Air Pollution Can Trigger Heart Attacks

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By Lisa Falkenberg

ASSOCIATED PRESS

DALLAS - High levels of air pollution can trigger heart attacks in at-risk people exposed for even a short time, a study has found.

Researchers who interviewed 772 Boston-area patients about four days after their attacks found that the onset of symptoms correlated with times of high daily air pollution.

Tiny, invisible particles long have been thought to cause long-term cardiovascular diseases. The new study is the first to examine short-term effects on the heart, said senior author Murray Mittleman, director of cardiovascular epidemiology at Boston's Beth Israel Deaconess Medical Center.

The study of 489 men and 283 women, conducted from January 1995 to May 1996, defined at-risk people as obese, inactive, or those with a history of heart problems.

The results appear in today's issue of Circulation, a journal of the American Heart Association.

The pollution particles are called PM-2.5, for particulate matter less than 2.5 micrometers in diameter. They are emitted by cars, power plants and industry, as well as fireplaces and wood-burning stoves.

Studies in the last five years have linked deaths and hospital admissions to a spike in PM-2.5 levels. In the study, risk for heart attack peaked two hours and 24 hours after patients were exposed to increased levels of the particles.

After two hours, risk increased 48 percent in the hours when pollution was the worst, compared with the best hours; after 24 hours, risk increased 62 percent.

The study also examined health risks caused by ozone, a chief ingredient of smog that is created when air pollutants mix. Ozone has been linked to lung and breathing problems, but researchers in this study found no data linking it to heart attacks, Mittleman said.

The study did not address how the particles trigger heart attacks. Other studies have shown that the particles, small enough to bypass the body's defenses and get into the lungs and other tissue, cause inflammation and blood clotting. These symptoms may contribute to heart attacks by blocking flow of blood through the heart, some researchers say.

Still other studies have shown that the particles may create electrical reactions that affect the nervous system.

PM-2.5 particles are light enough to travel long distances and infest air that is typically clean. Air conditioning helps to filter it out of the indoors.

"The best advice is to avoid outdoor activity on hot, hazy days," said study coauthor Douglas Dockery, professor of environmental epidemiology at Harvard.

Researchers noted that Boston did not have excessive pollution and met federal air-quality standards, so the risk could be even worse in high-pollution cities such as Houston and Los Angeles.

The Environmental Protection Agency's air-quality standards, last updated in 1997, have been challenged in court in part because no one has pinpointed why pollution particles pose a health risk.

The study could be used to encourage the EPA to consider stricter air standards, said Dr. Jonathan Samet, chairman of the department of epidemiology at Johns Hopkins University, who was not involved in the study.

Second Press Release on this topic:

Washington, 10 July 2001 (RFE/RL) -- A new report says high levels of air pollution can trigger a heart attack within two hours of exposure and the risk can last for more than 24 hours.

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Murray Mittleman, a physician at Harvard University, and a team of researchers discovered the correlation during a study of 772 patients in the northeastern city of Boston, Massachusetts.

In an interview with RFE/RL, Mittleman said that exposure to high levels of tiny particles of air pollutants increased the risk of a heart attack by 50 to 70 percent.

"The groups of people who are most vulnerable are those already at risk for heart disease. This would include elderly individuals and also people who have other risk factors for heart disease, including people who are overweight, smoke cigarettes, people who have a poor diet -- particularly high in fat -- and people who know they have high blood pressure."

Mittleman says the mechanisms involved in triggering heart attacks are "quite complicated," but likely involve changes in the blood that cause inflammation or hamper the body's ability to form clots.

In the U.S., the Environmental Protection Agency (EPA) is responsible for monitoring the level of pollution and setting a standard regulating particulate matter, even that measuring as small as 2.5

microns. Currently the U.S. standard is that no one should be exposed to more than 65 microns of pollutants per cubic meter of air during a 24-hour period. Also, states are required to notify residents by broadcasting air pollution alerts on television and radio when air quality is poor.

But Mittleman says this practice is not standard across the globe. He says not all countries measure and regulate pollutant particle levels. Of those that do, he says, many have set standards that involve much larger particles, such as those bigger than 2.5 microns. As a result, Mittleman says those nations are ignoring the most dangerous particles, those small enough to trigger deadly heart attacks.

"It would be prudent for people who understand that they have a high risk for a heart attack, even in the absence of this air pollution association, to try to avoid excessive exposure to outdoor air on those days when the air quality is poor. This would include on days when it is very hot and humid. In the summer, really limited outdoor activities on those days would be very valuable for those individuals."

Mittleman notes that based on his study and that of other researchers the EPA is currently re-evaluating their pollutant standards.

Third Press Release on this topic:

Study finds foul air can trigger heart attacks

June 11, 2001 Posted: 4:25 PM EDT (2025 GMT)

From Rhonda Rowland
CNN Medical Unit

ATLANTA, Georgia -- Studies already suggest that bad air can contribute to a number of health threats, including asthma attacks and lung and heart disease.

Now there's evidence that as pollution increases, so do your chances of a heart attack, according to a study in the American Heart Association journal Circulation.

Within just two hours of breathing in fine particles from a city's bad air -- caused by vehicle exhaust and smokestacks, among other factors -- the risk of a heart attack increased 44 percent. A full day after exposure, heart attacks increased overall by one-third.

"We were able to look at an hour-by-hour basis and what we found, as a result, was that in fact the risk of a heart attack seems to go up very shortly after high increased levels of fine particles," said Dr. Murray Mittleman, director of cardiovascular epidemiology at Beth Israel Deaconess Medical Center in Boston, Massachusetts.

Researchers interviewed 772 Boston-area heart attack survivors a few days after they were admitted to the hospital, to determine when their symptoms began, then compared the data to air pollution measurements.

"I was surprised that with such a relatively small sample of individuals they were able to see this kind of effect that they did see, which says to me that we are probably measuring something real," said Dr. Frank Spiezer of Harvard Medical School.

High-risk people should take precautions Researchers used air-quality measurements collected from monitoring stations throughout the Boston area.

"We now know for very low concentrations, concentrations below the national air quality standards, we still can detect effects of air quality on humans," said Petros Koutrakis of the Harvard School of Public Health.

Because they're so small, the particles can bypass the body's normal defense mechanisms and go deep into air sacs in the lungs, triggering an inflammatory response, researchers told Reuters.

This bad air is not just found in big cities. Weather patterns can send it hundreds of miles away, and it can vary dramatically from day to day.

While the conditions may not pose a big threat to young, healthy people, those who are at high risk for heart disease should avoid spending a lot of time outdoors on those hot, humid, hazy days, researchers say.

And when indoors, people should try to keep the bad air out by using air conditioning and making sure air filters are clean.

Source: The Chiropractic Resource Organization. Retrieved from:
http://www.chiro.org/LINKS/ABSTRACTS/Air_pollution_can_trigger_heart_attacks.shtml