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Sleep Deprivation

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Continuing Education Activity

Sleep loss from various causes is very common and often missed by physicians as a treatable health problem. There are strong associations with serious medical conditions such as diabetes mellitus and insulin resistance, hypertension, obesity, obstructive sleep apnea, depression, and anxiety. These medical and psychiatric comorbidities put a person at risk for heart attack and stroke. This activity covers the topic of sleep deprivation. It includes common causes of sleep deprivation, the importance of proper sleep, the cause and effect relationship chronic sleep deprivation has with co-morbid conditions, how to effectively screen for insomnia, and the varied treatment options to improve sleep.

Objectives:

- Describe the most up-to-date knowledge of the mechanistic links between chronic sleep deprivation and numerous physical and psychiatric illnesses.
- Summarize the numerous etiologies of sleep deprivation to understand better which patient populations are at risk of sleep deprivation. Identify tools to properly screen patients for sleep deprivation.
- Outline the different treatment options available to clinicians, including behavioral modification (sleep hygiene), medications, and treating any physical or psychiatric illnesses that may be exacerbating difficulties sleeping.
- Review the importance of an interprofessional approach to ensuring patients get adequate sleep to aid in maintaining physical and psychiatric health.

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Introduction

Sleep loss from various causes is prevalent and often missed by physicians as a treatable health problem. There are strong associations with serious medical conditions such as diabetes mellitus & insulin resistance, hypertension, obesity, obstructive sleep apnea, depression, and anxiety. These medical and psychiatric comorbidities put a person at risk for heart attack and stroke. Other adverse consequences of chronic sleep loss on public health include increased mortality & morbidity, poor performance on waking activities resulting in increased accidents & injuries, lower self-reported quality of life, decreased family well-being, and reduced use of health care. It is clear that sleep loss has a profound effect on human health and well-being. Quantity and quality of sleep play an essential role in mental & physical health and merit consideration in any treatment plan.

Etiology

Sleep loss has many causes and is generally multifactorial. Common contributing causes of sleep loss are sleep apnea, insomnia, restless leg syndrome, parasomnias, mood disturbances, psychosis, and other psychiatric, neurological, & medical conditions. When assessing the cause(s) of sleep loss, it is essential to address any of these underlying factors directly. Providers should not treat symptoms if they identify an underlying treatable cause. If the provider is unable to identify any contributing factors, the default diagnoses are primary insomnia. Primary insomnia is most common in

elderly populations. As people age, the sleep architecture changes; delta-wave (or deep) sleep decrease, and the proportion of time spent in lighter sleep increases; this results in increased sleep disruptions.[1] The duration of sleep also decreases with age. Comorbid medical conditions can be both the cause and the effect of chronic sleep loss. For instance, a patient can develop obesity, which results in obstructive sleep apnea. The lack of quality sleep then leads to increased serum cortisol levels, which facilitates further weight gain.

Epidemiology

Sleep loss is a pervasive problem that increases in frequency as individuals age. As the proportion of geriatric persons increases in the population in the U.S. and worldwide, the prevalence of sleep disorders will increase. Other causes of sleep loss, such as obesity, which leads to obstructive sleep apnea, are also on the rise.[2][3] Studies have found that sleep loss is more common than previously thought. Estimates are that 50 to 70 million Americans suffer from some form of sleep loss.[4] The drivers behind the recently increased prevalence of sleep loss include several broad societal changes, including working longer hours, shift work, and having greater access to television & the internet. Adults today are sleeping less to get more work done and staying up late to watch TV or use the Internet. A recent study found in people ages 25 to 45 years old, 20% were consistently sleeping 90 minutes less than was needed to maintain good health. [5] The problem of inadequate sleep is likely to increase due to our society's 24/7 nature, with activities to do at all hours and increased access to night time use of computers, mobile phones, and television. Studies have found that there has been a decline in the amount of sleep of up to 18 minutes per night over the last three decades.[6] [7] Epidemiological studies may inaccurately depict this problem as data is collected by self-report methods, which do not differentiate between time asleep and time in bed. Polysomnography is accurate but is expensive and time-consuming to utilize in extensive epidemiological studies. A new, cheaper method to collect data on sleeping habits involves the use of actigraphy.[8]

Pathophysiology

Chronic sleep deprivation has significant adverse effects on health and overall quality of life. Chronically sleep-deprived individuals had significantly lower reported markers of quality of life on a 36-item survey.[1] The survey looked at areas one's ability to function throughout the day, health problems, perception of pain, the general perception of one's health & vitality, social functioning, and mental health.

Interestingly, many conditions that are commonly comorbid with sleep deprivation are associated with similar physiological states. Chronic sleep deprivation is associated with elevated cortisol and decreased testosterone levels. Testosterone is known to enhance the function of the gamma-aminobutyric acid (GABA) and serotonin systems in the brain. This reduced function provides one possible causal link between two of the most commonly associated psychiatric disorders, depression, and anxiety. Also, elevated serum cortisol levels have correlations with depression, anxiety, hypertension, obesity, and diabetes type II. Chronic sleep deprivation correlates with increased inflammatory markers, which is associated with all the above-mentioned comorbid conditions and psychosis.

It is essential to realize that the body has many of the same physiological markers in chronic sleep deprivation as it does with its many comorbid conditions. Many of these physiological states provide the causal link between sleep deprivation and these other psychiatric and medical conditions. This cause and effect relationships are reciprocal, making chronic sleep deprivation a potential cause and result of these other conditions. It is of paramount importance to ensure a patient is getting adequate quality sleep when treating these conditions.

History and Physical

It is vital to assess a person’s quality and quantity of sleep. Seven to eight hours and nine hours of sleep are generally ideal for adults and adolescents, respectively. Less sleep correlates with obesity, diabetes & impaired glucose tolerance, cardiovascular disease & hypertension, anxiety and depressive symptoms, and alcohol use.[1] The presence of these ailments could serve as indicators that a patient may have an impaired quality of sleep. As a rule of thumb, the sicker the patient, the less likely it is that the patient sleeps well.

When taking a history, essential questions to ask to assess a patient's sleep are:

Do you have trouble falling asleep? Staying asleep? Do you feel tired upon waking from sleep?

If the patient answers affirmatively to any of these questions, follow up with: Do these problems with sleep occur despite adequate time and opportunity for rest? Is the sleep difficulty impairing your functioning during the day? Do you feel distressed from the lack of quality sleep?

It is also essential to make an inquiry regarding the severity and frequency of these symptoms.[1] A patient who lacks adequate sleep will commonly endorse symptoms of sleep loss, such as excessive daytime sleepiness, poor concentration, fatigue, moodiness, and decreased libido, among other symptoms.[9] Be sure to optimize the patient's sleep before focusing on symptom relief. Again, correct the cause, not the symptom.

Evaluation

Upon determination of the poor quality of sleep, further evaluation is needed to determine potential causes of sleep loss. There will generally be more than one cause contributing to the loss of sleep. It is better to treat the causes directly. If obstructive sleep apnea (OSA) is a cause of quality sleep loss, it is best to address this with CPAP and/or weight loss. Ignoring the contribution of OSA to the sleep disturbance and prescribing sedating sleep aids could worsen the OSA and quality of sleep. It is also important to identify the symptoms the patient may be experiencing from sleep loss. The symptoms the patient suffers from should be monitored to assess treatment progress. The most common symptom of sleep loss is excessive daytime sleepiness. Also, patients can display depressed mood, poor focus, and impaired memory. Lack of sleep can also exacerbate psychiatric and medical conditions such as OSA, obesity, hypertension, depression, anxiety, etc. Lack of sleep will impair executive functions.[10] After optimizing sleep by addressing all the contributing factors, it is crucial to re-evaluate the patient for residual symptoms. At this time, symptomatic relief can be the focus.

Treatment / Management

Despite the significant toll sleep loss places on public health, it is not often addressed by clinicians. To date, there are no formal treatment guidelines. However, there are many effective ways to treat sleep loss.

Treatment for sleep consists of three general approaches:

1. Behavioral modification/improving sleep hygiene
2. Treating causative medical and psychiatric conditions
3. Pharmacotherapy

It is important to review proper sleep hygiene with the patient to eliminate behavioral habits that adversely affect sleep. As mentioned previously, many of the comorbid medical and psychiatric conditions can be contributing to the trouble with sleep. The individual treatments for all these comorbidities are beyond the scope of this article. If the first two treatment options fail to resolve the sleep difficulties, one can consider pharmacotherapy. The clinician should be judicious when using medications as sleep aids because they can have unintended adverse effects. Certain medications can worsen daytime fatigue if given at too high a dose or if the medication half-life is too long. Sedating sleep aids can also exacerbate the conditions causing poor sleep. OSA can be worsened by sleep aids that promote weight gain and further relax the muscles around the airway during rest.

If sleep loss is a result of a lifestyle that cannot be changed (e.g., shift work), the provider can address excessive daytime sleepiness by giving specific behavioral tips to help individuals stay alert. Medications that promote wakefulness, such as caffeine, modafinil, and methylphenidate, are options. Currently, modafinil is the only medication that is FDA approved for shift work sleep disorder, but not sleep loss.[11]

Differential Diagnosis

Sleep loss is a symptom, and to appropriately treat it, it is vital to discern between the many potential causes, which include:

- Primary insomnia
- Depression

- Anxiety
- Obstructive sleep apnea
- Obesity
- Substance abuse
- Chronic pain

Conditions that can mimic the symptoms of sleep loss are:

- Chronic fatigue syndrome
- Narcolepsy
- Substance abuse
- Depression
- Anxiety

Prognosis

If a healthcare provider appropriately identifies sleep loss, treatment can be successful, and the patient can resume a healthy lifestyle.

Complications

Lack of adequate sleep can lead to many complications. Some of these complications can lead to further difficulty in getting sleep. Lack of sleep causes elevated cortisol, which can result in increased blood sugar, increased blood pressure, cravings for carbohydrates, and sugar, which leads to weight gain and other medical and psychiatric complications. The subjective experience of sleep loss can be distressing, which can exacerbate complications. The following is a non-comprehensive list of complications of sleep loss:

- Diabetes/insulin resistance
- Hypertension
- Obesity
- Obstructive sleep apnea
- Vascular disease
- Stroke
- Myocardial infarct
- Depression
- Anxiety
- Psychosis

Deterrence and Patient Education

The best preventive treatment is patient education. Once a person understands the importance and methods of quality sleep, rest will most likely become a higher priority. Patient education should include proper sleep hygiene and other common causes of poor sleep. It is crucial to assess the patient's current sleep habits and identify what they are doing right and areas where they can improve. Encourage a healthy lifestyle, which will result in better overall health, which will lessen the chances the patient will develop medical conditions that will affect sleep.

Enhancing Healthcare Team Outcomes

Sleep loss is generally a readily treatable health issue. However, it often goes undetected. The most important thing for healthcare providers to do is routinely screen for concerns with sleep in patients. Once a patient is found to have difficulty sleeping, proper treatment can begin.

For both diagnosis and treatment, an interprofessional team approach is beneficial. The family practitioner can enlist the help of psychiatry professionals or a sleep disorder specialist. The pharmacist should monitor all medications, looking for drug interactions, side effects potential, and in rare cases, misuse of sleep medication, alerting the team of any issues. Nursing can also play a vital role by verifying patient compliance, counseling on lifestyle and sleep hygiene issues, and letting the treating clinician know of any concerns. Psychiatric and medical care go hand and hand in promoting good sleep. It is essential that a psychiatrist considers a patient's physical health and that a PCP considers a patient's psychiatric health when treating sleep. Only with an interprofessional approach can sleep disorder management be optimized for patient benefit. [Level 5]

Review Questions

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