The Negative Effects of Sleeping Disturbance and Corresponding Treatments

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Abstract. This review paper organized the very importance of sleeping and the adverse effects of sleeping disturbances. Particularly long or short hours of sleep per night can raise the potential of body inflammation, as well as disrupting daily cognition and functions. Youth may lose cognitive and neuronal growth because of chronic sleep loss. Long-term lack of sleep may also deteriorate physical mechanisms such as memory, learning and other neuronal functions. It is crucial to find the effective and efficient methods to treat sleeping problems and ameliorate this global health concern. By reviewing the previous literature, this paper argues that music intervention can be a non-pharmacological evidence-based treatment which is effective on treating insomnia that are depression relative. It also suggests using standardized mindful awareness practices which is accessible to community can improve sleeping difficulties right after the intervention ends. It has clinical importance through remediating sleep disturbances among elderlies in the short run. Moreover, cognitive-behavioral therapy can also ameliorate sleep-related problems. Future research needs to include more participant-friendly methods and therapies that are convenient to engage on one's own in order to assist people make improvements on sleeping quality.

Keywords: Sleeping disturbance · Depression · Anxiety · Music Treatment · Mindfulness Meditation

1 Introduction

Sleeping disturbance has been one of the most central global health epidemics today. In the current years, no matter how busy people's lives are, they cannot ignore the special importance of sleep for physical and mental well-being any more. Modern life is pushing people to perform more tasks at the same time, within only 24 h. Sleep provides various functions and is very crucial for people to be able to think clearly, to be attentive, vigilant and keep alert [1]. A good night's sleep can consolidate memory functions, regulate emotions and maintain cognitive functions. When a person wakes for more than 16 h, their cognitive performance and focused attention start to decrease rather quickly [1]. Besides, the sleep loss from sleep deprivation can gradually increase over time and produce growing deterioration in people's alertness [1]. It is known that up to 70 million people in the United States have at least one diagnosed sleep disorder,

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however approximately 80% of these disorders often go undetected [1]. It is estimated that due to sleep disturbance, the United States lose from 280 to 411 billion dollars annually [2, 3]. An interdisciplinary approach will be required and needed to alleviate the public health problem with its high prevalence rate, negative health outcomes, and the economic pressures of sleep disturbance [3, 4]. One main goal for researchers is to ameliorate the diagnosis of sleep disorders. The procedure of recognizing and classifying comorbidities is one of the main challenges researchers face at the initial evaluation of individuals with sleep difficulties [1]. Figuring out the underlying causes and effects in bidirectional comorbidities can be really complicated. Take "insomnia" as an example, it is a very common sleep illness and often complicated by the existence of other sleep illness such as restless legs syndrome [1]. Another concern that researchers hold is about sleep disturbance leading to anxiety and depression, and the relationship between anxiety and sleep problems [5]. It suggests that sleep disturbance has the potential to develop into mood and anxiety disorders, and the chance of experiencing clinically significant anxiety can be enhanced by 17 times [5]. In addition, more than 50% of individuals who stated sleep difficulties experience comorbid psychiatric disorders [5]. As for the connection between depression and sleep disturbance, concerns for sleep duration and subjective sleep sufficiency are noted. People who sleep less than 6 or more than 8 h are prone to be more depressed [6]. When subjective sleep sufficiency declines, there will be more depression symptoms occurring [6].

Due to the great significance of sleeping, its adverse consequences are urgent for researchers to investigate and find effective and efficient treatment. The two major intervention that treat sleep disorders such as insomnia are sleep medications and Cognitive behavioral therapy (CBT) [1]. It has been addressed that medication have an positive effects for those who experience short term insomnia, whereas people diagnosed with chronic insomnia should only use CBT treatment for their long term benefit [1]. Cognitive behavioral therapy (CBT) are strategies that help reduce cognitive and physical arousal, and is considered to be effective in roughly 70% to 80% of patients who have chronic insomnia [1]. The researcher will further discuss CBT in the following paper. From the perspective of mental counselling, this paper mainly introduces psychological therapies. The researcher will systematically organize and list several psychotherapies which individuals can conduct them more conveniently compared to other treatment and even practice by themselves at home.

The general goal of this review is to investigate and integrate the treatments for general sleep disturbances and sleep disorders. The researcher would like to discuss the main findings of CBT, psychotherapy and mindfulness, especially their effects on depression and anxiety. This is a review paper which will first discuss the negative effects of sleep difficulties in physical and mental aspects. Next, three methods that were considered to be effective in ameliorating sleeping quality are discussed, which are listening to music, developing mindfulness-based techniques and using CBT techniques.

2 The Adverse Effects of Sleeping Disturbances

2.1 Physiological Effects

Short-term and long-term sleep disturbances both have physiological effects on people. According to the review article written by Jan and colleagues, short-term sleep loss can lead to disruptive cognition and behavior functioning temporarily, as well as health problems [7]. It can be caused by a few hours' sleep lost. However, long-term sleep disturbance refers to persistent sleep difficulties with insufficient amount of sleep for a couple of years or even lasts for lifetime [7]. Cumulative evidence has shown that long-term sleep loss give rise to neuronal and cognitive loss in youngsters. Specifically, chronic sleep loss can take away the exposure to healthy environment from children during critical developmental periods, which is the precondition for their cognitive growth [7]. Besides, sleep disturbance can negatively affect the functions of cells, organs, neuroprotective in circadian physiology etc. Neuronal functions are deteriorated widely by sleep loss through many different mechanisms, as well as learning, memory, neurogenesis and many other changes [7]. When these changes are established for quite a long time, too much cellular stress will develop and leads to extensive neuronal loss. Therefore, this paper tends to demonstrate that if chronic sleep disturbance is left untreated, it may cause impaired brain growth, neuronal damage and even developmental potentials loss permanently [7]. Further study is urgently required as all the findings are helpful for developing treatments of sleep disturbance.

Irwin and colleagues evaluated the global data linking sleep length, sleep disruption, and inflammation in research in 2015. Sleep disruption has been connected to the development of inflammatory diseases and deaths from all causes [8]. In population-based and clinical samples all across the world, the study conducted a complete evaluation and offered quantitative estimates of the links between sleep issues, extremely short or lengthy sleep duration, and inflammation [8]. They found out that instead of short sleep duration, long sleep duration and sleep disturbance are linked to growing systemic inflammation. The findings about sleep length and inflammation are comparable to those of sleep quality and mortality [8]. Previous metal-analytic research discovered a U-shaped relationship, with sleepers sleeping around 8 h each night having a 30% higher risk, and those sleeping around 7 h having a 12% higher risk of dying than those sleeping between 7 and 8 h each night [8]. Furthermore, it was thought to be highly harmful and corrosive for physical health when sleep disturbance groups with short sleep duration were studied. Short sleep interruptions, or sleep fragmentation, in comparison to shortened sleep amounts, may also lead to sleep problems [8]. This kind of sleep disruption is uniquely linked to daytime dysfunction issues and enhance mortality rates. Long-time sleep was regarded as extra behavioral factors for developing inflammation, which is modifiable via treatments that change sleep routines and behaviors. Treatments of insomnia, diet and physical activity together can reduce inflammation and promote sleep health [8].

2.2 Psychological Effects

Sleeping quality has been a major topic during the current years. Sleep disturbances (e.g., difficulty in falling asleep, frequent awakenings, decreased sleep efficiency, insomnia)

have been demonstrated to negatively influence individuals' health [5]. Frequent rates of sleep disturbance can forecast a number of poor health consequences, including diabetes, obesity, cardiovascular problems and psychiatric disorders, etc. [3]. People who sleep less than 6 h and more than 8 h are more prone to suffer from depression, compared to those sleep between 6 and 8 h [6]. A U-shaped association was exhibited according to the study between sleep duration and symptoms of depression [6]. Sleeping disturbance is closely linked to anxiety disorders depression. For example, adult attachment anxiety appears to influence sleep disturbance by lessening the inclination to engage in non-critical and non-judging reactions and quality of mind [3]. Worry and dread, in particular, can increase sleep disturbance in romantic relationships; however, aspects of mindfulness, such as non-judgment and non-reactivity, might improve sleep quality [3]. In another study, Kushnir and colleagues looked into the link between social anxiety disorder and sleep problems, finding that not only are sleep disturbances common in individuals with anxiety disorders, but anxiety symptoms are also common in patients with sleep problems [5]. Their results showed that subjective insomnia was linked to social anxiety disorders even though they controlled other variables such as depression severity. Besides, participants who own higher subjective insomnia are shown to possess high social anxiety level [5]. Depression severity was comorbid with anxiety disorders and was also positively linked to social anxiety disorders [5].

3 Treatments to Improve Sleeping Disturbances

3.1 Psychological Therapy

Listening to music while sleeping can help you sleep better. The efficacy of music listening on improving sleep quality for depression was investigated by Lund and colleagues, who found that a combination of music medicine utilising the Music Star application and a sound pillow may be effective in promoting sleep [9]. A sound pillow and the Music Star app were provided as resources. The pillow had internal speakers and linked to a player (e.g., iPad, mobile phone) where users can choose the music on the player [9]. As for the Music Star app, participants can choose music among particularly made playlists. These two combined and work for decreasing depression symptoms and sleep disturbances [9]. Participants were guided to listen to music at a duration of 30 min at minimum when they start to sleep. The music would pause by itself after 30 or 60 min. The 30 min intervention were adhered and regularly checked through The Music Star App [9]. Participants were also required to select the music of their choice for at least 30 min each night lasting for 4 weeks. This non-pharmacological intervention may not only positively improve sleeplessness but help insomnia patients to comply with the treatment and enhance general functioning [9]. In another elegant study, Wang and their colleagues investigated the effect of music interventions for elderly's sleep quality [10]. It suggests that music can be operated easily and used as effective approach to improve the sleep quality of older individuals. Specifically, music interventions have positive effects on sleep duration, sleep efficiency, sleep latency and daytime functioning [10]. The results showed that music treatment might be a clinically imperative advancement for the sleep condition for older adults [10]. Appropriate type of music intervention is thus useful for older adults to "loosen up a bit" and feel less anxious and depressive

about sleep [10]. It needs further research on whether music intervention can be applied directly onto patients with anxiety and depression who experience sleep disturbance.

3.2 Mindfulness Based Therapy

Developing mindfulness is becoming a popular method for people to adjust the physical and mental state, as well as helping people sleep better. In a review article, Winbush and colleagues evaluated the efficacy of Mindfulness-based stress reduction (MBSR) intervention [11]. MBSR is a psychoeducational technique which assists people manage and redefine bothersome and intrusive ideas and thoughts. The MBSR program has a prescribed length which usually lasts 8 weeks. The results suggested that accumulated practice of mindfulness strategies can promote sleep quality and MBSR participants go through less interfering cognitive processes such as worry and stress [11]. It was suggested to continue the mindfulness practice even when the program ends. In this way, individuals can maximize the profit from the techniques. In general, it is a fine way for motivated individuals to promote overall well-beings and sleep difficulties [11]. Gradually when individuals are less concerned about those intrusive thoughts and images, they experience less stress and worries. As a result, it can lower the level of anxiety and depression severity [11].

There is also research on another technique called mindful awareness practices. In 2015, Black and colleagues examined mindfulness meditation and its improvement in sleep quality for elderly with sleep difficulty [12]. Mindful awareness practices (MAPs) are standardized intervention which were community-accessible MAPs in this study and lasted for 6 weeks with assigned homework for the participants [12]. The MAPs for daily living consist of 2 h mindfulness meditation course each week, for a total of 6 weeks. This groups-based program is available to take both online and offline [12]. The formalized curriculum is delivered by a certified teacher with at least 20 years of meditation training. The meditation exercises contain mindful eating, sitting meditation, appreciation, mindful walking, mindful movement and loving-kindness meditation [12]. In each class, participants do mindful experiential practice for about 10 to 30 min. Then, the teacher delivers information about the material and host group discussions [12]. A mindfulness textbook is also provided, along with an instructional compact disc. There is daily practice homework for 5 min each day. By session or week 6, the practice time is enhanced to 20 min each day. The program received immediate positive outcomes at the postintervention [12]. Participant's progress in sleep quality was much better than another highly structured intervention called SHE. Formalized mindfulness-related techniques were possibly able to repair sleep difficulties for elderly in the short period and might help reduce sleep-relative daytime problems that predicted quality of life [12]. As older adults have less sleep problems and they are less worried about their sleep, they experience more relaxed and positive attitude, less anxiety about sleep, less persistent to sleep routines and become less depressive because of the problems.

3.3 Cognitive Behavioural Therapy

Cognitive behavioural therapy can be useful in treating sleep difficulties and sleep anxiety for youth. A 2015 paper from Peterman and colleagues investigated improvements in

sleep problems after CBT techniques for youth with anxiety [13]. The findings indicated that youth's anxiety and sleep problems reported from parents reduced following CBT intervention [13]. Further, in the parent-reported group, youth who reacted and responded to anxiety treatment in CBT presented significant progress, compared to non-responders. It was also noted that bedtime resistance and sleep anxiety changed after the treatment [13]. Therefore, sleep related problems around bedtime are the ones sensitive to CBT for anxious youth, instead of quantitative sleep variables such as sleep duration and sleep latency [13]. Overall, reduced general anxiety assists to relieve the anxiety specific to night time. Even though sleep-related improvements were found statistically significant, it indicated that youth with severe sleep problems may use additional sleep focused strategies [13]. In addition, youth may also need help in generalizing those skills because of their limited ability and life experience. Families probably need therapists to overtly and clearly guide youth in employing those skills in CBT [13]. Cooperation among parents, youth and therapists may be the best way for youth to ameliorate anxiety and to address sleep problems [13]. In addition, CBT is a better way to treat chronic insomnia or severe insomnia, compared to medicines [1]. It is because that people can develop tolerance and dependence on the drugs [1]. It is common to see that the effects of sleep medicines come to an end, which means patients will increase the doses or keep changing to different medicines. Therefore, taking sleep medicines are not a long-term solution, but CBT is a legitimate way towards recovery [1].

4 Conclusion

The purpose of the current review was to investigate the significance of sleeping and the negative physical and mental impacts of sleeping disturbances, followed by three psychological therapies, which are music intervention, mindfulness meditation and cognitive-behavioral therapy. These are three treatments that individuals can try to engage at home by themselves. Poor sleeping quality will affect people adversely by disrupting cognition and disturbing daily behaviors. Organs, cells and neuroprotective function poorly due to long term sleep loss. Sleeping for too short (less than 6 h) or sleeping too much (more than 8 h) can enhance the chance of experiencing depression. Anxiety is another risk that results from sleeping disturbances. Results indicate that music intervention is useful for improving symptoms of depression with the combination of a sound pillow and applications. Practicing mindfulness can help individuals manage thoughts and sleep better as well. Cognitive behavioural therapy was found to effectively treat sleep problems and sleep anxiety for youth. This paper did not include comprehensive treatments but expects to draw researchers' attention to find more convenient treatments and therapies that people can conduct on their own at home instead of going to hospital or having psychological counseling.

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