psychotherapy fails to address the spiritual aspects of human dimension. This can be approached through Islamic cognitive behavioral therapy, sleep etiquettes introduced by the prophet, and the practice of Islamic mindfulness.

Islamic-cognitive behavioral therapy could be applied by Muslim therapists while dealing with chronic insomnia patients. This intervention is an enhanced version of the conventional cognitive behavioral therapy (CBT), which integrates Islamic practices and values while conducting therapy. Husain and Hodge (2016) reported the effectiveness of Islamic CBT by incorporating the elements of Quranic recitation and reflection, and consistency in salah, zikr, and dua in decreasing insomnia among college students. Hence, therapists should practice Islamic CBT with Muslim clients to enhance the effectiveness of the therapy while increasing resilience and faith in Allah through spiritual practices.

Moreover, Islam also emphasizes sleep etiquette and hygiene before going to sleep as practiced by the Prophet (Nor et al., 2018). A person who struggles with insomnia could employ these practices to improve their sleep quality and reduce insomnia. The practices include taking ablution, lying down on the right side, turning off the light before sleeping, and washing hands after waking up from sleep (Nor et al., 2018). The practice of ablution does help to promote cleanliness and relaxation before sleeping which is also consistent with the modern principle of sleep hygiene to reduce insomnia (Alanazi et al., 2023). In addition, turning off lights before sleep as the Prophet encourages also aligns with scientific studies that mention that artificial bright light suppresses melatonin production that helps with sleep (Lewy et al., 1980). In essence, incorporating Islamic sleeping etiquette in one's daily life could promote better sleep quality. These ritual practices simultaneously condition the brain to get ready to sleep in the same way as sleep hygiene incorporates routines into sleep time such as consistent sleep hours and breathing techniques before bedtime.

In addition, practicing mindfulness could also help a person to reduce insomnia. An integrated Islamic mindfulness practice like zikr breathing therapy could significantly improve sleep quality in people who suffer from insomnia (Purwanto et al., 2023). This practice focuses on creating a calmer state of mind to avoid emotional and cognitive arousals before bedtime. As a result, this reduces anxiety, overthinking, and rumination which trigger insomnia. This practice not only addresses symptoms of insomnia but also improves spiritual well-being by getting the person closer to Allah as he always remembers Him. Therefore, the addition of such practices can supplement other interventions, especially for patients with high receptiveness to religious treatments.

Conclusion

To conclude, insomnia is a sleep disorder influenced by psychological, physiological, and environmental factors as explored through the cognitive and hyperarousal theories, and the 3P model. The concept of CBT emphasizes how maladaptive behaviors and dysfunctional cognitive patterns contribute to the persistence of sleep problems. In addition, the hyperarousal theory describes how elevated physiological and mental states can interfere with the sleep cycle. The 3P model (Predisposing, Precipitating, and Perpetuating factors) offers a comprehensive framework to understand the underlying causes and maintenance of insomnia. It is found that insomnia is highly prevalent among students and it is often caused by academic

stress, life struggles, and negative habits that require a holistic approach to address this issue. To curb this issue, this review focuses on CBT-I and MBSR intervention, mainly due to their evidence-based effectiveness in treating patients with insomnia-related symptoms. The interventions cater to the psychological, behavioral and cognitive causes of insomnia, making them comprehensive and integrated treatments. Accordingly, integrating Islamic values and principles in managing insomnia could provide complementary spiritual and psychological support to help those who are receptive towards religious intervention, utilizing Islamic CBT, mindfulness, and sleep etiquettes. Combining conventional and Islamic approaches can optimize treatment effectiveness, especially for Muslim patients. Finally, directions for future studies are proposed, emphasizing on longitudinal study design, gender specific focus and diverse sample exploration.

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