REVIEW ARTICLE

Sleep and Depression

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Abstract

There is a strong association between sleep and depression. Depressed patients often report sleep problems, including difficulty in initiation and maintenance of quality sleep.There are both subjective and objective changes in sleep pattern during depressed states. Together, these symptoms cause enormous distress and adversely impact the quality of life of the patients. Sleep problems often appear before depression symptoms and subjective sleep quality worsens before the onset of an episode.Insomnia is considered a key symptom of depression and could be the primary reason the depressed one seeks medical help. Sleep disturbance, hence, should be successfully managed in depression, in order to improve the quality of life in these patients. This paper reviews the existing scientific literature to explore the association between sleep and depression.

Keywords: Sleep, Depression, Insomnia, Mood Disorders, Excessive daytime sleepiness.

Introduction

Sleep is a biological necessity that is fundamental to the maintenance of normal body processes; its impairment has been shown to impact neurocognitive, academic, and psychological well-being[1]. Sleep disturbance and poor sleep quality are major health problems worldwide. Previous population-based studies have estimated the prevalence of insomnia and other sleep problems from 10 to 40 %[2].

Depression is a disorder of major public health importance, in terms of its prevalence and the suffering, dysfunction, morbidity, and economic burden. The report on Global Burden of Disease estimates the point prevalence of unipolar depressive episodes to be 1.9% for men and 3.2% for women, and the one-year prevalence has been estimated to be 5.8% for men and 9.5% for women. It is estimated that by the year 2020 if current trends continue, depression will increase to 5.7% of the total burden of disease and would be the second leading cause of disability-adjusted life years (DALYs), second to heart disease[3]. Many studies have estimated the prevalence of depression in community samples and the prevalence rates have varied from 1.7 to 74 per thousand population[4,5].

There is a very strong association between sleep disturbance and major depression. The objective of this paper is to review the existing scientific literature to explore the association between sleep and depression.

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Methods

A literature search was performed using keyword searches of Medline database. Scientific work available in abstract form was also included. Keywords 'sleep' and 'depression' were used.Papers on sleep and other medical and severe psychiatric conditions like bipolar disorders were excluded.

Sleep problems and mood disorders

Virtually all forms of sleep deprivation result in increased negative mood states, especially feelings of fatigue, loss of vigor, sleepiness, and confusion. These alterations in mood have been observed repeatedly when sleep deprivation occurs without regard for conditions[6].

Research investigating associations between sleep and affective illness has largely focused on depression and major depressive disorder. It has been shown that, 40-60% individuals who suffer from insomnia, display features of depression. Likewise, of those suffering from depression, 80% display sleep disturbances such as insomnia or excessive sleepiness[7].

Sleep disturbances, hence, are key features of depressive symptomatology, with subjective sleep complaints in more than 80% of patients[8]. Persistent sleep disturbance increases the risk of relapse and recurrence of depressive episodes and the risk for suicide[9,10]. In addition, insomnia of at least 2 weeks duration increases the lifetime risk of developing depression[9]. Moreover, adjunctive hypnotic or anxiolytic medications that are prescribed for depressed patients further exacerbate or do not aim to improve sleep disturbances[11]. Laboratory-based studies of sleep electrophysiology (EEG) have demonstrated sleep abnormalities in patients during an episode of depression and in clinical remission[8]

Truncated sleep and alteration in wake time have a substantial influence on neuroendocrine physiology by affecting the timing of the human circadian clock. This, in turn, may have important implications for neurocognitive function and psychological well-being[12]. Though this influence seems bidirectional (whether sleep disturbances lead to depressive symptoms, or depressive symptoms lead to sleep disturbances), there is growing evidence that sleep disturbances are at the beginning of increasing symptoms of depression[13].

Ford and Kamerow, in their study of sleep disturbances and psychiatric disorders for the National Institute of Mental Health, interviewed approximately 8000 adults on two occasions a year apart. Results of the study revealed astrong association between sleep disturbance and subsequent depression. The study found that 14% of those who had insomnia at the first interview had developed new major depression a year later.[14]Breslau et al in their survey found that the odds ratio of new depression was 4 times increased in those subjects who had insomnia 3 years earlier[15]. Sleep problems hence, often appear before other depression symptoms and subjective sleep quality worsens before onset of an episode in recurrent depression[16].

Insomnia and Depression

Poor sleep and insomnia have been recognized to be strongly correlated with the development of depression. The exploration of the basic mechanism of sleep disturbance could provide the basis for improved understanding and treatment of insomnia and prevention of depression[17].

Depression and anxiety are often comorbid with insomnia, sleep problems exacerbate depressive and anxious symptoms, and insomnia is a risk factor in the development of depression and anxiety disorders[18].

A population study of approximately 15,000 participants found that in those with depressive disorders, more than 40% experienced insomnia before the onset of the mood disorder symptoms and more than 20% experienced the symptoms concurrently[19].

Lee et al looked into whether changes in sleep quantity and quality in childhood were associated with the incidence of depressive symptoms. The study analyzed 2, 605 subjects who did not have depressive symptoms prior to the study and found that poor sleep quality was an important risk factor for depressive symptoms in children. The study suggested that early detection and intervention of poor sleep quality in elementary school is required to reduce early-onset depressive symptoms[20].

Taylor et al, in their Texas-based study that looked into the prevalence, correlates, and predictors of Insomnia in the US Army prior to deployment, assessed insomnia and other psychosocial variables in active duty service members prior to military deployment. The Insomnia Group reported more severe mental health symptoms, more recent stressful life events, greater childhood abuse, and lower levels of trait resilience and social support. After controlling for covariates, the Insomnia Group was more likely to have clinically significant post traumatic stress disorder (PTSD), anxiety, depression, alcohol use problems, extremity pain, headaches, and fatigue. The study concluded that greater PTSD, depression, fatigue, stressful life events, headaches, anxiety, alcohol use problems, extremity pain, childhood physical neglect/social support were statistically significant predictors of insomnia status[21].

Treating insomnia, alleviated symptoms of Depression and Anxiety, as shown in a study by Luik et al., Supported Cognitive Behavioral Therapy was given for insomnia for 98 individuals. Depression and anxiety were reduced following the therapy for insomnia, suggesting that a therapy for insomnia alleviates depression and anxiety in clients presenting with mental health complaints in routine healthcare[22].

Hypersomnia and depression

Hypersomnia seems to be less common and tends to be a feature of atypical depression. It seems to be more prevalent in the young (highly prevalent in the 30s and less prevalent in 50s) experiencing the symptom, and in females of all ages. Some patients experience both insomnia and hypersomnia during the same depressive episode[23].

Excessive Daytime Sleepiness (EDS) and Depression

Nuyen et al examined the link between EDS and depression among Hispanic Americans and explored the potential moderating roles of age, gender, income, education, health status, and acculturation. The study demonstrated that EDS was significantly related to depression. No socio demographic variables moderated the EDS-depression relationship. The study findings suggested that depression should be considered when individuals present with EDS[24].

RLS and depression

Lee et al, in their study, compared clinical characteristics and polysomnography (PSG) parameters among untreated RLS patients who were stratied based on periodic limb movement index (PLMI). The authors found that RLS patients without PLMS had higher depression and anxiety scores, a lower total arousal index, longer latency to REM, and a higher spontaneous arousal frequency on PSG than RLS patients with PLMS[25]. Increased sleep fragmentation and arousals have been reported among depressed patients, and sleep continuity disturbances are concomitant, prodromal, and residual symptoms of major depression that subside on depression remission[8].

Baumann et al. have also shown that restless legs symptoms without PLMS seem to have higher rates of psychiatric comorbidities than RLS patients with PLMS[26]. Depression and anxiety both have been shown to be common among RLS patients both in the community and in specialty clinics[27].

Sleep profile in depression

Sleep abnormalities in depression, both subjective and objective, point to a disruption in both homeostatic and circadian drives to sleep. Among individuals with depression, sleep disturbances often include difficulty with sleep initiation, frequent early awakenings, and insomnia or hypersomnia. Depression is also associated with electrophysiological disturbances in sleep, including disinhibition of REM sleep, REM sleep fragmentation, a reduction of slow wave sleep, and circadian rhythm dysregulation[18].

The sleep profile of asymptomatic but un-medicated adult with depression is prolonged sleep latency (sleep onset insomnia), bouts of intermittent wakefulness, increased light, non-restorative stage 1 sleep, decreased slow-wave sleep, and a shortened latency to the first REM period accompanied by increased phasic activity and an elevation in eye movement density. As a general rule, most of the studies have reported abnormalities in the timing and/or distribution of sleep stages as primary characteristics of depression[8,28-30]. Patients with depression appear to show greater asymmetry in both REM and NREM stages compared with healthy adults and both more alpha and more beta activity overall[31]. Palaginii et al have examined the importance of REM sleep in depression and reported that there is a high correlation between the parameters of REM sleep and depression.Several studies have shown significantly lower inter and intrahemispheric coherence in patients with depression. Approximately 80% of women with MDD and 35% of men with MDD show low coherence compared to healthy controls. Further, low coherence may persist into clinical remission[32].

Interaction between sleep and depression

Mayers et al, in their study, showed that depressed patients reported significantly poorer perceptions of sleep quality and poorer perceptions of life quality and mood

than the control group, even though estimates of sleep disturbance were similar, indicating that depressed individuals experience more "sleep distress" than healthy individuals[33].

Kabrita et al, in their study, looked into how sleep interacts with the individual's gender to shape psychological well-being and academic performance. The study investigated the relationship between the various sleep parameters and depression scores. A male-female difference was observed in the relationship between sleep and depression scores. Unlike males, psychological health in females appeared to be mainly influenced by the rise times and sleep duration on weekdays. Female students were at increased risk of developing depressive symptoms with earlier rise times and shorter sleep durations on the weekdays. The study concluded that there was a differential impact of the sleep/wake rhythm in the context of sex differences in the susceptibility to depression[34].

It is estimated that poor sleep precedes an episode of depression in 40% of cases and preexisting insomnia contributes greatly to the course and severity of depressive disorders and even predicts relapse or poor outcome. In addition, poor sleep increases the risk of suicidal ideation and also the likelihood of a poorer response to combined pharmacological and psychological treatments of depression[7].

Rotenberg et al, in their study on the relationship between subjective sleep estimation and objective sleep variables in depressed patients, looked into the association of self-reported and objectively measured sleep disturbances in depression. The study found that there was an association between sleep traits and depression and there was a difference in the extent of the association when comparing subjective and objective sleep measures. The study also observed that the depressed group had an overall underestimation of total time in bed and sleep duration. The study reported a robust negative association between depression and sleep duration using both subjective and objective sleep measures, and that the magnitude of association was strongest using subjective sleep measures. [35]Studies have reported that depressed patients are more likely to poorly recall aspects of sleep compared to the non-depressed patients[36].

Adequate amounts of high-quality sleep could strengthen emotion regulation, reducing the risk for developing depression/ anxiety symptoms[37]. A study conducted in Japan, investigated the sleep duration associated with the least depression/anxiety in adolescence found that sleep duration of ≥8.5 h on nights may be associated with the lowest risk of depression/ anxiety on average in adolescents[38].

Conclusion

The available literature has shown that sleep disturbances are almost always present in patients with depression. A number of studies have demonstrated that insomnia increases the risk of new-onset and recurrence of depression. Therefore, there isa need for more successful management of sleep disturbance in depression. Gaining insight into the mechanisms by which sleep affect mood has valuable implications in medicine.

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