• Ensure proper sunscreen application when in or near water, snow, and sand as these environments can increase sunburn risk.
• 400 IU of vitamin D can be obtained daily and safely through a healthy diet that may include vitamin supplementation. Try to avoid getting vitamin D from the sun.
• Tanning bed use should be avoided. To obtain a tanned appearance, consider using a self-tanning product that does not require UV light exposure. Continue to use a proper sunscreen during exposure to sunlight.
• Perform skin checks annually. Report any skin changes or areas of concern to a health care provider.

It is important to look for a product that contains a sun protection factor (SPF) of at least 15 and that provides protection against ultraviolet A (UVA) and ultraviolet B (UVB) rays. Such sunscreens would include ingredients such as avobenzone, titanium dioxide, and/or zinc oxide. The American Academy of Dermatology states that the average person requires about 1 oz (1 oz = 29.57 mL) of sunscreen daily to cover the exposed areas of the body and that sunscreen should be applied at least 15 to 30 minutes before sun exposure. For more information and recommendations, visit the American Academy of Dermatology’s “Be Sun Smart” website.

Xerosis (Dry Skin)

Xerosis is an abnormal drying of the skin. It usually occurs during the winter months and tends to affect older people the most as the ability to retain water in the skin diminishes with age. The skin appears dry and itchy, and fine cracks may appear on the skin surface. Bleeding may occur if the cracks are severe. The skin may take on a gray appearance in persons with dark skin. Cracked skin may be a pathway for bacteria to enter the body, so it is important precautions are taken to avoid this.

Excessive exposure to water should be avoided. If hands are immersed in water daily, such as when washing dishes, gloves should be worn. When bathing, cool water should be used. The skin should be kept moist, and oil-based lubricants (i.e., ointments) are highly effective for this. Moisturizers that contain urea or lactic acid also provide great benefit. Topical anti-inflammatory agents, such as cortisone, may provide benefit if any inflammation exists.

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Further Readings

Websites
American Academy of Dermatology: http://www.aad.org

Sleep

All humans spend about one-third of their lives asleep. Despite the ubiquitous nature of sleep, the science of sleep is still in its infancy, though it is growing rapidly. Many studies have reported ways in which sleep is related to health and longevity; concurrently, research is showing that
problems with sleep can be ameliorated with behavioral and medical interventions. It is clear that while it is possible to have good sleep but be in poor health, it is difficult to have poor sleep and be in good health. Additionally, sleep is a health behavior, in that (a) there is a substantial behavioral component that is under voluntary control; (b) this behavior is related to overall health in much the same way as other health behaviors, such as diet and exercise; and (c) this behavior exists in a social and cultural context.

This entry introduces some of the basics of how sleep is regulated, how sleep can be disturbed, and how sleep disturbance affects health outcomes such as longevity, cardiovascular health, and mental health. Finally, some ways in which healthier sleep can be achieved are described.

Basics of Sleep

The internal drive to be awake or asleep is thought to be the result of 2 separate processes that interact. The homeostatic process, or sleep drive, increases the longer wakefulness is maintained, just as hunger is a drive that increases the longer one goes without eating. The circadian process follows a regular rhythm across the 24-hour day. Virtually every bodily process follows a circadian rhythm. The circadian pattern of wakefulness peaks late in the morning and is at its lowest point in the middle of the night. Whether an individual is awake or asleep at any given time is largely a reflection of the combination of these 2 processes.

During the night, sleep proceeds through a series of stages that repeat approximately every 90 minutes. The night usually begins in stage 1 (very light sleep), which then transitions to stage 2, followed by slow-wave sleep (SWS), the deepest state of sleep. The process then reverses, transitioning back up to stage 2 and then into rapid eye movement (REM) sleep. The process generally repeats throughout the night (stage 1 to stage 2 to SWS to stage 2 to REM and then back to stage 1 or 2). Stage 1 sleep is largely a transitional stage between wakefulness and sleep, and very little of the night is spent in this. Stage 2 sleep comprises the majority of the night’s sleep, and its primary roles may be related to blocking and/or processing sensory information. SWS, largely associated with sleep’s restorative functions, is found primarily during the first 1 to 2 sleep cycles and may be reduced in older adults. REM is associated with brain activity very similar to waking, and this is when dreams that have detailed plots, strong emotions, or bizarre elements usually take place. Unlike in other stages, during REM, the body is in a state of muscular atonia or paralysis.

Types of Sleep Disturbance

It is thought that humans need, on average, approximately 7 to 8 hours of sleep per night to be fully rested. Suboptimal sleep can occur in 2 main ways. First, there may be a reduction in the quantity of sleep, leading to sleep loss. This can refer to a total lack of sleep, or it can be a partial loss, occurring at the beginning of the night, during the night after sleep onset, or at the end of the night. Sleep loss can be a result of insomnia (a pathological difficulty in initiating or maintaining sleep), though it can be voluntary as well. This may be due to demanding schedules that do not leave sufficient time for sleep, difficulty unwinding and/or getting to bed as early as desired, or a mismatch between circadian rhythms and external demands. Second, the quality of sleep may be impaired. Sleep fragmentation refers to sleep that is interrupted frequently, though not necessarily for long periods of time. This could be a result of obstructive sleep apnea (a condition characterized by frequent reductions in breathing during the night), other sleep disorders, various medical conditions, or environmental factors. Other problems can also occur during sleep. For example, in the case of chronic pain or certain autoimmune diseases, sleep may be of poor quality, even though it is not interrupted. Also, less REM or SWS, which can result from medications and even normal aging, may reduce sleep quality.

Problems Associated With Poor Sleep

Poor sleep, whether too little or too much, fragmented or otherwise disturbed, is associated with a number of negative health outcomes. Many epidemiological studies over the past several decades have found that both short sleep (usually ≤6 hours) and long durations of sleep (≥9 hours) are associated with increased mortality risk. It is unclear how sleep duration shortens
life span, though several factors may play a role. These include cardiovascular disease, altered metabolism, impaired immune system, psychological factors (e.g., depression and stress), neurobehavioral performance deficits (which may increase accidents), and cancer. Current research is exploring these and other possibilities. A major problem with these studies is that they usually measure habitual sleep duration with a single survey question, without any objective or prospective sleep assessments; thus, self-reported sleep duration may better reflect time in bed rather than sleep.

Sleep is important for many physiological functions. For example, the secretion of a number of hormones is coupled to sleep and related circadian rhythms. These include melatonin, a physiological marker for night/dark; cortisol, a stress-related hormone; growth hormone, which is primarily secreted during SWS and can be altered with sleep deprivation; and hypocretin, otherwise known as orexin, a substance strongly implicated in activation and alertness. Other functions may also be affected by sleep, including secretion of metabolic, thyroid, and sex hormones.

In addition to the endocrine system, sleep-related processes seem to be particularly coupled with cardiometabolic health. Sleep loss has been associated with increased cardiovascular risk, including hypertension, high cholesterol, heart attack, and stroke, especially in women. Sleep deprivation and self-reported short sleep have been associated with impaired glucose tolerance and insulin resistance. In laboratory studies, sleep loss has also been associated with alterations in the hormones leptin and ghrelin, which signal hunger and satiety, as well as increased subjective hunger and appetite, especially for high-carbohydrate foods. Perhaps because of these relationships, self-reported short sleep duration has been linked to increased risk for development of type 2 diabetes.

Sleep loss is associated with a number of negative cognitive and psychological outcomes. Within the cognitive domain, many studies have demonstrated that sleep deprivation is associated with impaired sustained attention. Other aspects of cognitive functioning, including processing speed, motor functioning, working memory, and executive functioning, have all been shown to be affected by sleep loss, though impairments in these systems have been difficult to detect, presumably because individuals may maintain performance by recruiting additional brain resources. Although less studied, short-term sleep loss as well as habitual long and short sleep durations have been associated with problems such as depression and anxiety. Recent evidence suggests that interventions targeting sleep may have a profound impact on depressed moods in patients with clinically relevant depression.

## Getting Healthy Sleep

How much sleep do we need? Unfortunately, there are very few data available that addresses this question directly. Sleep deprivation studies show that young, healthy, 8-hour sleepers show significant performance deficits when forced to sleep 6 hours or less. This is complicated by the finding that certain people are more susceptible, whereas others are less susceptible to sleep loss—some people perform much worse, while some people still perform well. As mentioned above, epidemiological surveys suggest that sleeping ≤6 hours or >9 hours is associated with a number of negative health outcomes. Unfortunately, it is not known how these population studies translate to the individual level. Taken together, the available research suggests that sleep is very much like diet—getting too little or too much is bad for health, and getting a little less than you want is probably optimal.

Once the proper duration of sleep is achieved, often there is a problem of sleep quality. There are many factors that can improve sleep quality. One of the most profound of these is regularity of schedule. Keeping a regular bedtime and wake time, across all 7 days of the week, carries high stimulus value and can make sleep initiation and waking up much easier. Maintaining a regular bedtime/morning routine can enhance this effect.

It can also be important to remove significant barriers to sleep. These may exist in the sleep environment. Darkness can be achieved with heavy blinds or curtains, since even a small amount of light might disturb sleep. However, a room that is too dark may be dangerous if bathroom trips or other causes for getting out of bed are common at night. Sometimes, noise is unavoidable, and total quiet is unsettling for some people. In that case, a
fan or white-noise machine may create some repetitive, calming noise and drown out sounds. A cool bedroom is ideal because it facilitates the natural drop in core body temperature that accompanies sleep. Also, a comfortable mattress may have a significant effect on sleep quality. Other barriers to sleep quality include caffeine from coffee, tea, energy drinks, soda, chocolate, or other sources (which may affect sleep for ≥12 hours after consumption); alcohol (which helps with sleep initiation but often results in restlessness, early morning awakenings, and trips to the bathroom); nicotine (which may feel relaxing but can make sleep difficult); water (which may lead to trips to the bathroom); exercise close to bedtime (which may prolong sleep onset if vigorous exercise occurs too late in the day); heavy meals (which may cause heartburn or aggravate gastroesophageal reflux disease); and others. Finally, arguing and worrying, especially at night, can make sleep initiation difficult. It should be noted that the impact of each of these varies across people.

As mentioned earlier, a bedtime routine can dramatically improve sleep initiation difficulties. As part of this routine, it may be helpful to incorporate relaxation exercises, including diaphragmatic breathing, guided imagery, autogenic training, and progressive muscle relaxation. Mindfulness meditation may also be particularly helpful. Another important activity is taking time out during the day to make lists of all the things that one would normally be worried about when trying to sleep, so that they can be preemptively addressed.

Often, individuals with insomnia will note that they sleep better when away from home. This is a key indicator that there are elements in the sleep environment that are problematic. Often, this results in a pairing of the bed with lying awake, tossing, and turning. Although it is counterintuitive, staying in bed trying to sleep will make sleep more difficult. Often, when individuals remove themselves from the bed or bedroom when they are lying awake and return to bed only when sleepy and maintain this practice over weeks and months, a pairing of the bed and sleep is created, making sleep easier to obtain.

Many millions of Americans meet criteria for a clinically relevant sleep disorder, and these illnesses are often underdiagnosed. As mentioned earlier, this may have a profound impact on health and longevity. Individuals should be encouraged to talk to a health professional if they are having particular difficulty falling or staying asleep, if they are excessively sleepy during the day, or if they snore loudly. These are all indicators of treatable sleep disorders. There are many clinicians who have obtained specialized training in the diagnosis and treatment of sleep disorders. A number of empirically supported therapies have emerged that avoid the use of prescription medications. For example, cognitive-behavioral therapy for insomnia has demonstrated long-term outcomes superior to any medication currently on the market. Other nonmedication approaches to sleep disorders (which are collectively called behavioral sleep medicine) have demonstrated their utility. Medications also have their place in the treatment of sleep disorders; currently, medication interventions for insomnia, sleep apnea, narcolepsy, restless legs syndrome, and other sleep disorders have demonstrated efficacy and effectiveness.

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See also Sleep Deprivation and Immunity

Further Readings


