Getting A COVID -19 Vaccine? How Sleep Can Optimize Its Effectiveness

This is a good time to talk about how sleep can affect the body's immune response to a vaccination.

March 6, 2021 By Michael Breus, PhD

Most of us are waiting for our turn to be vaccinated for Covid-19. I know there are a range of strong feelings and questions about the vaccines. Some people are excited and others are feeling more cautious, anxious, and wary.

This is a good time to talk about how sleep can affect the body's immune response to a vaccination. This is especially important information to know now, when so many people are struggling with their sleep during the pandemic. If you're anticipating getting a vaccine in the weeks and months ahead, NOW is the time to start working on getting more consistent, restful sleep, to prepare your immune system and optimize the vaccine's effectiveness.

How sleep affects immunity

Lack of sufficient, high quality sleep impairs the ability of the immune system to function at its best. Healthy sleep AND circadian rhythms are critical for strong, robust immunity.

Like sleep itself, the immune system is regulated by circadian rhythms, which direct the immune system's activity, including how and when it activates to defend against viruses, infectious bacteria, and other harmful pathogens that threaten the body's health. As a strong body of research shows, circadian rhythms help to program the immune system to respond swiftly and effectively to illness- and disease-causing threats, and to stand down when the threat has been neutralized—to avoid excessive and chronic inflammation that occurs when the immune system is dysregulated and in constant high-alert mode. When circadian rhythms are disrupted, immune function is compromised. Sleeping on a consistent routine, with regular bedtimes and waketimes, is one of the MOST important ways to keep circadian rhythms in sync, and the immune system functioning optimally.

Sleep itself affects how well the immune system operates. During sleep—particularly during deep, slow-wave sleep—the immune system strengthens its defenses, and this nightly restoration is critical to ongoing, long-term immune function. Studies show that short sleep (in many studies, that means sleeping less than 6 hours a night) is linked to compromised immunity, including:

- accelerated cellular aging and reduced longevity
- greater susceptibility to infections, including viruses
- chronic and systemic inflammation, a dysfunctional immune response that is a major contributor to chronic illness and disease
- weakened adaptive immunity—the ability of the immune system to recognize threats and respond specifically and effectively to them

How sleep affects vaccine response

Sleep influences innate immunity, the body's broad, front-line response to the presence of a threat. Sleep also affects adaptive, or acquired immunity, which occurs when the immune system recognizes and remembers a threat and launches a specific response to attack it. Vaccines are one important way that the body develops acquired immunity. Vaccines work in different ways, but ultimately their goal is to teach the body to recognize a specific threat—whether the flu virus or the coronavirus that causes Covid-19—and to produce antibodies that are targeted specifically at neutralizing that threat.

There are three main takeaways I want you to know about how your sleep can impact the effectiveness of a vaccine:

Sleep is connected to antibody production

An optimal vaccine response is one that produces plentiful antibodies to fight the specific infection being targeted. And research shows that short sleep is associated with the production of fewer antibodies in response to receiving a vaccine. Several studies, including ones examining vaccination responses to flu, Hepatitis A and Hepatitis B, have linked short sleep to lower antibody production.

Longer sleep amounts, which give more time for immune-boosting, slow-wave sleep, are associated with higher antibody production in response to vaccination. In some studies, longer sleep duration is linked to a 50% boost in antibody production after a vaccine.

Sleep before AND after vaccination affects effectiveness

Research shows that in order to optimize the effectiveness of a vaccine, it's important to sleep well ahead of getting the vaccine and after you receive it.

This 2020 study found that the amount of sleep patients received prior to receiving a flu vaccine was linked to antibody response for months afterward. Shorter sleep duration in patients on the two nights prior to vaccination was associated with the production of fewer antibodies at one month and four months after vaccination.

Research also indicates that lack of sleep on following an immunization reduce antibody

production. And research of a multi-dose vaccination series (for Hepatitis B) found that short sleep was linked to the production of fewer antibodiesafter the first immunization, and to a lower likelihood of being clinically protected from the virus at the end of the vaccination series

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Many of us are likely to receive a Covid-19 vaccine that comes in two parts, spaced weeks apart. The research of sleep and vaccination response tells us that sleeping well throughout the vaccination period, and beyond, may help boost the body's virus-fighting response.

Sleep duration is key to optimizing vaccine response

Most of the research linking better sleep to a more robust vaccine response indicates that it's the duration of sleep that's key to getting the most protection from vaccines. That's not to say that the quality of your sleep doesn't matter. Sleep quality always matters. But in order to maximize vaccine effectiveness, it's not enough to sleep soundly for a handful of hours. The duration of nightly rest—for most adults, in the range of 7 hours a night, allowing for plenty of restorative slow-wave sleep—appears to be critical to enabling the immune system to respond robustly to immunization.

Stress can inhibit the effectiveness of vaccines—and hurt sleep

You've seen me write frequently, this year in particular, about the close relationship between stress and sleep. A lot of us are under heavy stress right now and have been for months. Stress, and the loneliness of social isolation and the prolonged disruption of normalcy in our daily lives, is taking an especially heavy toll on sleep.

There's a body of research showing that psychological stress undercuts vaccine response and lowers the production of antibodies. Loneliness and lack of social support are linked to reduced effectiveness of vaccines as well.

(Here's where you can read more about how loneliness interferes with sleep and health.)

On the other hand, optimism and a positive mood—including on the day of vaccination, are linked to a stronger adaptive response by the immune system and higher antibody production. Strong social support is associated with a greater effectiveness of vaccines, too.

Every action you take right now to calm your mind and body, reduce stress, and strengthen your social connections may enhance your body's adaptive response to receiving the Covid-19 vaccine. You'll sleep better, too, further enhancing the protection that the vaccine delivers.

I've written about the widespread challenges to sleep and psychological health during the pandemic, and how to address those challenges, including:

- Recommitting to the fundamentals of sleep hygiene and an optimal sleep environment
- Adopting a pandemic sleep and productivity routine that fits your individual chronotype
- Limiting your exposure to sleep disrupting, melatonin-inhibiting light from your smartphone

- Talking with your doctor about adding supplements for sleep and stress to your daily routine—and how to use natural sleep and stress aids for their maximum benefit

We're not out of the woods yet, but there's real light at the end of this long tunnel. Right now, simple steps every day to improve your sleep can make a real difference in how your body goes to work to protect you from Covid.

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