Sleep – An Overview

INTRODUCTION

Human beings spend approximately one-third of their lives in a state of sleep [21]. The importance of this activity cannot be overestimated, yet many people suffer from sleep disorders that disrupt their daily activities and wreak havoc in their lives. This course examines normal sleep patterns as well as circadian rhythm and sleep hormones.

Normal sleep patterns

Despite being essential to human life, the reasons for sleep are often mysterious and the full extent of why humans need regular sleep is not completely known. Although it may appear to be a time of rest and relaxation when a person feels tired, instead, sleep is known to be a time of regeneration and repair for the body. While it appears that most of the body remains in a state of rest the brain is hard at work, managing and supervising activities within the body.

Sleep is actually a structured phenomenon that is organized into different stages. The basic stages of sleep are classified as rapid eye movement sleep and non-rapid eye movement sleep [21]. These stages may be further broken down into other segments, but each plays important roles as the body moves through patterns of sleep each night.

NREM Sleep
Non-rapid eye movement (NREM) sleep is typically the first part of the sleep cycle that a person enters after falling asleep. Sleep actually moves through a cycle of the stages of sleep, rather than consisting of one period of NREM sleep followed by rapid eye movement sleep. The length of each cycle between NREM and REM sleep varies, but typically lasts about 75 to 100 minutes for the first stage and increases in length with successive stages throughout the night. A person spends approximately 75 to 80 percent of his or her time asleep in the stage of NREM [21].

NREM sleep is further divided into stages 1, 2, 3, and 4. Each stage has its own characteristics and purposes for the sleeping person. Studies performed on people while they were asleep show that different types of brain activity occur with each stage of sleep during the NREM cycle.

Most people start out sleeping in NREM sleep, stage 1. The exceptions to this are newborn infants and people who have narcolepsy, who transition directly into REM sleep [21]. Stage 1 is the lightest form of sleep, in which the person may be easily awakened by an outside noise or activity in the room. A person spends approximately 5 percent of total sleeping time in stage 1 NREM sleep [21].

The average amount of time a person spends in stage 1 of NREM sleep is approximately 7 minutes, [31] although some people may spend longer in this time and others may move through this stage more rapidly. Overall, sleep is a very individual experience that differs between people. Stage 1 sleep has been described as a dreamy feeling, where sights and sounds may be amplified at times.
Hypnogogic hallucinations may also occur during this time, which happen when a person experiences the sensation of hearing or seeing something that is not really there. This occurs because the person is falling asleep and is between the stage of sleeping and being awake [31]. Other sensations that may occur during stage 1 NREM sleep are vivid and unusual sensations of “slipping away,” or the feeling of falling, which may be disrupted by abrupt awakening or a response from the muscles of the body [31].

The initial period of stage 2 NREM sleep lasts up to 25 minutes in the first sleep cycle of the night, but this stage then lengthens with each successive cycle thereafter. A person who is in stage 2 of NREM sleep is harder to wake up because he is in a deeper state of sleep than stage 1 [21]. Stage 2 is characterized by a decrease in body temperature and in heart rate. Stage 2 also demonstrates short periods of brain activity that occur in rhythmic patterns [31]. These patterns are known as sleep spindles, and they are essential for consolidating or “locking in” information learned throughout the day to become part of memory. A person who does not experience enough of stage 2 sleep may be more likely to develop memory problems because this stage is important for retaining information in memory that can be later recalled [21].

Stage 3 NREM sleep is a transitional period in which a person moves from light sleep into deep sleep [31]. During stage 3, delta waves begin, which are slow brain waves. Stage 3 is the beginning of what is known as slow wave sleep, which is restorative for the body. Stage three may last only a few minutes before transitioning into stage 4
NREM sleep. The average person spends approximately 8 percent of their total sleep time in stage 3 sleep [21].

Stage 4 NREM sleep is the deepest stage of sleep and it is at this stage that a person is most difficult to wake. Stage 4 constitutes about 15 percent of total sleep and may last up to 40 minutes in length [21]. Sleep studies have also shown increased amounts of slow wave brain activity during stage 4 sleep. Because these slow brain waves are also called delta waves, stage 4 is sometimes referred to as the delta stage of sleep. It is during this stage of sleep that some types of sleep disorders begin to manifest as behaviors, often at the point where the person is starting to transition into the next type of sleep classification, rapid eye movement, or REM sleep [31].

REM Sleep

In contrast to NREM sleep, the REM stage of sleep constitutes much less total sleeping time. A person spends approximately 25 percent of his or her time sleeping in the stage of REM sleep. As described by its name, REM sleep is characterized by rapid eye movements that occur while a person is dreaming. This stage is also made up of low voltage brain wave activity and muscle paralysis or atonia. The initial phase of REM sleep may be quite short during the first cycle between NREM and REM. However, periods of REM sleep become longer in length as the night progresses [21].

REM sleep differs consistently from NREM sleep. During REM sleep, the heart rate may increase after initially falling when first going to sleep during early phases of NREM. Blood flow to the brain increases, and the person has an increase in blood pressure levels. The person may
breathe at a faster rate and their body temperature, which may have decreased initially during the early stages of NREM sleep, may increase or may take on that of the surrounding environment. In fact, during REM sleep, the body does not maintain temperature regulation and the person is unable to sweat for heat loss or shiver to produce heat [21].

REM sleep is also the period where most dreaming occurs at night. If a person is awakened from REM sleep, he or she may be more likely to remember the dream. The muscles of the body enter a state of atonia or paralysis, in which they are slightly frozen while the person is dreaming. This prevents the person from acting out what he or she dreams [21]. Because of the difference between high brain activity and low body and muscle activity during REM sleep that occurs, REM sleep is sometimes referred to as the paradoxical stage of sleep [31].

**CIRCADIAN RHYTHM AND SLEEP HORMONES**

One major function of sleep that has been noted is the production of certain hormones. Sleep hormones are responsible for not only regulating the amount of sleep a person gets, they can help a person to fall asleep and later wake up. Some hormones secreted while a person sleeps contribute to other body areas and play significant roles on metabolism and stress.

**Melatonin**

The body normally has a 24-hour clock that controls the time when a person typically goes to sleep and when he or she is awake. This 24-
hour clock is known as the circadian rhythm. The body produces hormones in response to the time on the clock of the circadian rhythm; in other words, the body is aware of certain times of day when it knows it should be sleeping or awake and then produces hormones in response.

One hormone that is secreted by the body in response to circadian rhythm is melatonin. The control of secretion of this hormone is by a part of the brain known as the supra-chiasmatic nucleus (SCN), which is responsible for regulating the internal clock. The SCN responds to changes in the outside environment, such as the sun going down and the external environment becoming darker, to stimulate parts of the brain to secrete hormones such as melatonin [13].

Melatonin is secreted by the pineal gland in the brain and, during the day, secretion of this hormone is almost non-existent. This is because most people do not sleep during the day and do not need larger amounts of melatonin to increase the ability to sleep. Alternatively, as the day moves into night, the SCN stimulates the pineal gland to secrete melatonin into the bloodstream. As blood levels of melatonin rise, the person begins to feel sleepier. This release of melatonin typically starts to occur around 9 pm and lasts for approximately 12 hours [13].

Melatonin is only released in an environment that does not have bright light. It must be dim for the body to produce melatonin, otherwise, sleep may be more difficult to come by. This is why most people need to sleep in a dark environment, rather than sleeping with an overhead light on or in a bright room. Even if the clock says that it is a normal
bedtime, if the external environment still contains bright light, the body will not produce much melatonin and the person will have a more difficult time going to sleep [13].

The amount of melatonin that the body secretes varies between people. As a person grows, their melatonin production decreases. Alternatively, children and teens typically secrete more melatonin than do adults [13].

Parents can help their children with sleeping by maintaining a dim area to sleep in. Although some children do not like complete darkness, a dim environment is typically necessary for sleep. A nightlight can be used for some children who do not like the dark, and it should not have a major impact on the body’s production of melatonin. Parents can also help their child’s melatonin production by dimming the lights and helping the child to “wind down” as it gets closer to bedtime. This dim and quieter environment may be more likely to help the child naturally produce melatonin, which will in turn stimulate more sleep.

In some situations, melatonin supplementation may be necessary for children or teens that have significant sleep difficulties. While there are some true cases of diminished melatonin production in some people, the ability to determine this depends on laboratory testing and studies done by a healthcare provider. Melatonin can be purchased without a prescription; in fact, it is the only hormone sold in the United States that is available over the counter.

Because melatonin can be found in some foods, it is not necessarily classified as a drug when it is sold. Therefore, the U. S. Food and Drug Administration does not regulate it. This means that it’s labeling does
not have to list potential side effects and dosages may vary between products. There is not necessarily a set dosage that is recommended for children and teens, and parents who buy melatonin supplements may need to guess or rely on earsay to determine the right amount to give to a child for the first time. Although there have not been reported cases of melatonin toxicity in supplements, the practice of randomly trying a dose of melatonin to see if it helps a child to sleep could be harmful and should be avoided [13].

Use of melatonin supplements may help some children and teens that have sleep disorders that result in sleep deprivation and its negative effects. Some studies have shown that melatonin can help people to fall asleep faster and stay asleep, but it does not necessarily increase total sleep time for all people. If melatonin supplements are taken at the wrong time, such as just before normal waking time or during the day when a person would normally be awake, it can cause increased drowsiness, fatigue, reduced reaction time, and lethargy [13]. If a parent decides to use melatonin supplements to help a child with sleep problems, it is best used under the guidance of a healthcare provider.

**Cortisol**

Cortisol is another type of hormone that is produced during sleep. Cortisol production is regulated by the hypothalamic-pituitary-adrenal (HPA) axis in the body. The part of the brain called the hypothalamus secretes the hormone called corticotropin-releasing hormone. The pituitary gland in the brain contains receptors for corticotropin-releasing hormone, and the secretion of the hormone then causes the pituitary gland to secrete another type of hormone called adrenocorticotrophic hormone (ACTH) into the bloodstream. This
release of ACTH acts on the adrenal cortex to release cortisol into the body [32].

Cortisol actually has a type of negative feedback loop with the HPA axis in that the more cortisol that is released, the greater level of stimulation it will provide to the hypothalamus, which ultimately limits the beginning of the cycle of the release of corticotropin-releasing hormone. The circadian rhythm affects cortisol secretion; cortisol begins to be secreted during sleep approximately 2 to 3 hours after a person has fallen asleep. As the night progresses, cortisol secretion continues and peaks in late morning after awakening, approximately 9 am. After this point, cortisol levels start to drop and slowly decrease throughout the course of the day until the point when a person goes to sleep again at night, and the process repeats [32]. Often, when a person has a cortisol level checked in a laboratory setting, the timing of the test is recommended to be early in the morning because this is when levels will be at their highest.

Cortisol is sometimes referred to as a stress hormone. When a person is under stress, norepinephrine levels and glucocorticoid receptors become activated. Corticotropin-releasing hormone binds to the glucocorticoid receptors, which causes an increase in brain wave frequency on the electroencephalogram (EEG), decreased amounts of slow wave sleep, and lighter sleep overall [32]. This is how increased stress levels contribute to problems with sleep, because the person with increased amounts of stress will be less likely to experience deep, restorative sleep.
The main function of cortisol is to regulate the body’s response to stress. Cortisol also plays many other major roles in the body, including regulating metabolism, controlling blood glucose levels, and regulating the pH of the body. Cortisol also plays a role in controlling immune response and can stifle the inflammatory process, meaning that when a person is under chronic stress, he or she may not be able to respond well to infection and may be more likely to become ill or develop certain diseases. Additionally, excess cortisol production caused by stress can cause atrophy in certain parts of the brain where memories are stored, making memory consolidation and recall difficult.

Sleep is essential for cortisol production and adequate and restful sleep will help to better regulate cortisol levels. Parents can help their children by assisting them to get enough sleep at night by encouraging regular bedtimes, helping them to sleep in environments where it is easier to fall asleep and stay asleep, such as dim environments that do not contain a lot of distractions, and helping them if they suspect that a sleep disorder is present. Additionally, parents may help their children to regulate stress levels during the day by helping them learn to control big emotions and practice appropriate responses to stressful times. Because the effects of chronic stress can be very harmful to children and teens, it is imperative that parents help their children learn to manage stress early in life.

**Sleep recommendations**

A good night’s sleep is not simply a recommendation; it is a necessity. People require different amounts of sleep depending on their ages, with the most sleep required at the very youngest of ages during the
newborn period. Parents who help their children with developing sleep habits early on and who monitor that their children are getting enough sleep will go a long way in keeping children healthy, reducing illness and injuries, and preventing other negative consequences that can result from sleep deprivation.

**Infants**

The length of sleep cycles varies between people; infants can have very short sleep cycles when compared to older children, teens, and adults. An infant may go through a complete sleep cycle every 50 to 60 minutes, which means that he or she is likely to awaken much more often [1]. Depending on an infant’s age, the number of hours of sleep each day and night can vary. Newborns and very young infants may sleep most of the day and night and have few periods of wakefulness. As a baby approaches one year of age, he or she may sleep in larger chunks of time, with longer periods of wakefulness in between.

On average, a one-month-old infant sleeps approximately 16 hours in a 24 hour time period. This includes regular naps and periods of sleeping, on and off, during the day and at night. By three months, a baby may sleep 6 to 10 hours at night and between 5 and 9 hours on and off during the day. At around four months of age, infants start to sleep for longer periods at night—between 6 and 8 hours at a time—which can give tired parents a much needed rest. However, this varies between infants and some babies may not sleep longer than a few hours at a time, while others may easily sleep for long stretches.
By six months, an infant sleeps between 14 and 15 hours out of a 24-hour period. Most of this time is spent sleeping at night, but he or she will still sleep on and off for about 4 hours during the day. By 9 months, most babies still wake up at least once at night, but can sleep for long periods, mostly during the nighttime hours. Infants between 9 and 12 months are readily differentiated between day and night, spending most of their sleeping time at night. The average amount of sleep a child between 9 and 12 months should get is 11 hours at night and about 2 to 3 hours during the day, split between 2 naps [1].

The first year of life can be quite difficult for some parents who must adjust to their baby’s sleep schedule. Every person is different; some people are able to sleep easily and fall asleep quickly, while others take more time or wake more frequently. The same holds true among infants as well. Parents can take measures to improve their infant’s sleep time, but infants quickly develop their own individual sleep styles, including length and quality of sleep early on.

An infant who does not sleep well not only develops sleep deprivation for him-or herself, but also for their family. Parents often are awakened during the night to rock or feed a crying baby, sometimes awakening frequently, leading to poor and disrupted sleep for all members of the family. It can be a trying time to get through the period of infancy; to help a child develop good sleep habits in order to avoid sleep deprivation and sleep disorders that can develop in childhood, and also to allow parents to eventually get adequate and restful sleep.

*Children*
Unfortunately, sleep deprivation is not simply relegated to adults. Children can develop sleep deprivation at very early ages when they do not have good sleep habits or they develop disorders that impact the quality of their sleep. Children may start to show signs of sleep deprivation at about the time of starting elementary school, and the effects can be problematic. Sleep difficulties cause fatigue and lethargy as well as difficulties with concentration and memory, making for poor performance in school and in relationships among young children [1].

Throughout infancy, babies need regular naps and will often take at least two naps per day. As a baby grows, the need for a nap lessens to the point that it is no longer necessary and the child is getting all the sleep he or she needs at night. Many children stop taking naps around the age of 3 years, although some children will nap daily until they are 5 or 6 years old, and other children give up taking naps before they have reached 3 years. Typically time during the preschool years should allow for a daily nap. Once a child reaches 2 to 3 years, he or she should sleep for approximately 11 hours at night and should take one nap each day that is anywhere from 1 to 2.5 hours long [1].

As a child continues to grow, he or she still sleeps roughly the same amount each night—between 11 and 12 hours—but the daytime naps are eliminated. Often, this is due to a child starting pre-kindergarten or elementary school where school activities and classroom work take the place of daily naps. Children who have reached 4, 5, and 6 years old often stay awake all day with preschool or elementary school activities and sleep only at night [1].
The total hours of sleep a child gets during a 24-hour period slightly diminishes as he or she approaches adolescence. From age 7 to age 9, children need approximately 11 hours of sleep at night, with no nap during the day. This number drops to 10 hours of sleep at night that is typical of a child between the ages of 10 and 12 years [1].

These numbers vary between children. Some kids sleep for longer periods and others need less. According to the University of Michigan Health System, school-aged children sleep between 9 and 12 hours each night on average [1]. Many parents worry that their child is not getting enough sleep because the number of hours of sleep their child gets does not seem to match the recommended numbers. However, parents can have a better idea if their child is sleeping well by looking for clues that show he or she is well rested and does not have difficulties sleeping, rather than by focusing on numbers alone.

In general, a child is getting enough sleep if he or she can fall asleep in under 30 minutes; can wake up with relative ease and without consistent nagging, prodding, or other means of attempting to get a child to get up and go; and, if he or she seems mentally alert throughout the day and does not need a nap [1]. In most cases, parents can tell if their child is getting enough sleep if he or she does not have problems falling or staying asleep and stays awake during the day. If teachers or other caregivers are reporting that certain children are falling asleep in class or otherwise do not seem engaged due to fatigue, parents may need to consider whether their child is getting enough sleep at night.

Adolescents
Adolescence is a time of physical and emotional changes, yet many teens do not get enough sleep and end up sleep deprived. This can occur for a number of reasons, including a desire to stay up late to talk to or be with friends, lack of sleep because of activities such as studying, increased anxiety due to social pressures and hormone changes.

The average amount of sleep needed for teens is less than that of school-aged children, but the importance of the quality of sleep for adolescents remains the same as that for younger children. By 12 to 13 years of age, most teens need between 9.5 and 10 hours of sleep at night without sleeping during the day. By 16 years of age, teens should be getting about 9 to 9.5 hours of sleep each night, which is just a little more than the recommended amounts for adults [1].

Just as with any other age group, sleep is essential for adolescents; however, teens often have added pressures and risks that may be threatening to their sleep habits and their health. Teens continue to produce melatonin to help them go to sleep at night, but some adolescents may have trouble getting sleep or may fall asleep later, despite the fact that they still get up at the same time in the morning. Teens may be more likely to develop delayed sleep phase syndrome, in which the circadian rhythms are shifted and they may have trouble getting to sleep until very late at night or even early in the morning. Because of changes in the body that occur during adolescence, many teens also experience higher levels of stress, whether due to social pressures, hormone changes, or family circumstances. These increased levels of stress may lead to more sleep problems and greater risks of chronic sleep deprivation among adolescents.
A teen that is excessively tired during the day may need to see a medical provider to rule out any potential health problems, including some types of sleep disorders. Although daytime sleepiness and feeling tired during the day are symptoms of sleep deprivation, there could be other conditions that are also occurring that may need to be identified and treated.

The optimal amount of time needed for sleep among adults is less than that for children and adolescents, although adults still need between 7.5 and 9 hours of sleep each night. Most people get by on less sleep, believing that they can adequately function on only 5 or 6 hours each night. While a person who subsists on 6 hours of sleep each night can continue to function during the day, it does not necessarily mean that he would not perform better and feel better during the day if he slept more [65]. The optimal amount of time to sleep often varies considerably from the actual amount of time.

Adults who get enough sleep at night should feel alert and awake throughout the day. For someone who has a lag during the day, must take naps, or consistently feels tired and less energetic, sleep needs are most likely not being met. Because each person requires different amounts of sleep, it will do no good to make comparisons between what one person can accomplish on a few hours of sleep. Instead, each person should best determine the amount of sleep he or she needs — not just how much to get by on — and aim to get that much sleep each night.

**Insomnia**
Most Americans do not get enough sleep, often because of choosing to go without sleep in order to complete deadlines or pursue other activities. However, there are some people who struggle to get enough sleep because they are unable to get to sleep or stay asleep at night due to insomnia.

Many people have occasional nights where they do not sleep well. They may stay awake worrying, they may feel pressure and stress to complete certain tasks and lie awake thinking about them, they may have medical conditions or have eaten or drank something that caused them to stay awake longer than necessary, or they may continually awaken due to environmental noises that they cannot control. Occasional lack of sleep occurs in almost everyone; however, consistent lack of sleep due to insomnia can quickly cause problems associated with sleep deprivation and its effects on the physical and emotional condition of a person.

Insomnia occurs when an individual consistently has difficulties falling asleep, staying asleep once he or she has fallen asleep, waking up too much during the night, or generally having poor quality sleep and feeling as if he or she barely slept at all after a full night. Insomnia can develop for a number of reasons and is associated with certain illnesses and physical conditions. However, there are some people who develop insomnia that is unrelated to any other underlying disorder. Approximately 50 percent of cases of insomnia have no identifiable cause. There are many other conditions that can predispose a person to developing insomnia. Some conditions that may increase the risk include advancing age, substance use, menopause in women, gastroesophageal reflux, changes in body temperature due to illness,
altered hormone secretion or function, or other sleep disorders, including circadian rhythm sleep disorders [12].

People who suffer from insomnia may toss and turn much of the night in an effort to try and achieve sleep. They may fall asleep briefly but never truly feel as if they are getting restful and restorative sleep. Consequently, the person with insomnia may awaken and face the day without feeling refreshed or by having a decent night’s sleep. He or she may suffer from daytime fatigue, irritability, headaches, and difficulties concentrating. When going to bed at night, the affected person may still be unable to sleep despite feeling exhausted [12].

Insomnia can lead to mental health issues, most commonly anxiety and depression related to lack of sleep. Often, when insomnia occurs every night, the affected person may become more anxious as evening approaches. It can be very difficult to lie in bed awake while trying to get to sleep; if the situation has continued for many nights, anxiety may increase with worrying if another sleepless night will happen. Further, while lying awake, a person often feels anxious and worries about getting too little sleep to face the day. This further compounds anxiety and may make getting to sleep more difficult [12].

Insomnia may also be a cause of depression, although the cause-and-effect relationship between the two conditions is not always clear. Some people with chronic insomnia may be more likely to develop depression because they typically feel isolated when they cannot sleep and others can. They may feel as if no one else understands how difficult insomnia can be; truly, it can be difficult to understand insomnia from a person who normally has no trouble sleeping at all. A
person may also develop depression due to frustration at not being able to achieve sleep or not finding an appropriate treatment to resolve sleep deprivation.

Alternatively, people who suffer from depression often develop insomnia and have difficulties sleeping. The insomnia that occurs may happen because of pre-existing depression, and could be managed with treatment of depression through medications or other conventional means. Depression is so widely associated with insomnia that studies have shown up to 60 percent of people with insomnia also have depression [12].

Diagnosis of insomnia is made by taking a medical history, including any underlying medical conditions and the use of medications and substances, as well as performing a physical exam to measure vital signs and basal metabolic index (BMI). In some cases, the physician may order a sleep study if the patient’s history suggests the presence of another underlying sleep disorder. If the polysomnogram reveals another sleep disorder, the insomnia is often resolved with treatment of that disorder.

There are various approaches to treatment of insomnia. Some patients use medications to help them sleep and, while these may work, often a change in certain lifestyle factors can be even more successful. In some cases, lifestyle changes alone may be enough to promote sleep such that insomnia is resolved. Some patients also choose complementary and alternative therapies in an effort to reduce or resolve their insomnia.
Medications to induce sleep and treat insomnia include both prescription and over-the-counter varieties. Prescription sedative-hypnotics are often given by providers to improve sleep; these medications typically change the levels of neurotransmitters in the brain, which can induce drowsiness. A class of drugs known as non-benzodiazepine and benzodiazepine-receptor agonists are often prescribed because they have low levels of dependence among users and are less likely to be abused when compared to some other types of sleep medications. Examples of these medications include zolpidem (Ambien®) and eszopiclone (Lunesta®).

Other medications that are benzodiazepines may also be used for inducing sleep associated with insomnia, however, these drugs may be more likely to cause dependence and some people may take them inappropriately. They do have a depressant effect that can cause a person to fall asleep. Examples include temazepam (Restoril®) and triazolam (Halcion®) [12].

Some patients have success with using over-the-counter medications that may be either indicated for sleep or may have side effects that cause a person to feel sleepy. Non-prescription medications that could be used include pain relievers that contain extra sleep aids. People who experience difficulties sleeping because of increased pain often take these drugs, but they may also be used if insomnia is present and related to other factors. An example of this type of medication is diphenhydramine ibuprofen (Advil PM®). Additionally, using non-prescription drugs that have been designed for other purposes may also induce sleep because their side effects cause drowsiness. One of the most commonly used medications is diphenhydramine
(Benadryl®). Diphenhydramine is sometimes combined with other medications into a pill that is designed to be a sleep aid, [12] for example, acetaminophen diphenhydramine (Tylenol PM®) is marketed as a sleep aid, although the diphenhydramine is labeled for use in the treatment of allergies.

Changing certain lifestyle factors can make a big difference in treating insomnia and improving sleep. At times, some patients may be unaware that their choices and lifestyle habits are contributing to lack of sleep and through proper education and awareness, may be able to sleep better when making some changes in their routines. Patients should be encouraged to avoid taking naps during the day, especially closer to dinnertime in the evening when bedtime is approaching. Avoiding other activities and substances late in the day, such as alcohol, caffeine, and exercise, can all help a person to better “wind down” while getting ready for bed. Alcohol has an initial depressant effect but can later cause a person to awaken more, ultimately having the opposite effect. Caffeine acts as a stimulant, which can inhibit sleep and should be avoided while trying to get to sleep. Exercise is beneficial and should be done during the day to improve circulation and flexibility; however, exercise late in the day may cause a person to feel more awake and have difficulties sleeping when it comes time to go to bed.

Some people spend time working on computers or watching television in the evening before bed. Reducing or eliminating these activities can also help to promote sleep. The bright light from the screen often keeps the body awake longer and the person may have difficulties slowing down into a state of sleep after significant exposure to bright
light. This is why bright light therapy is sometimes used in the treatment of certain sleep disorders; the light stimulates the brain to believe that it is time to be awake and helps the person to get up. However, this has the opposite effect when used in the evening when a person is trying to go to sleep.

For some people with insomnia, it may also help to establish a solid bedtime routine, in which certain activities are performed each night that help to promote relaxation and restfulness. The bedroom should be designed as a place used only for sleep, and the person should not spend significant amounts of time in bed reading or working on a computer. The body may later have difficulties transitioning to sleep when the individual has already been in the same place and position for hours doing other activities. It may also help to have slow, soothing activities before bed, such as taking a bath or listening to soft music, which can help to slow down the pace of the day and may make a person feel relaxed and tired.

Finally, treatment and management of other disorders that may be contributing to insomnia can be extremely helpful in improving sleep for the affected person. For example, a patient who suffers from sleep apnea and who has concurrent insomnia may sleep much better when the sleep apnea is treated. Medical conditions that contribute to insomnia, such as gastroesophageal reflux or fibromyalgia, can be treated or managed using outside therapies and medications, which can further improve sleep when these situations are managed or resolved.
There are a number of options for the treatment of insomnia, which may depend on concurrent conditions. For people who struggle to sleep because of insomnia, talking to a healthcare provider and trying different methods of treatments and lifestyle changes can often improve sleep enough that a person feels more rested.

**Footnotes:**


47. Ramasamy, N. (2012, Mar.). *Why am I in such a bad mood?* Retrieved from https://www.flickr.com/photos/19204893@N00/6823657000/


