Factors That Can Impact Immunity

The body's response to infection can be improved by incorporating lifestyle changes one step at a time.

By Matthew D. Hansen, DPT, MPT, BSPTS

MANY FACTORS CAN impair immunity, some of which are beyond our control or the full understanding of the scientific world. However, the effectiveness of the body's defenses against disease is a spectrum that may be impacted by several key factors influenced by healthy living habits. Therefore, those who live with compromised immune systems should not sell themselves short by thinking there isn't anything they can do to stop infection. There are always things people can do to better help keep germs out and to improve the body's response to a contagion.

Handwashing and Sanitization

Though not technically a factor that affects immunity directly, proper handwashing, as reported by the Centers for Disease Control and Prevention (CDC), is the most effective action individuals can take to reduce the spread of infectious diseases. While this should be a no-brainer, it's amazing how many different germs people are exposed to in an average day. It's also astonishing how many people don't wash their hands when or how they should.

Many studies have been conducted on handwashing during the last two decades, and sadly, the results are very similar. Anywhere between 10 percent and 35 percent of subjects surveyed or directly observed didn't wash their hands at all after using the bathroom!

One study conducted at Michigan State University observed more than 3,700 people after using public restrooms. Of all studies conducted on handwashing, the Michigan State findings demonstrated among the highest compliance rates for subjects at least making a token washing of their hands. That's what one might expect of a higher-educated population, right? The study found "only" 7 percent of women and 15 percent of men did not wash their hands after using the bathroom. However, a closer look at the results reveals just 50 percent of men and 78 percent of women used soap. The average handwashing time: 6 seconds! Only 5 percent of people washed their hands long enough to kill infectious germs.[1] Surveys have demonstrated that even fewer people self-report washing their hands before preparing and eating food, and after handling money and performing other activities that involve high exposure to microbes than they do after using the bathroom.

My brother and I used to think my Aunt Diane was paranoid for always opening public doors with a clean tissue or with her sleeve. I chuckled at the comedian Howey Mandel for refusing to shake someone's hand and fist bumping instead, thinking maybe it was part of his bit. But, my wife and I began modeling both Diane's and Howey's behavior a long time ago, and we insist our kids do the same. I'll still shake hands or give a high five, but as soon as I can discreetly sanitize my hands afterward, out comes the bottle, and I'm very careful not to touch my eyes, nose or mouth — or anything that could come in contact with them — in between.

CDC indicates it takes 15 seconds to 20 seconds of vigorous handwashing to effectively kill germs. The proper way to wash is to wet the hands with clean running water and apply soap. The hands should be rubbed together to make a lather and scrubbed well, including between the fingers, under fingernails and the back of hands. You may have heard the suggestion to sing the "Happy Birthday" song twice (with a regular rhythm) to assure sufficient time. After you're done washing, rinse hands under running water and dry with a clean towel or air dryer (damp hands are much more likely to spread bacteria).[2] I usually use my knuckles to turn the paper towel dispenser if it isn't automatic. I do the same, or use my elbow, to press public elevator buttons.

Other universal precautions that should be considered in addition to handwashing, particularly if someone with a compromised immune system is around others who they suspect to be infectious or if they are infectious, include wearing medical gloves and/or a face mask.

Stress

If reducing stress were only as simple as handwashing, would we do it? According to the American Psychological Association, 75 percent of Americans reported experiencing at least one symptom of stress in the past month.[3] When stressed, individuals' adrenal glands produce hormones called adrenaline and cortisol. These hormones have many effects on the body to help it prepare for a fight-or-flight response. The short-term response on the immune system is actually a boost for three to five days. However, if people persist in worrying about the stressor, even after the immediate concern may have resolved, the cortisol begins to interfere with the number of T cells and white blood cells produced by the body, which then affects the efficiency of the body's immunological response.

CDC indicates it takes 15 seconds to 20 seconds of vigorous handwashing to effectively kill germs.

Studies have demonstrated that subjects exposed to stress are more susceptible to colds and other infections. Stress itself does not actually make people sick; however, when it compromises the immune system, that person is likely to get sick more often and take longer to recover. In addition to this direct impact on the body's immune response, stress can influence other factors (e.g., sleep patterns, nutrition and activity levels) that, in turn, can distress the immune system as well.

Individuals should find activities that help to reduce stress, and learn how and where to apply them as needed. Activities can include exercising, walking/hiking, meditating or performing

yoga, praying, listening to music, writing in a journal or art — anything that works in a pinch that they can look forward to in order to decompress.

Sleep

Experts generally agree that the optimal amount of sleep for adults is seven hours to nine hours per night. However, according to a widely referenced 2013 Gallup Poll, 40 percent of respondents received less than the minimally recommended seven hours.[4] CDC published similar findings in 2016 from a review of collected data that indicated "a third of American adults are not getting enough sleep on a regular basis."[5]

> A plethora of suspected environmental factors affect people's immune responses.

According to Eric J. Olson, MD, of the Mayo Clinic, studies show people who don't get quality sleep or enough sleep are more likely to get sick after being exposed to a virus such as a common cold virus. Lack of sleep can also affect how fast you recover if you do get sick.[6] These studies have shown sleep deprivation may decrease the production and release of small protective proteins called cytokines that are needed to combat infection and inflammation. Additionally, infection-fighting T cells are reduced, as is their ability to attach to infected cells during periods when people don't get enough sleep.

As with stress, there are a number of motivators for someone experiencing poor sleep; however, given the fact that the average amount of sleeping has dropped by one-and-a-half hours to two hours over the past century, it would suggest many of the problems are self-induced. Video games and binge-watching shows were not pastimes 100 years ago. In fact, before the electric age, people tended to retire for the night and rise in the morning with the sun, or soon after. Trying to go to bed and wake up at the same time every day is still a good practice.

Getting rid of distractions and practices that could interrupt sleep are also important. For instance, the bedroom should be comfortable, dark and as quiet as possible. That might mean having to address concerns with a bed partner who snores or grinds his or her teeth. It almost definitely means there shouldn't be a TV or computer on in the room, even if the volume is muted. Some people can't take caffeine any time after noon, or they find it difficult to sleep at night at a reasonable time if they take a nap after a certain hour.

If people still can't sleep due to insomnia or other health complications, they should meet with their physician or other healthcare specialist to consider their options such as prescribed or over-the-counter medications and relaxation or cognitive behavioral therapy techniques.

Environmental Factors

A plethora of suspected environmental factors affect people's immune responses, and an army of research is seeking to confirm or refute those factors' role. What can definitively be said is the prevalence of many medical diagnoses associated with the immune system is increasing.

Although we know genes play a role in many of these diseases, not all have been proven to have a genetic link. What's more, it appears the disease process in some genetically susceptible people may still be triggered — or at least exacerbated — by environmental factors. In this context, environment includes the air people breathe, what people take into their bodies, the industrial chemicals that surround people and other potential hazards that people are exposed to as part of daily life in modern society.

There are many hypotheses regarding the consequences of air pollution, processed foods, plastics, contaminated water and other possible environmental offenders, but the purpose here is not to elaborate on theories, as convincing as some of them may be. Instead, individuals should conduct their own research, paying close attention to the sources of information. Oftentimes, many of the articles available on the Internet are sponsored, if not commissioned, by legal groups heading class action lawsuits, or other factions that may possess a bias.

Though the exact consequences of many environmental risk factors may not be well-established, there are some that are. The hazards of smoking and, to a lesser degree, second-hand smoke are well-known. The government website www.smokefree.gov states that the high levels of tar and other chemicals in cigarettes can make the immune system less effective at fighting infections and leave it more susceptible to acquiring autoimmune diseases.

Nutrition and Supplements

Many people are under the impression that at the first inkling of feeling sick, they can pop a vitamin C with 1,000 percent of the recommended dietary allowance (RDA) or some other special supplement to nip a cold in the bud. Though the placebo effect can be a factor in feeling better, the Cleveland Clinic maintains, "A truly healthy immune system depends on a balanced mix of vitamins and minerals over time. With some exceptions, it's best to get your vitamins and minerals from your food rather than in pill form."[7] Vitamins and other natural elements important to preventing and fighting infection include vitamins C, E, B6, A and D, folate, iron, selenium, zinc and protein.

Multivitamins and other vitamins certainly have a place, but guess where most of the 900 percent excess in RDA often goes if the body is already at capacity? I'm weary of high-priced supplements that claim to be superior because they have a proprietary formula. I also warn people they should become familiar with the origination and quality of their supplements because some have been demonstrated to not include what they say they contain, or they are contaminated with other ingredients.

If there's one common ingredient individuals should try to ingest less of on behalf of their immune systems and other bodily functions, it's refined sugar. Sugar provides fuel for bacteria, fungi and yeast. When white blood cells are exposed to sugar in high levels, their ability to fight bacteria decreases. Sugar also depletes vitamin C and B vitamins in the body, triggers inflammation, raises cortisol (see discussion on stress), and can lead to insulin resistance and type 2 diabetes, impairing the immune system further.

Unfortunately, many foods high in refined sugar are also low in nutrients needed for the immune system. People shouldn't be fooled by marketing ploys that try to make sugar sound healthy (e.g., organic cane juice, agave nectar, palm sugar). These sugars are broken down in the body essentially the same as table sugar. Agave, often pitched as a healthier alternative to sugar, is up to 90 percent fructose, which can be metabolized only in the liver. High fructose intake can lead to diabetes and other complications.[8]

Exercise

If you've read any of my other articles, you know that exercise is one of my favorite topics. According to the government website www.medlineplus.gov, we do not know exactly if or how exercise increases your immunity to certain illnesses, because none of the theories have yet been proven. We do, however, understand that exercise helps to decrease stress hormones (e.g., cortisol), improve sleep, increase general fitness and generally help participants feel better about themselves and life.

One Step at a Time

In fact, that's the best part about all of this information. Science is finding that if something is good for the immune system, it usually has far-reaching implications for well-being too. So, people shouldn't give up on the influence they can have on their health. Sometimes it doesn't start with healthy, but healthier. Healthy living takes time, but it's something everyone can start or continue to do one step at a time.

MATTHEW DAVID HANSEN, DPT, MPT, BSPTS, is a practicing physical therapist in Utah and president of an allied healthcare staffing and consulting agency named SOMA Health, LLC. He completed his formal education at the University of Utah, Salt Lake City, and has additional training in exercise and sports science, motor development and neurological and pediatric physical therapy.

References

1. Borchgrevink, CP, Cha, J, and SeungHyun, K. Handwashing Practices in a College Town Environment. *Journal of Environmental Health*, 75(8), 18-24. Accessed at msutoday.msu.edu/_/pdf/assets/2013/hand-washing-study-1.pdf.
2. Centers for Disease Control and Prevention. When & How to Wash Your Hands. Accessed at www.cdc.gov/handwashing/when-how-handwashing.html.
3. American Psychological Association. Stress in America: The State of Our Nation. Stress in America Survey, Nov. 1, 2017. Accessed at www.apa.org/news/press/releases/stress/2017/state-nation.pdf.
4. Jones, JM. In U.S., 40% Get Less Than Recommended Amount of Sleep. Gallup News, Dec. 19, 2013. Accessed at news.gallup.com/poll/166553/less-recommended-amount-sleep.aspx.
5. Centers for Disease Control and Prevention. 1 in 3 Adults Don't Get Enough Sleep. Accessed at www.cdc.gov/media/releases/2016/p0215-enough-sleep.html.
6. Olson, EJ. Lack of Sleep: Can It Make You Sick? Mayo Clinic, Nov. 28. Accessed at www.mayoclinic.org/diseases-conditions/insomnia/expert-answers/lack-of-sleep/faq-20057757.
7. Kirkpatrick, K. 8 Vitamins and Minerals You Need for a Healthy Immune System. Cleveland Clinic, Jan. 15, 2015. Accessed at health.clevelandclinic.org/eat-these-foods-to-boost-your-immune-system.
8. Max Living. How Sugar Affects the Immune System, Sept. 13, 2018. Accessed at maxliving.com/healthy-articles/how-sugar-affects-your-immune-system.