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Insomnia Linked to Increased Risk for Heart Disease

Analysis by Dr. Joseph Mercola | October 27, 2023

STORY AT-A-GLANCE

- Research shows genetic predisposition to insomnia is associated with a significantly higher risk of coronary artery disease, heart failure and ischemic stroke, but not atrial fibrillation
- Frequent or chronic insomnia is strongly associated with an increased risk of high blood pressure, a precursor and risk factor for heart disease
- Compared to those getting seven to eight hours of sleep on a regular basis, those who sleep less are 27% more likely to have subclinical atherosclerosis
- Mechanisms by which insomnia or poor sleep affects your heart health include hypothalamic-pituitary axis dysregulation, increased sympathetic nervous system activity, abnormal modulation of the autonomic nervous system, increased atherogenesis and increased systemic inflammation
- While short sleep duration (typically less than six hours) is considered distinct from insomnia, it appears that too little sleep, whether due to insomnia or not, can have similar effects, and that when insomnia and short sleep duration occurs together, they may have an additive effect on CVD risk

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Sleep deprivation has the same effect on your immune system as physical stress or illness,[1] which may help explain why lack of sleep is tied to an increased risk of numerous chronic diseases,[2] including heart disease. For example, research[3] has shown

frequent or chronic insomnia is strongly associated with an increased risk of high blood pressure, a precursor and risk factor for heart disease.

According to the Mayo Clinic,[4] "People who sleep five hours or less a night may be at higher risk of developing high blood pressure or worsening already high blood pressure."

Other evidence showing the importance of sleep for heart health includes research looking at heart attack frequency following daylight saving time.[5] Findings published in 2008[6,7] and 2013[8] found heart attack incidence rises by approximately 10% following the time change to DST, and falls by the same amount right after the switch back to standard time (when you gain an hour).

Lack of Sleep Linked to Increased Risk of Atherosclerosis

Compared to those getting seven to eight hours of sleep on a regular basis, those who sleep less are 27% more likely to have subclinical atherosclerosis (the early stages of hardening and narrowing of the arteries), according to a 2019 study[9] published in the Journal of the American College of Cardiology.

They also found that sleep quality makes a big difference, as those who had the most fragmented sleep were 34% more likely to have signs of subclinical atherosclerosis, compared to longer sleepers.

At the subclinical level, atherosclerosis is in the early stages and may not yet be causing any symptoms. It's also possible to reverse the progression at this stage, such that heart disease may be prevented. Toward this end, proper sleep may be crucial. In a statement, senior study author José M. Ordovás, Ph.D., said:[10]

> *"[T]his study emphasizes we have to include sleep as one of the weapons we use to fight heart disease — a factor we are compromising every day. This is the first study to show that objectively measured sleep is independently associated with atherosclerosis throughout the body, not just in the heart."*

Insomnia Raises Risk of Heart Disease and Stroke

Additional support for the sleep-heart disease risk hypothesis was published in the August 2019 issue of the journal Circulation,[11,12,13,14] which examined data from 1.3 million participants in a novel effort to ascertain whether insomnia is a causative trigger of cardiovascular disease (CVD) and stroke, or a mere correlation (as correlation does not imply, let alone prove, causation[15]).

To do that, they looked at genetic predispositions to insomnia. To reduce bias, the researchers also took into account genetic variations associated with risk factors for coronary artery disease, heart failure, atrial fibrillation (irregular heartbeat) and ischemic stroke, in addition to looking at single-nucleotide polymorphisms (SNPs) associated with insomnia.[16]

In the end, they concluded that, indeed, genetic predisposition to insomnia was associated with a significantly higher risk of coronary artery disease, heart failure and ischemic stroke. However, no association was found for atrial fibrillation.

For stroke, genetic predisposition to insomnia was associated with a 13% increased risk of larger artery stroke, an 8% higher risk of small vessel stroke, and a 6% increased risk of cardioembolic stroke.[17,18] AJMC.com writes:[19]

> *"Lead study author Susanna Larsson, PhD, associate professor of cardiovascular and nutritional epidemiology at the Karolinska Institutet, emphasized that 'sleep is a behavior that can be changed by new habits and stress management.'*
>
> *By changing habits to ameliorate insomnia severity, individuals can subsequently lower their risk for CVDs and subtypes of stroke. 'It's important to identify the underlying reason for insomnia and treat it,' said Larsson. As insomnia affects 30% of the general population, further studies are needed to assess insomnia relation to CVDs and stroke."*

Genetic Predisposition for Insomnia May Raise CVD Risk

Michael Holmes, an associate professor at the University of Oxford, who was not involved in the study, commented on the results to The Guardian:[20]

> *"This study doesn't allow us to conclude that insomnia causes cardiovascular disease. Rather, all we can say is that individuals carrying genetic variants linked to a higher risk of insomnia also have a higher risk of cardiovascular disease."*

The Guardian also spoke with professor Jeremy Pearson, associate medical director at the British Heart Foundation, who stated that:[21]

> *"People who suffer from insomnia or disturbed sleep are often at increased risk of coronary heart disease — the leading cause of a heart attack.*
>
> *But it's hard to know whether there's a direct connection or if this is down to other behaviors that are common among people who struggle to sleep, such as a poor diet or living with high blood pressure.*
>
> *This study suggests that people whose genetic makeup predisposes them to insomnia also have a slightly increased risk of coronary heart disease. If this connection is proven in further research, it could pave the way for more precise ways of lowering the risk of heart disease in people who suffer from insomnia."*

Why Poor Sleep Threatens Your Heart Health

A 2017 scientific review[22] of the available evidence presents a few possible mechanisms by which insomnia or poor sleep affects your heart health, the top ones being:[23]

- Hypothalamic-pituitary axis dysregulation (which not only increases your risk of CVD but also insulin resistance, diabetes, anxiety and depression)
- Increased sympathetic nervous system (SNS) activity (which increases cortisol release and other hormones associated with hyperarousal, especially

adrenocorticotropic hormone)

- Abnormal modulation of the autonomic nervous system
- Increased atherogenesis (identifiable through elevations in inflammatory markers such as **C-reactive protein**, tumor necrosis factor-alpha and interleukin 6)
- Increased systemic inflammation

To this I would add that poor sleep is also associated with an increased risk for insulin resistance, and this is yet another mechanism by which insomnia can affect your risk of heart disease. According to this 2017 review:[24]

> *"In the past decade there has been increasing evidence associating insomnia with hypertension, coronary heart disease (CHD), and heart failure (HF), as well as subclinical cardiovascular disease (CVD) and CVD mortality.*
>
> *Because of the wide variations in how insomnia is defined and measured, however, there are conflicting data, and caution must be exercised when comparing studies and interpreting results. Nonetheless, the existing data suggest that insomnia is an important risk factor for CVD …*
>
> *Studies … demonstrate increased SNS activity, with elevated levels of plasma and urine norepinephrine in both short sleepers and those with insomnia compared with normal control subjects, as well as increased heart rate and altered or blunted heart rate variability, reflecting underlying autonomic dysregulation.*
>
> *SNS activity is an integral part of cardiovascular homeostasis and plays a critical role in the pathogenesis of HTN, arrhythmias, CHD, and HF."*

The paper[25] also points out that while short sleep duration (typically less than six hours) is considered distinct from insomnia, it appears that too little sleep, whether due to insomnia or not, can have similar effects, and that when insomnia and short sleep duration occurs together, they may have an additive effect on CVD risk.

Other Consequences of Insufficient Sleep and Insomnia

While the evidence linking lack of sleep to poor heart health is strong, heart disease is by far not the only health risk posed by insufficient sleep and insomnia.

Sleep also affects gene expression, hormone regulation and brain detoxification, just to mention a few, which further strengthens its importance for general health and longevity. Other health problems linked to insufficient sleep include but are not limited to:

Increased risk of neurological problems, ranging from depression to Alzheimer's disease[26] **—** Your blood-brain barrier becomes more permeable with age, allowing more toxins to enter.[27]

This, in conjunction with reduced efficiency of the glymphatic system due to lack of sleep, allows for more rapid damage to occur in your brain and this deterioration is thought to play a significant role in the development of Alzheimer's.[28]

Increased risk of Type 2 diabetes — In one historical cohort study,[29] published in 2017, patients with insomnia were on average 16% more likely to develop Type 2 diabetes compared to those who slept well. The risk was most significant among those under the age of 40, in whom the adjusted hazard ratio was 31%.

What's more, the risk rose exponentially over time. In those struggling with insomnia for less than four years, the risk for diabetes was 14%, but rose to 38% when insomnia persisted between four to eight years, and 51% when lasting longer than eight years.

Increased risk of obesity.[30]

Increased risk of osteoporosis — As noted in a 2018 medical review,[31] "the quality of sleep is an important factor in the development of osteoporosis. Certainly, it is expected that there are hidden important links between sleep and osteoporosis, and there are effective mechanisms that can break the vicious cycle between the two."

According to this review, possible causative factors linking insomnia to bone mass deficits include hypothalamus-pituitary-adrenal axis dysregulation, SNS activation and hormonal influences.

Increased risk of pain and pain-related conditions such as fibromyalgia — In one study, poor or insufficient sleep was the strongest predictor for widespread pain in adults over 50.[32]

Increased susceptibility to stomach ulcers — As explained in a 2013 study[33] looking at people with sleep apnea, a sleeping disorder that results in highly fragmented sleep:

> *"Patients with sleep apnea sustain cessation of breath during sleep, leading to intermittent hypoxia, systemic inflammation and sympathetic activation. These insults are not only be a threat to cardiovascular system but can also contribute to damage to the gastrointestinal mucosa and hence initiation or progression of peptic ulcers.*
>
> *In a very large study of nearly 35000 patients from Taiwan, patients with sleep apnea experienced 2.4 fold higher risk for peptic ulcer bleeding. This may warrant surveying for sleep apnea as a potential predisposing factor in patients with peptic ulcer bleeding and without any apparent risk factors."*

Impaired sexual function.[34]

Increased risk of depression and anxiety (including post-traumatic stress disorder), schizophrenia and suicide — In fact, according to professor Matthew Walker, Ph.D., founder and director of the University of California Berkeley's Center for Human Sleep Science and author of "Why We Sleep: The New Science of Sleep and Dreams," researchers have been unable to find a single psychiatric condition in which the subject's sleep is normal.[35]

Premature aging.[36,37,38]

Increased risk of dying from any cause — In one study,[39] persistent but not intermittent insomnia was associated with a 58% increased risk of all-cause mortality and cardiopulmonary mortality, primarily caused by increased systemic inflammation levels.

How to Improve Your Sleep

The good news is that small adjustments to your daily routine and sleeping area can go a long way to ensure uninterrupted, restful sleep and, thereby, better health. I suggest you read through my full set of **33 healthy sleep guidelines** for more in-depth guidance, but to start, consider implementing the following changes to promote more shut-eye:

Avoid watching TV or using your computer in the evening, at least an hour or two before going to bed — Electronic devices emit blue light, which tricks your brain into thinking it's still daytime. Normally, your brain starts secreting melatonin between 9 p.m. and 10 p.m., and these devices emit light that may stifle that process.

If they cannot be avoided, consider installing software that automatically dims your monitor or screens in the evening, such as Iris,[40] or wear blue-blocking eyeglasses.

Get some sun in the morning, and at least 30 minutes of midday sun exposure — Your circadian system needs bright light to reset itself. Ten to 15 minutes of morning sunlight will send a strong message to your internal clock that day has arrived, making it less likely to be confused by weaker light signals during the night. Also, if you work indoors, make a point to get outdoors for at least a total of 30 to 60 minutes during the brightest portion of the day.

Sleep in total darkness — Even the slightest bit of light in your bedroom can disrupt your pineal gland's melatonin production. I recommend covering your windows with drapes or blackout shades, or using an eye mask.

Install a low-wattage yellow, orange or red light bulb if you need a source of light for navigation at night — Light in these bandwidths does not shut down melatonin production in the way that white and blue bandwidth light does. Salt lamps are ideal for this purpose.

Make sure your bedroom is cool enough for sleep — While there's no set consensus as to what temperature will help you sleep best, temperatures above 75 degrees F. (too hot) and below 54 degrees F. (too cold) tend to interfere with sleep.[41]

Avoid electromagnetic fields (EMFs) in your bedroom — EMFs can disrupt your pineal gland and its melatonin production, and has many other negative biological effects as well. Ideally, turn off your wireless router while sleeping, keep cellphones out of the bedroom unless they're in airplane mode, and trade your electric alarm clock for a battery driven one.

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