

How Loud Noises Can Lead to Heart Attacks

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✓ Fact Checked

May 26, 2022

STORY AT-A-GLANCE

- › Data from Rutgers Robert Wood Johnson Medical School showed that people living in urban areas near busy streets or under flight paths have a higher risk of a heart attack that can't be blamed on other health conditions or air pollution
- › Short- and long-term exposure to air pollution also raises the risk of cardiovascular disease and it can exacerbate existing heart conditions. Nearly double the number than previous estimates are dying from air pollution and 80% of those are from heart disease
- › Noise pollution also affects sleep quality and creates psychological stress that lowers productivity, interferes with concentration and increases the number of people taking anti-anxiety medication
- › Children exposed to chronic noise pollution have a difficult time learning and the excess noise is associated with decreased measures of cognitive function, memory, depression and verbal and nonverbal learning

Pollution comes in several different forms. While the health effects of air and water pollution have been well studied over the last several decades, researchers have only begun to delve into the health effects of noise and light pollution on humans and the environment. A study presented at the American College of Cardiology Annual Scientific Session in 2022 revealed data that blames noise pollution on 1 in 20 heart attacks.¹

At the most basic level, noise pollution is sound in the environment that has potential health effects on sleep, hearing damage and stress levels. Sources of environmental

noise pollution can include construction, vehicles, aircraft and industrial sounds like generators, compressors and train station traffic.

Whether the noise comes from natural sources such as cicadas or birds, or human activity such as vehicle traffic, it is still noise. Most people often overlook noise pollution as a health hazard. One review² published in 2017 found that noise pollution is a major problem in urban areas, and while it is more widespread than in past years, the writers anticipated it would continue to grow in severity and magnitude related to several factors.

Industrial growth, transportation, population growth and urbanization all contribute to noise pollution that has a direct and cumulative effect on health. The paper compares the adverse effects on health to those caused by chronic stress. The writers concluded, "People have the right to choose the nature of their acoustical environment; it should not be imposed by others."³

Noise Pollution Raises Risk of Heart Attacks

Scientists from Rutgers Robert Wood Johnson Medical School⁴ asked the question if people who live in urban areas near busy roads, trains or under flight paths would have a higher risk of heart attacks that could not be blamed on personal health issues or air pollution.

The researchers gathered data from nearly 16,000 patients who were hospitalized in 2018 for a heart attack in New Jersey. They used the patient's home address to calculate the daily noise level at home. The group was separated into those who lived in areas where there was a high level of transportation noise with an average of 65 decibels or higher and those who lived in areas with exposure to low noise levels at an average of 50 decibels or less.

Decibels are the unit of measurement that describes how loud a sound is. To put this into perspective,⁵ breathing is measured at 10 decibels and described as being barely

audible, while a jet taking off at 25 meters (27.3 yards) from the individual is 150 decibels, which can rupture an eardrum.

Sounds⁶ that are 65 decibels and above start with normal conversation and laughter and moves louder to vacuum cleaners, hairdryers, dishwashers and washing machines that measure 78 decibels. Sounds that are 50 decibels and lower start with a quiet office and reduce in intensity to a refrigerator humming or a whisper at 30 decibels.

When the data were analyzed, the researchers found that the heart attack rate of people who lived in places where they were routinely exposed to noise at 65 decibels and louder had a 72% higher chance of a heart attack as compared to those who lived in areas where the noise level measured 50 decibels and lower.⁷

When the data were extrapolated, the heart attack rate was 3,336 heart attacks per 100,000 people (3.3%) in areas with higher noise levels as compared to 1,938 heart attacks per 100,000 people (1.9%) in quieter areas. Their data showed that exposure to high levels of noise was associated with approximately 5% of all heart attacks experienced in busy cities.

This data supports past studies that have demonstrated similar results. One 2016 study⁸ engaged 5,223 people and found those with hearing loss from being around loud sounds had a greater risk of heart problems. A 2018 study⁹ made a link between transportation noise and a higher risk for heart attack, high blood pressure, stroke and heart failure.

Another study¹⁰ showed individuals who are exposed to higher levels of noise had greater activity in the amygdala and an increase in harmful inflammation in blood vessels. Researchers then went on to look at participants in the study who had heart attacks, strokes, chest pain or blocked arteries and found those who had been around loud noise had more heart problems.

Abel Moreyra, a professor in the division of cardiology at Rutgers commented on the featured study:¹¹

"When people talk about pollution, they're usually talking about particles in the air or water. But there are other forms of pollution, and noise pollution is one of these. As cardiologists, we are used to thinking about many traditional risk factors such as smoking, hypertension or diabetes. This study and others suggest maybe we should start thinking about air pollution and noise pollution as additional risk factors for cardiovascular disease."

Cardiovascular Risk Also Rises With Air Pollution Levels

Air pollution is an insidious problem that does not recognize borders and can travel thousands of miles. One collaborative effort of more than 40 researchers who analyzed data from 130 countries called air pollution the "largest environmental cause of disease and premature death in the world today."¹²

Fine particulate matter measures 2.5 microns or less in width. To put this into perspective, there are 25,000 microns in 1 inch and PM2.5 particles are about 30 times smaller than a human hair.¹³ Particles this size can pass through lung tissue and enter your bloodstream, which in turn triggers chronic inflammation and chronic disease.

Once PM2.5 is in the body it can deposit in any organ system and has been linked to inflammation leading to cardiovascular disease,¹⁴ obesity,¹⁵ chronic obstructive pulmonary disease¹⁶ and cancer.¹⁷

According to Jeff Schussler of Baylor Scott & White Health, "Half of the people that are going to die in America are going to die of cardiovascular disease. That includes heart attacks, and it includes strokes."¹⁸ According to a Royal College of Physicians report:¹⁹

"The evidence for the effects of both short- and long-term exposures to air pollution on cardiovascular disease in adults is strong. Exposure to air pollution can exacerbate existing heart conditions and contribute to the development of cardiovascular disease, resulting in increased hospital admissions and deaths from cardiovascular disease."

One study that evaluated the ambient air pollution in Europe discovered the problem was far worse than had been previously measured.²⁰ The estimated number of people who were dying an early death from exposure to air pollution was nearly double the previous estimate.²¹

The key focus of the study was air pollution in Europe, where the researchers found it triggered an estimated 790,000 deaths, nearly 80% of which were from cardiovascular disease.²² One paper reviewed the literature and found that there were extensive epidemiological studies that showed particulate air pollution was associated with the development of cardiovascular disease.²³

Psychological Effects of Exposure to Noise Pollution

Your brain is always monitoring the environment for sounds that indicate danger, even when you're asleep.²⁴ Continued exposure to noise pollution can trigger sensitivity to stress. If you feel unable to control the amount of noise in the environment, it can have an impact on your mental health.

Noise impacts the depth and quality of your sleep²⁵ and alters the amount of rapid eye movement sleep,²⁶ which in turn impacts your mood and ability to concentrate.

According to the United States Department of Labor Occupational Safety and Health Administration (OSHA),²⁷ loud noise also can create psychological stress, reduce productivity and interfere with concentration.

One study²⁸ analyzed the number of prescribed anxiolytics medications in 4,861 people living near seven airports in six European countries. They found those living near the airport had an excessive risk of taking anxiolytics medication when exposed to aircraft noise.²⁹ Another 2018 study³⁰ found similar results after examining information from 7,321 respondents who completed questionnaires.

Higher levels of noise were associated with anxiolytics drug use but not sedatives or antidepressants. Individuals who were sensitive to noise had an increased use of psychotropic medication.

The Effect on Children's Health

Experts hypothesize that noise pollution influences cognitive function in adults and children.³¹ One review found that exposure to air and noise pollution separately was associated with measures of global cognitive function, memory, depression, anxiety and verbal and nonverbal learning.

Living in urban areas with steady exposure to noise pollution can impair a child's development and have a lifelong effect on overall health. The World Health Organization released a study in 2011 in which they analyzed 10 years of data from across Western Europe using large-scale epidemiological studies of noise from transportation vehicles and other city sources. Writing about the study, Acoustica Projects reports:³²

“They found that at least one million healthy years of life are lost each year in Europe alone due to noise pollution (and this figure does not include noise from industrial workplaces).

The authors concluded that ‘there is overwhelming evidence that exposure to environmental noise has adverse effects on the health of the population’ and ranked traffic noise second among environmental threats to public health (the first being air pollution). The authors also noted that while other forms of pollution are decreasing, noise pollution is increasing.”

As children are still in the process of cognitive and physical development, noise pollution is an environmental stressor that could have irreversible negative consequences. Studies of children who are exposed to environmental noise have consistently demonstrated an effect on cognitive performance,³³ many of which involve reading comprehension and memory.^{34,35,36}

An analysis of data³⁷ from an ongoing study in children exposed to air and noise pollution around London's Heathrow Airport showed exposure to aircraft noise was significantly associated with recall memory and poor recognition memory, even after the data were adjusted for increased exposure to air pollution. The children also experienced poor reading comprehension and information recall.

In 2022, researchers did an updated systematic review and meta-analysis³⁸ of noise pollution as it relates to cognitive abilities across the lifespan. An evaluation of the data found that children who were taught in quiet classrooms had higher scores than children taught in noisier classrooms. Environmental noise also had an impact on reading and language abilities.

Poor Hearing Increases Risk of Dementia

A review also found high-quality evidence of an association between cognitive impairment in middle-aged to older adults and environmental noise pollution.³⁹ Interestingly, cognitive impairment is also found when sound levels are reduced. In other words, without enough sound and environmental stimulation, adults are at a higher risk for dementia.

Hearing loss is frustrating as it leads to social isolation, depression and dementia. In some cases, hearing loss is related to chronic exposure to loud noises. According to the Centers for Disease Control and Prevention⁴⁰ nearly 1 in 4 adults who believe they have excellent or good hearing have measurable hearing loss and noise-induced hearing loss increases from 1 in 5 young adults to 1 in 4 adults aged 50 to 59.

Exposure to loud noise increases your risk for hearing loss and increases your risk for tinnitus. This is the perception of noise or ringing in your ears that can be chronic and is estimated to affect up to 25.3% of people in the U.S.⁴¹ Tinnitus can also be triggered by other factors such as smoking, head injuries and some medications.⁴²

Unfortunately, fewer than 30% of people over age 70 who have a hearing loss will wear hearing aids.⁴³ Data gathered by the University of Exeter and King's College London demonstrated how wearing an effective hearing aid can reduce the risk of developing dementia.⁴⁴

It is important to take action to protect your hearing at all ages. The cost of cardiovascular disease and hearing loss places a significant financial burden on families and communities.

You can begin protecting your hearing by reducing exposure to everyday loud noises, such as music and a loud work environment. Nutritional imbalances can affect hearing, as can certain medications. Consider wearing ear protection when using loud equipment at home, such as lawnmowers and leaf blowers.

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