

by David C. Nieman, Dr.PH, FACSM

Q: Can exercise help me sleep better?

A: Yes, there is growing scientific evidence that regular exercise will help you sleep better. But let me emphasize that a good night's sleep is linked to many other factors to which you should pay attention.

The National Sleep Foundation reports that 74% of adults in the United States experience a sleeping problem a few nights a week or more, 39% get less than 7 hours of sleep each weeknight, and 37% are so sleepy during the day that it interferes with daily activities (1).

According to a report issued by the National Commission on Sleep Disorders Research, 30% to 40% of people in the United States have insomnia within any given year, defined by the National Institutes of Health as “an experience of inadequate or poor quality sleep” (2). Characteristics of insomnia include the following:

- difficulty falling asleep
- difficulty maintaining sleep
- waking up too early in the morning
- non-refreshing sleep
- daytime tiredness, lack of energy, difficulty concentrating, and irritability.

Lack of sleep leads to problems completing a task, concentrating, making decisions, and working with and getting along with other people, as well as unsafe actions (1). Sleep duration is related to length of life, with a greater risk of death in those sleeping fewer than 6 hours a night (3). Sleep deprivation is linked to approximately 100,000 vehicle crashes and 1,500 deaths each year (1). Insomnia early in adult life is a risk factor for the

development of clinical depression and mental health disorders (1).

A night's sleep consists of four or five cycles, each of which progresses through several stages (1). During each night, a person alternates between non-rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep. The entire cycle of NREM and REM sleep takes approximately 90 minutes. The average adult sleeps 7.5 hours (five full cycles), with 25% of that in REM. By age 70, total sleep time decreases to approximately 6 hours (four sleep cycles), but the proportion of REM stays at approximately 25%. Sleep efficiency is reduced in elderly individuals with an increased number of awakenings during the night.

In NREM sleep, brain activity, heart rate, respiration, blood pressure, and metabolism (vital signs) slow

down and body temperature falls as a deep, restful state is reached. The brain waves slow in NREM, a state termed “slow-wave sleep” by sleep researchers. Slow-wave sleep usually terminates with the sleeper changing position. The brain waves now reverse their course as the sleeper heads for the active REM stage.

In REM sleep, the eyes dart about under closed eyelids, and vivid dreams transpire that often can be remembered. The even breathing of NREM gives way to halting uncertainty, and the heart rhythm speeds or slows unaccountably. The brain is highly active during REM sleep, and overall brain metabolism may be increased above the level experienced when awake.

Getting a good night's sleep has proven to be a difficult goal for many people in this modern era.



YOU ASKED FOR IT



The National Sleep Foundation has published several guidelines for better sleep. Here are 10 guidelines for better sleep (1):

- Maintain a regular bed and wake time schedule, including weekends.
 - Establish a regular, relaxing bedtime routine such as soaking in a hot bath or hot tub and then reading a book or listening to soothing music.
 - Create a sleep-conducive environment that is dark, quiet, comfortable, and cool.
 - Sleep on a comfortable mattress and pillows.
 - Use your bedroom only for sleep and sex. It is best to take work materials, computers, and televisions out of the sleeping environment.
 - Finish eating at least 2 to 3 hours before your regular bedtime.
- Avoid nicotine (*e.g.*, cigarettes and other tobacco products). Used close to bedtime, it can lead to poor sleep.
 - Avoid caffeine (*e.g.*, coffee, tea, soft drinks, or chocolate) close to bedtime. It can keep you awake.
 - Avoid alcohol close to bedtime. It can lead to disrupted sleep later in the night.
 - Exercise regularly. It is best to complete your workout at least a few hours before bedtime.

Compared with those who avoid exercise, physically fit people claim that they fall asleep more rapidly, sleep better, and feel less tired during the day. These beliefs have been confirmed, and scientists have shown that people who exercise regularly do indeed spend more time in slow-wave sleep (4–6).

In a study conducted at Stanford University, physically inactive older adults were assigned to exercise or nonexercise groups for 16 weeks (5). Subjects in the exercise group engaged in low-impact aerobics and brisk walking for 30 to 40 minutes, 4 days per week. Exercise training led to improved sleep quality, longer sleep, and a shorter time to fall asleep. A year-long study of postmenopausal women showed that those exercising moderately in the morning for 3 to 4 hours per week had less trouble falling asleep compared with those exercising less (6).

So yes, exercise should help you sleep better. There is some evidence, however, that exercising and sweating

close to bedtime can have an adverse effect on sleep quality for both fit and sedentary subjects (1, 5, 6). This is why the National Sleep Foundation recommends avoiding heavy exercise late in the day.



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