

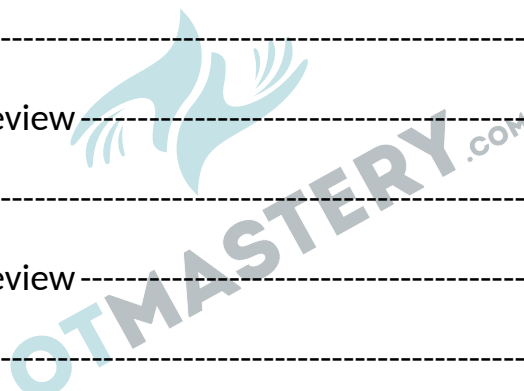


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Rest and Sleep Across the Lifespan



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Introduction

While the category of rest and sleep was just added to the list of occupational areas within our field's scope of practice, it has long had an impact on the way individuals function. People who get too much, too little, or poor quality sleep are at risk of experiencing physical and mental health concerns and decreased quality of life. Individuals who do not get the right kind of rest also experience poorer health outcomes along with higher healthcare costs and service utilization.

Sleep concerns do not discriminate, so it's possible for individuals to experience trouble sleeping across the lifespan. Sleep difficulties can co-occur with other health concerns, complicate the treatment process, and even cause additional health concerns to arise. For this reason, occupational therapists should be prepared to provide patients with both preventive and remedial interventions focused on productive sleep and rest. Sleep and rest interventions clearly align with the Occupational Therapy Practice Framework, as they are heavily impacted by a person's client factors, performance patterns, routines, habits, roles, and a variety of contextual factors.

Section 1: Definition of Sleep, The Occupation

1,2,3,4,5,6,7,8,9

Many sources define sleep as an activity that gives someone sufficient recovery of the energy they spent during ongoing learning and engagement during waking hours. During this activity, someone experiences temporarily reduced consciousness, less physical and mental activity, and inhibited sensory activity. According to the World Health Organization, sleep is a crucial part of a person's physical well-being. In order for someone to achieve peak physical well-being, they must have a healthy balance between sleep/rest, exercise/physical activity, and cognition/perception.

There are five stages of sleep. The first is waking followed by N1, N2, N3, and REM. During stages N1 to N3, people experience non-rapid eye movement sleep, or light sleep. With each passing phase, a person gets slightly deeper sleep until they enter REM sleep, which is the heaviest sleep. In a typical night, someone will cycle through these five stages between four and five times with one cycle lasting between 90 and 110 minutes. It is most common for someone to transition from N1 to N2, then N3 and back to N2 followed by REM sleep. As each cycle goes on, a person spends less time in non-REM sleep (the N stages) and more time in REM sleep. Each stage is important for certain reasons. Non-REM sleep gives the body time to build and repair bone, muscle, and tissue while fortifying the immune system. REM sleep is intended to help someone develop and retain memories as well as consolidate information learned during the previous day.

Sleep is not just a bodily function, and it can be included within the scope of occupational therapy. In 2008, sleep and rest transitioned from being viewed as an activity of daily living (ADL) to an occupational domain as per the American Occupational Therapy Association's (AOTA) Occupational Therapy Practice Framework. In addition, sleep and rest are statistically some of the most practiced occupational domains in existence, as nearly one third of a person's life is spent engaging in or attempting to engage in sleep and rest. However, research conducted by AOTA shows that many occupational therapists still do not emphasize this practice area as much as they should through treatment methods and patient education, nor do they prioritize the occupation of sleep among other occupations or daily activities. An occupation is also defined as an activity that a person consciously chooses to do with premeditated intention, which means sleep must be characterized as a solely volitional activity. Since sleep can be more of an impulse for certain populations, especially young children, some experts argue that it cannot be an occupation.

Yet, it's possible for the true nature of sleep to shift over the lifespan according to a person's needs and lifestyle. Occupations – including sleep and rest – also have the potential to generate other occupations, which may be equally as beneficial or detrimental as the original occupation. For example, someone may adopt certain enjoyable practices (such as journaling or reading before bed) that become habitual and help them obtain better sleep. On the other end of the spectrum, some people use alcohol, or illegal substances to help them get to sleep, which they may consider effective at first glance; however, such methods are known to cause long-term health problems including but not limited to sleep interruptions.

As we mentioned, there are several aspects of sleep and rest that are open to speculation. One position that some research takes is that traditional medical sleep interventions can have varying levels of effectiveness, primarily because there are too many variations in how sleep can be measured. Researchers suggest this variation is due to a person lacking consciousness for the greater majority of their sleep participation. This is also yet another reason that some experts argue sleep cannot be an occupation: the act of sleep consists of many moments where someone is not purposely engaged in actions that constitute occupational performance. For this reason, some professionals also consider patients who have marked lethargy and a slumped posture coupled with inactivity as engaging in a general form of sleep, since they cannot participate in other occupations at the same time.

Many therapists also report that they struggle to find comprehensive, client-centered assessments and interventions focused on sleep along with research they can use to demonstrate the validity of their treatment to patients. Despite this, occupational therapists and other similarly holistic professionals can use more on occupation-based sleep treatment, which involves focusing more on how individuals feel after engaging in sleep, the ways periods of sleep and rest are organized and integrated into someone's life, how someone views sleep, and other similar approaches. Each of these subtopics are explored in greater detail in

the field of occupational science, which is a field very closely related to occupational therapy.

Regardless of these arguments against sleep as an occupation, the current outlook gives occupational therapists (and other providers) ample opportunity to fill in the gaps from their scope of practice with existing and developing information from related disciplines such as sleep specialists, psychologists, psychiatrists, and doulas.

There is a lot of background that supports sleep as an essential part of someone's life. According to Maslow's hierarchy of needs, sleep and rest are both viewed as essential physiological requirements alongside food, water, and warmth. This means they are rudimentary needs that someone must have met, even before achieving personal safety or feelings of belonging, connection, and love. By reaching homeostasis to engage in sleep, someone can build personal motivation to thrive in their social environment. In other words, once sleep and other basic needs have been met, a person can shift their cognitive energy and mental focus to places such as building and maintaining relationships, accomplishing tasks, and more. Some of the oldest research done on sleep even suggests that sleep difficulties may stem from a mismatch between a person's modern life and their natural sleep-wake cycles. There is some credence to this, as it aligns with much of the current literature and practice-based guidelines on sleep.

Sleep is important from the very start of someone's life. Early in the lifespan, the way a baby sleeps develops according to the rituals and routines of their family. A child may view sleep according to how the people around them prioritize that activity. Children go through many milestones in a short period of time, so routines and rituals surrounding sleep can serve as an anchor of stability that children can look to for consistency and reassurance. Studies also show sleep routines are strongly correlated with parenting competence and the identity of the family as a whole. At this stage of a parent and child's life, sleep is considered a co-occupation since it involves organization and cooperation among one or

more parents as well as the child for successful participation. Parents should also be on the same page regarding giving their child more autonomy surrounding sleep and rest as they get older. Bedtime rituals and routines have an impact on the type of sleep a child gets, but their benefit also extends to improved emotion regulation, better attachment with parent(s), enhanced family function, greater language development, and better literacy overall. A child's sleep patterns may also be impacted by other activities that take precedence or even by interpersonal difficulties such as violence or unstable relationships within the home. It's possible that processes such as sleep and rest can become positive feedback loops for newborns and infants who have not yet formed solid sleeping habits. These young children do not often sleep through the night, which causes a disruption in the sleep that other members of the family are getting. This, in turn, may cause stress on siblings and adult family members, who may be emotionally or physically unable to meet their newborn child's needs. In this sense, sleep is viewed for its ability to supply the body with energy and similarly allow someone to build and maintain healthy attachments.

In many cases, the effects of sleep also extend throughout childhood and into adolescence. For example, studies show that teenagers in families with single parents or stepparents got less sleep during the week, took longer to fall asleep, and had difficulty falling back to sleep after waking up during the night. These same adolescents traditionally went to sleep two or more hours later than most of their peers. These same studies suggest that adolescents who spent an equal amount of time living with each of their parents had sleep patterns that were more in line with those of their peers.

Sleep is monumental in a young child's life, but many children do not view it that way and may even see sleep as a punishment, whether or not it is actually used as one. However, it is common for people to struggle with sleep at various times during their lives. Some individuals may experience disruptions in their sleep during pivotal life phases or consistently across many years. The occupation of sleep impacts patients both with and without health concerns, so it's possible for

it to hinder (or assist) occupational performance in a variety of ways. Getting good sleep and rest helps people feel their best, which contributes to a person's identity, sense of belonging, and perception of the world around them.

Looking at the bigger picture, sleep is an occupational right. When someone is not able to access proper sleep and rest, this is a form of occupational injustice. The term sleep deprivation is commonly used in our society – especially when describing new parents, people who are adjusting to major schedule changes, those under a lot of stress, and individuals with chronic or acute health conditions. But what many people don't recognize is that this major lack of sleep is a fitting example of occupational deprivation, which is when someone is prevented from engaging in necessary or chosen activities. An inability to sleep and occupational deprivation share many of the same long-term effects, including decreased quality-of-life and a decline in overall health. Many people actually confuse sleep deficiency with sleep deprivation. Sleep deprivation occurs when a person simply does not get enough sleep either on one occasion or multiple occasions. Sleep deficiency instead refers to one or more of the following circumstances: sleeping during a time different than you usually do, not getting good quality sleep, not getting enough hours of sleep in total, not getting enough of one type of sleep (non-REM and REM), and living with a sleep disorder that results in poor quality sleep or little to no sleep.

In addition to being considered a type of occupational deprivation, lack of proper sleep and rest can also fall under the category of occupational alienation. This is because many people who do not get good sleep grapple with feelings of isolation, helplessness, frustration, and a loss of control over their situation. Occupational alienation leads people to feel their inner needs are not being satisfied, which is what often occurs when someone craves better sleep but cannot attain it in a way that makes them feel better. Poor sleep can also be considered an occupational imbalance, since it can cause stress on other parts of someone's life. In specific circumstances, such as labor or sex trafficking,

individuals may experience occupational marginalization where sleep is withheld from them until they fulfill certain duties or quotas.

Section 1 Personal Reflection

Where does sleep fall in the list of priorities in your own life? Do you think this might impact a therapist's ability to successfully help a patient struggling to achieve productive sleep and rest?

Section 1 Key Words

Homeostasis - A state of stability or equilibrium between more than one interrelated factors; this term most often pertains to physiological processes such as appetite and sleep

Paradigm - A fundamental approach that all subparts must follow; paradigms typically come along with a set of theories and related assumptions, principles, and research methods

Reductionist - Used to describe a type of approach that involves oversimplifying complex concepts or phenomena by focusing excessively on fundamentals; also known as reductionism

Section 2: Biological and Occupational Importance of Sleep

10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32

Generally speaking, sleep is crucial for a range of bodily functions. Sleep allows us to create and maintain pathways in the brain that allow us to learn and retain information. Sleep also helps us with cognitive functions such as focus and response time. This is because sleep helps the speed with which neurons communicate with one another.

When our bodies sleep, our brains remain hard at work. Our neurons help eliminate waste from the body. Our thalamus sends a range of sensory signals to the rest of the brain during REM sleep, which is what we know more commonly as dreams. The hypothalamus helps with our level of arousal, which keeps us asleep after we first doze off. The brain stem also remains active to help regulate our breathing and heart rate while controlling the transitions between sleep and wake. In order to keep us safe while we dream, the brain stem also suppresses our movement. The pineal gland in the brain releases melatonin, which helps our body naturally ready itself for sleep in response to changes in external light.

Circadian rhythms are an internal mechanism that help our body naturally fluctuate between wakefulness and sleep based on a 24-hour day. This is considered our body's biological clock, which helps us naturally become drowsy around a certain time in the evening and sometimes even causes us to awaken without an alarm at the time we typically wake up. While our body's circadian rhythms operate on their own schedule independent of where a person is, they can sync up with external cues such as temperature and light.

Sleep-wake homeostasis is another internal mechanism that we briefly mentioned before. This is an internal drive that controls how intensely we sleep and even gives us reminders to sleep after certain periods of time pass. If you stay up much later than your typical bedtime and enter the start of sleep deprivation, sleep-wake homeostasis is what makes it more difficult for you to wake up after you do get to sleep.

Sleep is important across the lifespan, as our bodies need varying amounts of sleep depending on our age. The CDC and other health authorities outline exactly how much sleep healthy individuals should be getting. Experts say babies should be getting between 16 and 18 hours of sleep each night and/or day. It is recommended that any child in school (from the ages of 5 up through adolescence) gets around 9.5 hours of sleep each night to function properly.

During adulthood, it is expected and normal to get between 7 and 9 hours of sleep nightly. While older adults also need sleep to maintain their awareness, prevent falls, and function properly, it is normal for individuals over the age of 65 to get around 5 hours of sleep each night.

All sleep mechanisms are very important to someone getting good rest. If someone does not get enough of a certain sleep stage or too little sleep as a whole, they may experience negative outcomes. This means poor sleep can both place someone at a higher risk of certain health concerns or conditions and cause an increase in symptoms for individuals who already have these conditions. Some of these negative outcomes include:

- Substance use disorders
- Mood disorders
- Behavioral disorders
- Obesity
- Diabetes
- Heart disease
- Myocardial infarction
- Kidney disease
- Migraines
- Stroke
- High blood pressure
- Low fertility rates
- Weakened immune system
- Decreased brain function



- Difficulties with focus and attention
- Increased, more frequent irritability
- Greater emotional hypersensitivity overall
- Trouble learning new things or following instructions
- Memory loss
- Difficulty engaging in reciprocal conversation
- Inability to pick up on social cues and attend to emotional context
- Trouble shifting between tasks or different types of thinking (also known as rigid thinking or feedback blunting)
- Less efficiency and productivity in one's actions
- Issues with creative thinking
- Impaired ability to solve problems
- Slowed reaction time

In the short-term, poor sleep can cause someone to present as if they are intoxicated. Lack of sleep can lead to impaired motor control, an inability to smoothly perform rhythmic movements, and difficulty fully articulating one's emotions verbally.

Lower brain function that results from sleep deprivation can also cause someone to experience decreased reaction time and impaired safety awareness. This places individuals who do not get good sleep at risk of a range of accidents, including falls, car collisions, and accidents related to operating heavy machinery, power tools, and other similar equipment. All of these accidents can result in serious injury, which is a major safety concern for individuals involved and those around them.

The impact that researchers have found that lack of sleep has on attention and learning can also influence a child's ability to function in a school setting. In fact, many experts argue that a later school start time can have a significantly positive impact on the academic performance and overall daytime function of adolescent students.

A decline in participation and performance in school settings is just one example of an occupational area that poor sleep can impact. Studies also show that sleep can prevent someone from engaging in certain strenuous leisure activities, as lack of sleep has been linked to prolonged sessions of internet use as a means of entertainment. A different piece of research showed that sleep and fatigue along with anxiety, pain, depressive symptoms, and perceived cognitive abilities all impacted the social participation of individuals with spinal cord injuries. Other studies have looked at the connection between sleep and socialization. One analysis found that people who sleep for longer periods of time may have less formal opportunities to socialize. Results also suggest that older females who lived in rural areas and lacked positive emotional support more often did not get enough sleep. Another interesting study assessed the relationship between COVID-19, social time pressure, and sleep. This study specifically looked at what is known as social jetlag, which is the discrepancy between a person's sleep times on days when they work and sleep times when they do not work. Results showed that, when there were more relaxed meet-up times for social gatherings, people were able to get more sleep, experienced less social jetlag, and used their alarm clock less frequently.

Other research looked at how the health and harmony of domestic relationships impact someone's sleep. People who had more social support reported less instances of poor sleep and more feelings of being rested each morning. Individuals who experienced less social support and more social strain experienced a greater number of sleep disturbances. A closer look at the results showed that women more often had a positive connection between social support

and better sleep than men did. Men also reported less sleep efficiency and taking longer to fall asleep when they felt social strain.

Research has yielded a similarly strong connection between sleep and activities of daily living, especially in pediatric populations. Studies show that young children are more involved in and motivated for activities of daily living on the weekend when they get more sleep as compared to the weekdays when they sleep less. Other research also found that children get an average of one hour less sleep during the week, and that they perform better at school when they are able to sleep longer on the weekends.

There are a range of factors that impact someone's ability to get good quality sleep. Some of these are internal factors such as medical conditions, which can be controlled through medication and other management strategies but cannot be entirely eliminated as a cause of poor sleep. Other factors are external, meaning they may be aspects of a person's environment or lifestyle and can usually be modified to help someone's sleep function. Some such concerns that impact a person's sleep include:

- Physical pain or discomfort
 - This can include pain due to musculoskeletal concerns such as arthritis or other health conditions. People may also be uncomfortable while sleeping or shortly after waking up if they have an improper sleeping position.
 - People who sleep on their stomach or side may experience pain in one or both shoulders, upper back, and neck.
- Sleeping on a flat, unsupportive mattress and/or pillow
- Snoring or sleeping with a partner who snores
- Stress

- Studies show that over 40% of Americans have experienced poor quality sleep as a result of stress. This creates a positive feedback loop since a lack of sleep causes an increase in natural stress hormones (cortisol and adrenaline), which elevates the body's vital signs. An increased heart rate and blood pressure along with a spike in other bodily functions prevents someone from relaxing, which in turn keeps them from getting quality sleep.
- Chronic, acute, and traumatic stress can all impact a person's ability to sleep. Acute stress may resolve on its own and someone's sleep may return to normal, but any stress that persists and prevents someone from sleeping in the long-term may only be remedied through medical and/or psychiatric intervention. If chronic stress with a job-related cause persists, this can lead to burnout, which can impact a person's physical and emotional well-being along with their sleep.
- Light exposure, either natural or artificial
 - Exposure to sunlight, blue light, or fluorescent light prevents the body from producing melatonin, which makes us sleepy in preparation for resting.
- Jet lag
- Eating certain foods
 - Some foods that can cause indigestion and related difficulty sleeping include spicy food, fried foods, greasy foods, carbonated drinks, acidic foods, chocolate, and peppermint. Eating large meals before bed can also prevent you from sleeping well.
- Doing shift work
- A distracting or stress-inducing sleep environment

- Research shows that trying to rest in extremely hot or extremely cold conditions can cause trouble sleeping.
- A noisy environment can interrupt sleep, but some lesser known environmental causes of poor sleep include having pets in your bed and the smell of smoke or other foul odors in your room.
- Taking too many naps during the day or taking naps that are too long
- Getting up to use the bathroom in the middle of the night
- Side effects from prescription medications
 - In particular, these include antidepressants (specifically SSRIs), dopamine agonists used to treat Parkinson's, amphetamines, anticonvulsants, corticosteroids, some decongestants, bronchodilators (beta agonists) used to treat lung disorders, alpha agonists used to treat hypertension, beta blockers for heart conditions, diuretics, appetite suppressants, cholinesterase inhibitors that treat Alzheimer's, and statins to treat high cholesterol.
 - Dietary supplements such as Vitamin B3 (or niacin) may also cause difficulty sleeping.
- An irregular sleep schedule
- Sleeping pills
 - Whether natural (such as melatonin) or prescription, these can cause dependence and lead someone to have difficulty falling asleep on their own.
- Personality traits such as impatience or perfectionism
- Ingesting caffeine shortly before trying to sleep
- Regularly drinking alcohol or drinking alcohol shortly before trying to sleep

- Sleep disorders
 - Some people with sleep disorders such as insomnia and obstructive sleep apnea may get better rest if they make some lifestyle changes.
 - Sleep disorders such as central sleep apnea, parasomnia, narcolepsy, restless leg syndrome, night terrors, and sleepwalking may only get better sleep after seeking medical intervention.
- Mental health concerns
 - Psychosis, symptoms of mood disorders such as depression, symptoms of anxiety disorders, and symptoms of PTSD

Poor sleep is a common medical complaint for many individuals with health conditions, especially those with neurological disorders. Epilepsy is one example of a neurological condition that causes someone to experience sleep disruptions. Individuals with epilepsy are twice as likely to live with insomnia as the general population is. Around 25% of people with epilepsy experience seizures primarily at night, which can majorly impact a person's energy levels during the day. Similarly, a lack of sleep can trigger seizures in people who have epilepsy. The reason epilepsy and sleep are so connected is because the same abnormal brain waves that cause someone to have seizures are also known to interrupt slow-wave and REM sleep cycles.

Dementia is another neurological condition that can impact someone's sleep. In the evening, it is common for individuals with Alzheimer's and other forms of dementia to experience what is called sundowning. Sundowning is a cluster of symptoms that occur in the late afternoon through the evening and night. When someone is sundowning, they display symptoms such as disorientation, wandering, and agitation. It is thought that sundowning can be triggered by unmet physiological needs such as tiredness, hunger, and pain. But research also shows it may improve with an increase in daytime sun exposure. This suggests that sundowning might be linked to a disruption in circadian rhythms, since they

are also impacted by UV rays from sunlight. Brain changes related to dementia also impact a person's sleep-wake cycles, which can further complicate a person's ability to rest. It is known that dementia causes people to spend less time in deep sleep and get more light sleep.

Chronic headaches, including migraines and cluster headaches, have both been linked to sleep deprivation due to related changes in blood supply to the brain. When someone tries to catch up on lost sleep after going a few days with less than the recommended amount, their brain tends to spend more time in delta sleep. This phase is characterized by the greatest amount of blood vessel constriction, which leads someone to experience a more drastic shift in circulation levels when they enter REM sleep. This quick shift is what often leads someone to experience a headache and sometimes can even cause someone to awaken with a migraine. However, sleep can relieve migraines for some people, which suggests there is still a lot to learn about the connection between sleep and headaches.

Sleep concerns have also been linked to other neurological conditions such as Parkinson's disease, fibromyalgia, traumatic brain injury, and multiple sclerosis. In addition, sleep is also impacted in people who have mental health concerns. It is common for those with Generalized Anxiety Disorder (GAD) to have difficulty staying asleep, falling asleep, and feeling well rested. Panic attacks often occur at night, which lends evidence to these attacks being due in part to physiological changes. Research has ruled out the possibility of psychological triggers causing sleep-related panic attacks, since they are known to take place during both light sleep and deep sleep. Depression is another example of how sleep intersects with mental health, as 90% of people with major depression also have insomnia. Some people with depression also naturally wake up earlier in the morning than they intend to, toss and turn throughout the night, and have trouble getting to sleep. Insomnia is the most common symptom in those who have dysthymia, or low-grade depression. All individuals with depression spend less time in slow-wave sleep and enter the REM cycle more quickly than other people do. Most people with schizophrenia do not get enough deep sleep, but schizophrenia-related sleep

concerns – namely sleeping very little – are most common early in psychotic episodes since this is when someone’s symptoms are at a peak. People with bipolar disorder have particularly obvious concerns related to sleep. When someone is experiencing a manic episode, it is common to persist on little to no sleep. Lack of sleep is also known to trigger or worsen such manic episodes while it can temporarily help depressive episodes that may be characterized by an excess of sleep. Individuals with bipolar disorder often alternate between a lack of sleep and an excess of sleep depending on the episodes they are experiencing.

Sleep is also linked to other health concerns, such as gastroesophageal reflux disorder (GERD). Laying down often worsens the severity of reflux, so people may struggle to sleep well regardless of whether they sleep on their back, side, or stomach. People with chronic pain including conditions such as arthritis, fibromyalgia, and temporomandibular joint disorder (TMD) often don’t sleep well. At least half of individuals with fibromyalgia experience abnormal deep sleep cycles, since their slow brain waves tend to alternate with periods of relaxed wakefulness in what is called the alpha-delta sleep pattern. In fact, back pain is one of the most common types of chronic pain that impacts someone’s ability to sleep.

Chronic pain resulting from cancer can also interrupt someone’s sleep-wake cycles or cause insomnia. About 50% of people with cancer report not getting good sleep. These difficulties may stem from side effects of medications, bodily changes due to surgery or the cancer itself, frequent hospitalizations, and stress. Tumors may also cause someone to have sleep problems due to the pressure they can place on nearby organs, gastrointestinal symptoms (diarrhea, constipation, and bloating), urinary urgency and other bladder concerns, itching, pain, fever, cough, and difficulty breathing.

Individuals with heart conditions may experience difficulty sleeping due to breathing concerns resulting from fluid buildup, which worsens when someone lays down. People with Congestive Heart Failure may also experience Cheyne-

Stokes respiration, which is a series of gradually deeper breaths followed by a brief pause in breaths. This can be especially dangerous if it takes place while someone sleeps. Individuals with Coronary Artery Disease often have interruptions in their circadian rhythms, which can lead to angina and arrhythmia while also increasing their risk of myocardial infarction while they are asleep.

Thyroid conditions tend to overstimulate the nervous system, which can lead to increased wakefulness during the night, insomnia, and night sweats. Insomnia is also related to kidney failure, since the buildup of waste products is especially prominent in the later stages of the disease. Restless leg syndrome or similar symptoms are also related to kidney failure, yet kidney transplants and dialysis do not typically help with these concerns. Chronic obstructive pulmonary disorder (COPD) and other respiratory conditions are affected by circadian rhythms, which impact a person's muscle tone surrounding the airways. This results in nocturnal asthma and airway constriction during the nighttime hours. Many people with COPD and similar conditions experience anxiety about having these attacks while they sleep, especially if they sleep alone. Symptoms such as coughing, shortness of breath, and excess sputum production can all also impact sleeping.

People with diabetes are also known to experience sleep interruptions, and the reasons for this vary depending on a person's symptoms and complications of the condition. Standard diabetes symptoms such as night sweats and low blood sugar levels throughout the night can cause impaired sleep. In addition, someone with diabetes may also develop a condition called neuropathy, which causes damage to the peripheral nervous system. Neuropathy may lead someone to have an increase in nighttime movements or leg pain that can interrupt their sleep. People with diabetes may also frequently have the urge to urinate throughout the night. Frequent urination, also known as nocturia, is a symptom associated with diabetes and several other health conditions, including Parkinson's disease, spinal cord compression, multiple sclerosis, and urinary tract infections. Many of these conditions have a neurological basis, which causes interruptions to someone's sleep-wake cycles and can lead to nocturia. Nocturia is also common in people

who have organ failure (particularly the kidneys, liver, and heart) since impaired homeostatic processes trigger the body to eliminate an excess of waste. But nocturia may also arise due to someone's lifestyle or nighttime habits, which is why some people experience nocturia intermittently throughout their lives or on a regular basis. The main external triggers for nocturia include drinking too much fluid before bedtime and using caffeine or alcohol right before bed. Someone who wakes up at least twice per night to urinate is known to have mild nocturia while severe cases may cause someone to awaken and use the bathroom between five and six times each night.

Obstructive sleep apnea (OSA) can also cause nocturia and other symptoms that impact a person's sleep. This condition results from muscular imbalances in the body that block someone's airways. These same muscular concerns lead to an increase in intra-abdominal pressure, which places pressure on the bladder and makes someone need to urinate (or feel they need to urinate) during the night. OSA also causes an increase in the bodily chemicals that someone needs to balance their electrolytes, which the body responds to by eliminating fluid from the body via urine. People with OSA have difficulty getting deep sleep, which is what the body needs to feel energized and renewed the following day. For this reason, common sleep-related problems for someone with OSA include daytime sleepiness, excessive fatigue, and irritability. Some people with OSA may be able to sleep through the night, but they usually do not feel rested the next day. OSA and congestive heart failure may co-occur in some people due to the nervous system's inability to activate at the proper time, an increase in oxidative stress within someone's cells, and changes in pressure within the thoracic cavity. The relationship between these two conditions also causes an exacerbation of both CHF and OSA, which leads to even more sleep concerns.

Sleep can also be impacted by Sensory Processing Disorder (SPD), as individuals with this condition may struggle getting to sleep and staying asleep. People with SPD may also have difficulty with sleep hygiene and preparation along with drowsiness during the day. There is a lot of research to support the link between

childhood sleep concerns and impaired sensory regulation. In a similar vein, children and adults with Autism Spectrum Disorder (ASD) may have trouble sleeping. This can also extend to the families of children with ASD, who as a whole report themes of difficulty and hopelessness regarding their relationship with healthy sleep. Individuals with ASD have trouble falling asleep and staying asleep, and also demonstrate disruptive nighttime behaviors that impact sleep health of their families. Children with ASD may demonstrate aggression, irritability, hyperactivity, and other affective problems related to sleep. Research shows that kids who have ASD may wake up often during the night, lack muscle tone during REM sleep, and have difficulty feeling awake and alert once they arise from bed.

In general, the aging process also has an impact on someone's sleep for a variety of reasons. Middle-aged and older adults often have more chronic conditions than younger adults, which typically come along with medications and related side effects. A person's level of physical activity and cognitive stimulation both usually slow as they age and this can cause sleep difficulties. All of the above factors also contribute to low sleep satisfaction.

In addition, it's possible that vitamin and mineral deficiencies can lead someone to have difficulty sleeping. Low Vitamin D levels are one of the most common deficiencies that can lead to sleep concerns, as does a lack of Vitamins A, C, B6, B12, D, E, and K along with calcium and magnesium.

As you can imagine, each of these health concerns and the natural aging process can all impact a person's occupational performance across the lifespan. There are many ways this occurs, which is why identifying how concerns related to sleep and rest influence a person's ability to function in their natural contexts is an important part of how occupational therapy can help patients of all ages.

Section 2 Personal Reflection

How might a person with multiple health conditions manage differing instructions from providers to help them achieve better sleep?

Section 2 Key Words

Co-occur - When a person has two or more health conditions, each of which may impact the treatment process for the others

Feedback blunting - A temporary loss of cognitive flexibility that leads to an inability to adapt to environmental changes and produce a certain response to those changes and other types of feedback; for this same reason, someone may be able to recognize mistakes they make but they may struggle to understand the impact they have on their life or know how to fix them

Positive feedback loop - When the result of a certain reaction (usually a small one) causes a spike in that same response; in most physiological examples, positive feedback loops enhance specific changes, which moves a person further away from equilibrium

Section 3: Sleep Assessment and Interventions

33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55

In addition to an occupational profile, there are a range of ways that occupational therapists can assess how well a patient is engaging in sleep and rest. Some evaluation measures focus mainly on a person's participation in sleep while others assess conditions that are very likely to have sleep concerns, such as mental health conditions. In fact, experts often recommend that all providers routinely screen for sleep concerns because of how commonly they occur and how significant of an impact they can have on a person's plan of care. Studies also show that over 90% of people with major depressive disorder also have insomnia, which is why many mental health screenings and evaluations cover sleep and rest in detail. This is also why many providers look toward mental health concerns as a possibility when someone reports new or persistent insomnia.

Regardless of how a provider completes their evaluation, this step in the treatment process should be thorough enough to assist with setting goals. Some examples of outcome measures that help therapists determine a patient's sleep function include:

- Dysfunctional Beliefs about Sleep Questionnaire
- Engagement in Meaningful Activities Survey
- EPWORTH Sleepiness Scale
- Insomnia Severity Index (ISI)
- Mindful Attention Awareness Scale
- Patient Health Questionnaire (PHQ) Depression Scale
- Perceived Stress Scale
- Pittsburgh Sleep Quality Index Addendum for PTSD
- Patient-Reported Outcomes Measurement Information System (PROMIS) Ability to Participate in Social Roles and Activities
- PROMIS Pain Interference
- PROMIS Satisfaction with Participation in Social Roles
- PROMIS Sleep Disturbance
- PTSD Checklist Civilian Version 6 Item
- Generalized Anxiety Disorder Screener (GAD)
- Insomnia Severity Index
- The Sleep Disorders Symptom Checklist (SDS-CL)

Once a therapist has gained information about a patient's sleep-related concerns from these assessments, they can determine what interventions are most suitable for them. There are many sleep-based interventions that align with the occupational therapy practice framework. Occupational therapists are well-suited to address sleep concerns due to their ability to assess a person's contexts, performance skills, activity demands, and levels of engagement at certain times of the day. Each of these areas of a person's life can contribute to sleep concerns, which is why a well-rounded approach is so important.

That being said, age and medical conditions may impact how effective some sleep interventions are. Some methods may be more appropriate for certain age groups while others may be recommended for specific medical concerns or conditions. It is also important to note that the exact work an occupational therapist does related to sleep and rest will vary based on their practice setting. Therapists who work with patients on a consultative basis or run cash-based practices focused solely on sleep and rest may take on more of a coaching role when educating patients about the ways they can improve their sleep. They may also have more flexibility to help patients organize and plan the implementation of such methods in a way that encourages optimal success. Therapists in institutional settings such as hospitals and nursing facilities can certainly also address sleep, but their role may focus more on temporary strategies used to encourage better periods of rest within such highly stimulating and stressful places. In addition, therapists in these traditional patient care settings are especially encouraged to focus on a patient's function – primarily because of insurance limitations but also because of the nature of the field. This is why any education a therapist provides their patients on rest and sleep is often supplemented by functional training along with a discussion of how it connects back to a person's occupational engagement.

Regardless of the setting where an occupational therapist practices, research shows that around 44% of therapists report addressing sleep as an occupation when they treat patients. Even fewer therapists (30%) formed goals related to sleep as part of a patient's treatment plan. Many OTs reported the reasons for this

as not receiving enough education on sleep during OT schooling and not seeking out continuing education on the topic since entering the field. In light of these perceptions from providers, intervention on sleep is crucial.

Interventions

Therapists can choose from a range of evidence-based sleep and rest interventions for their patients:

- Cognitive Behavioral Therapy for Insomnia (CBT-i)
 - CBT-i can consist of several components, including stimulus control therapy, sleep restriction therapy, cognitive restructuring, and paradoxical intention therapy. This subtype of CBT is intended for those with insomnia, so it will not be effective for other sleep disturbances.
 - As part of stimulus control therapy, it is recommended that patients use the 15-minute rule where they stay in bed no longer than that amount of time if they can't sleep. This also involves designating the physical space of the bedroom only for sex and sleep.
 - Sleep restriction therapy requires patients to gradually decrease the amount of time they spend in bed to better consolidate their sleep. It takes several weeks for patients to see results from this technique, but it pairs well with medication and is considered one of the most effective sleep hygiene habits. It initially will cause someone to experience additional sleep disruptions and more fatigue, which is why some people may have difficulty with it. In order to use this technique, patients must calculate how long they spend in bed on average and stay in bed for no longer than that. Patients must also set strict sleep and wake times that do not fluctuate regardless of how much sleep they got the night before. In addition to these steps, it's important to avoid naps and be exposed to bright light in the

morning and dim light in the evening. It's best to stick to this schedule for 2 weeks for the best results.

- Therapists may also recommend paradoxical intention therapy for patients with insomnia. While this goes against many of the principles in sleep restriction therapy, it may help some patients. This technique involves prescribing the symptom, or encouraging patients to do what they aren't supposed to in order to relieve preoccupation that may be impacting sleep. To practice this, patients must get in bed and stay awake, which is meant to slowly get rid of their anxiety about trying to fall asleep slowly.
- Sleep hygiene
 - Sleep hygiene includes both environmental and behavioral modifications to assist people with mild to moderate insomnia. There are many habits and routines that can fall under the category of sleep hygiene, so this can be highly individualized. Although, the efficacy of sleep hygiene is not necessarily dependent on the type of habits someone adopts. In particular, there is a lot of research supporting the effectiveness of this type of intervention, especially for populations such as those with schizophrenia.
 - Some examples of environmental modifications that can assist with insomnia include adjusting the room temperature (65 degrees is the most ideal, but between 60 and 67 degrees is an acceptable range); adjusting the comfort level of the bed using comforters, sheets, blankets, and pillows of various textures and thickness; regulating the noise in the room or home (using earplugs, playing white noise, listening to music as you sleep); and modifying one's sleep position to avoid or improve pain (sometimes specialized pillows can help with this by better supporting the neck and/or back).

- Additional environmental modifications may be indicated for people with REM sleep behavior disorder and other sleep disorders that involve potentially dangerous nighttime behaviors. These may include lowering the bed, placing a mattress on the floor alongside the bed, sleeping on a floor mattress, having a first-floor bedroom setup, placing pillows around the bed, installing padded bed rails, maximizing the distance from locked windows, getting rid of other furniture around the bed, and possibly even implementing physical restraints (padded belts, sleeping bags).
- Assistive devices such as bed alarms can also be helpful for people with REM sleep behavior disorder, dementia, children with ASD or ID, and those who are a fall risk.
- Behavioral and lifestyle-based modifications are another part of sleep hygiene. This category can include exercise programs, energy conservation strategies, and stress management (using relaxation techniques mentioned below or through other means). Other more specific behavioral modifications that can help individuals with sleep concerns are limiting caffeine intake – especially in the afternoon and evening – along with limiting water intake before bed, cutting back on alcohol and smoking at all hours, and restricting blue light exposure from any electronics for 1.5 hours before bedtime. Napping is another common habit that can help people with sleep concerns if it is done right. People with hypersomnia may benefit from taking 10-20 minute naps every 2 to 4 hours during the day and refraining from longer or more frequent naps. Other individuals, especially those with chronic pain, may benefit from one or two short naps to help their energy levels. Exercise programs can help most people with sleep concerns, but they can be particularly helpful as a weight loss strategy, which is beneficial for people with conditions such as obstructive sleep apnea and congestive heart failure. Research shows

that routine modifications and modified sleep schedules are especially beneficial for older adults who experience age-related sleeping concerns that cannot be attributed to health conditions.

- People who adopt or participate in exercise programs should aim for moderate intensity exercises (including biking, brisk walking, aerobics, hiking, and rollerblading) at least three times each week. Research shows that programs with these parameters had the most positive impact on the sleep patterns of both middle-aged and older adults. Similar programs have also proven effective for younger adults with slight adjustments made based on their weight and current activity levels.
- Relaxation strategies
 - This is also personalized since people may find some activities relaxing while gaining less of this effect from other tasks. Some options include meditation, guided imagery, progressive muscle relaxation, aromatherapy, massage therapy, mindfulness training, yoga, tai chi, rhythmic exercise, and more.
- Non-pharmacological sleeping aids
 - These include tools that help someone sleep better without the use of medication. Some options under this category include weighted blankets, melatonin, scented pillows, wearable sleep trackers, light therapy lamps (to offer bright light during the daytime), and light metronomes (which use visual cues and timers to help someone achieve rhythmic breathing). There is not much research on some of these methods, especially the light metronomes. However, weighted blankets assist with sensory regulation and are known to address sleep problems that stem from sensory concerns.
- Complementary health approaches and integrative health

- Acupuncture has proven especially effective in helping those with chronic insomnia. There is also research to support its benefit for those with chronic pain, which can have secondary effects for people who have conditions that cause that symptom.
- Biofeedback for chronic insomnia - when using neurofeedback, studies show some promise for short-term results but this modality lacks long-term efficacy; more positive results with biofeedback focused on heart rate variability, which was found to increase vagal activity in young adults and improve subjective sleep quality; similar promise for short-term results when BF used to target teeth grinding/ clenching
- Bright light therapy with evidence for helping those with insomnia after experiencing a mild to moderate stroke; research shows it improves daytime sleepiness, fatigue, mood, and quality of life; other studies yielded similar results for those with migraines and sleep disturbances; bright light therapy can also help regulate the sleep-wake cycles of women undergoing chemotherapy
- Symptom management for any non-sleep-related conditions that interfere with rest due to their symptoms
 - Individuals with restless leg syndrome can adopt exercises such as biking and walking to manage feelings of discomfort in the legs. Practices such as soaking limbs, regularly getting leg and foot massages, and using pneumatic compression are also helpful for the same purpose.
 - People with obstructive sleep apnea can use continuous positive airway pressure (CPAP) and bilateral positive airway pressure (BiPap) machines to improve their breathing over the night. Individuals with mild cases of obstructive sleep apnea typically benefit more from

mandibular advancement devices (or splints). These are mouthpieces that prevent snoring by moving a person's jaw forward to prevent airway blockages. Individuals with central sleep apnea often benefit more from medication to improve their sleep quality.

- Individuals who have been diagnosed with temporomandibular joint disorder (TMJ/TMD) may be prescribed mouthpieces (also known as mouthguards, splints) to prevent them from clenching and grinding their teeth. These hold a person's teeth and, therefore, their mouth in the same position so it cannot move. Custom-fit mouthguards are the most effective type for TMJ/TMD. Acupuncture and cervical stretches can also help this condition by relaxing the muscles in the face and neck to prevent excess tension that impacts sleep at night.
- Sensory strategies
 - Children with Autism Spectrum Disorder, Attention-Deficit/Hyperactivity Disorder, and Sensory Processing Disorder may benefit from using rocking chairs, gliders, and swings to provide calming, linear vestibular input that can help them become more regulated in preparation for sleep. Similarly, lycra compression stockings along with a variety of weighted products (blankets, lap pads, backpacks, vests, toy animals, etc.) can offer deep pressure that is calming to the body and can help with sleep.
 - Fine motor manipulatives can be used to help children with restless hands.
 - Children with these diagnoses may also want to incorporate heavy work activities into their bedtime routine. Some examples of heavy work include animal walks, yoga poses, wheelbarrow walks, laundry basket slides, wall push-ups, and any other exercise that offers proprioceptive input to major joints in the body. This can help them

throughout the day – heavy work can be completed in the morning to improve alertness and regulate children; similar activities can also be completed 1-2 hours before bed just prior to relaxation techniques and other sleep hygiene elements to calm children.

Section 3 Personal Reflection

What are some ways occupational therapists can help patients who want to try multiple strategies for sleep and track the results?

Section 4: Case Study #1

A 76-year-old woman residing in a long-term care (LTC) facility is beginning to have increased difficulty sleeping. She first arrived at the LTC three months ago after having a bilateral below-knee amputation and being unable to care for herself independently in her home at the time. When she first moved, she reported mild sleeping concerns to the nursing staff. They noted it in her chart, but it was not a major concern at the time (according to the patient) so it was not addressed. Now she is reporting more persistent insomnia and wakes up several times in the middle of the night requesting to urinate, but does not void when she gets to the bathroom. Nursing staff is also noting a sharp increase in daytime sleepiness and some irritability when the patient is asked to join in residential activities. She is not currently receiving rehab services, but therapists recently performed a screen on this patient during which time they observed decreased safety awareness during ADLs and transfers along with some confusion.

1. What are some possible causes for this insomnia and daytime sleepiness?
2. Based on any of these causes, what are some potential ways to remedy this patient's insomnia?

Section 5: Case Study #1 Review

This section will review the case studies that were previously presented. Responses will guide the clinician through a discussion of potential answers as well as encourage reflection.

1. What are some possible causes for this insomnia and daytime sleepiness?

There are several potential causes for this patient's sleeping difficulties. Some of her sleep concerns may be the result of depression and difficulty adjusting to the loss of her limbs and independence. She may also be struggling to sleep due to a decrease in physical activity following her surgery, which is impacting her sleep-wake cycles. Lastly, her nighttime urination may be a sign of a urinary tract infection, which is common in postmenopausal women as they age. She is also at an increased risk of UTI since her activity levels have likely decreased quite a bit since after her surgery. Another infection (such as a surgical site incision) may also be a contributing factor to this woman's sleep troubles, since the onset occurred so shortly after her surgery. Another possibility is that she is having a hard time adjusting to a new (busier and likely louder) environment.

2. Based on any of these causes, what are some potential ways to remedy this patient's insomnia?

Nursing staff and therapists alike can work with this patient to develop a sleep routine and educate her on sleep hygiene. It is also best practice for nursing to request a screen from a staff psychiatrist or psychologist to determine if depression, adjustment to disability, and/or a new living environment are playing a part in the patient's insomnia. If the patient qualifies for rehab services (which is likely the case due to impaired safety awareness during ADLs and transfers), they should expedite a referral to begin working with the patient. This will not only increase her activity levels but decrease her risk of falls and allow therapists to create an exercise

program so that nursing staff can help the patient remain more active outside of sessions.

Section 6: Case Study #2

A 25-year-old man who just graduated with his Master's degree moved back to his hometown because he accepted a job offer in the finance industry. As a young person eager to get his career started, he quickly fell into the habit of working long hours, accepting overtime, and neglecting to take any paid vacation time or sick days, even when he was not feeling the best. During college, he had the sleep schedule of a typical student where there were times he would stay up late to study for an exam. However, his sleep schedule would always readjust after that and he would always return to a moderate bedtime at 10 pm and wake at 7 am for his classes without any concern. For the past 2 months, he has had severe difficulty falling asleep, which has led him to fall asleep around 1 or 2 am and have a lot of difficulty waking up to catch his train at 6:30 am. He reports racing thoughts during the night as being a contributing factor to his insomnia. He has looked up some remedies online and tried them briefly, but quickly got discouraged.

1. What is the most likely cause of this man's insomnia?
2. What strategies might help this man achieve better sleep?
3. Will he be able to return to a normal sleep schedule if he adjusts his working hours?

Section 7: Case Study #2 Review

This section will review the case studies that were previously presented. Responses will guide the clinician through a discussion of potential answers as well as encourage reflection.

1. What is the most likely cause of this man's insomnia?

There are likely several contributing factors to the insomnia he is experiencing. It is likely that he is experiencing the early signs of burnout, which stands to impact someone's emotional and physical well-being and can certainly prevent them from sleeping well. His sleep could also be affected by blue light exposure from extended computer usage, which may be especially exacerbated on the nights he is working right up until going to bed. He could also be struggling with feelings of doubt and insecurity since he is at the start of his career and may be overly concerned with working his way up to achieve more stability. These could be contributing to his racing thoughts, which are influencing his ability to sleep.

2. What strategies might help this man achieve better sleep?

He can particularly benefit from strict sleep and wake times along with staying in bed for no longer than 15 minutes if he is unable to get to sleep. CBT-i can help address his racing thoughts through cognitive restructuring. He would also benefit from education on productive leisure, hobbies, and relaxation techniques to help him achieve a better work-life balance. These relaxation techniques can be used during the day to help him better manage work-related stress. In addition, during the time he leaves bed due to not falling asleep, he can begin incorporating the relaxation techniques he finds most effective and enjoyable.

3. Will he be able to return to a normal sleep schedule if he adjusts his working hours?

It depends. If burnout is one of the main causes of his sleep concerns, it's possible that many of his difficulties could be reversed since he has only been working a few months and his burnout is most likely in the early stages. However, some of his difficulties may also be attributed to being in a new stage of life with different stressors that were not present in college. If

he is diligent in managing his racing thoughts, incorporating leisure into his schedule, minimizing working hours, and sticking to a sleep schedule, he is likely to see good results.

Section 8: Case Study #3

A 5-year-old girl was just diagnosed with Autism Spectrum Disorder. Her development has been mostly normal in terms of fine motor skills, gross motor skills, and ADL function, except for some minor sensory defensiveness. She is mostly sedentary and prefers to spend time inside coloring, doing crafts, and listening to music. She has no problems eating a variety of foods, but her father recently lost his job and her diet has been much more limited recently due to financial struggles within the family. Over the past 2-3 months, she has begun experiencing difficulty sleeping along with difficult behaviors in the evening including irritability, aggression, and increased activity level. Much of this is brought on by her parents asking her to go to bed, which happens at the same time each night. She will wake up several times during the night and stays in her room playing, which her parents know because they wake up and find toys on the ground that were not there the night before.

1. What might be the potential cause for this child's sleeping difficulties?
2. What strategies might help this child and her family sleep better?
3. Do you think the child's parents should mention these concerns to her pediatrician?

Section 9: Case Study #3 Review

This section will review the case studies that were previously presented. Responses will guide the clinician through a discussion of potential answers as well as encourage reflection.

1. What might be the potential cause for this child's sleeping difficulties?

It's possible that sensory dysregulation is partly to blame for this child's sleeping concerns. Not only is this common in children who have ASD, but she is still young enough that her sensory systems are still developing, so it's very possible that new sensitivities and varied levels of alertness are changing. The change in diet may also be a contributing factor, since the child may have some vitamin and mineral deficiencies that are impacting her sleep. Her lack of activity during the day may also mean she is not getting enough Vitamin D from sunshine outdoors nor is she active enough to help regulate her sleep-wake cycles.

2. What strategies might help this child and her family sleep better?

This child's parents can plan more outdoor activities, including games, exercise, and sports. Any activities that involve heavy work are preferred. This will help the child's circadian rhythms as well as her mood and sensory regulation. Her parents should also consider trying some sensory aids to help her settle down at night. It's best to start with proprioceptive-based aids such as weighted blankets or proprioceptive activities 1-2 hours before bed, especially for someone who has a history of sensory defensiveness. If the child is open to it, her parents can try some vestibular-based and others such as scented pillows.

3. Do you think the child's parents should mention these concerns to her pediatrician?

Yes. While this is not necessarily considered a medical emergency or major concern, lack of sleep can certainly impact the quality of life of this child and her family. It can also be difficult to correct if insomnia becomes a habit for this child. In addition, there is the potential that these changes can be due to vitamin and/or mineral deficiencies, which the doctor can test for using bloodwork. Based on the results, dietary changes and

supplementation may be able to help. If the doctor is aware of the child's growing sleep and sensory concerns, they can also refer the child to occupational therapy for further intervention.

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