

Regular exercise helps prevent high blood pressure, even in areas of high air pollution

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People who regularly exercise tend to have a lower risk of high blood pressure, even if they live in areas where air pollution is relatively high, according to new research published today in the American Heart Association's flagship journal *Circulation*.

The risk-benefit relationship between air pollution and [physical activity](#) is an important public concern because more than 91% of people worldwide live in areas where air quality does not meet World Health Organization (WHO) guidelines.

"Extended outdoor activity in urban areas increases the intake of air pollutants, which can worsen the harmful health effects of air pollution," said study author Xiang Qian Lao, Ph.D., an associate professor at the Jockey Club School of Public Health and Primary Care at The Chinese University of Hong Kong in Shatin, Hong Kong. "While we found that high physical activity combined with lower air pollution exposure was linked to lower risk of [high blood pressure](#), physical activity continued to have a protective effect even when people were exposed to high pollution levels. The message is that physical activity, even in polluted air, is an important high blood pressure prevention strategy."

Researchers studied more than 140,000 non-hypertensive adults in Taiwan and followed them for an average of 5 years. Researchers classified the weekly physical activity levels of each adult as inactive, moderately active or highly active.

Researchers also classified level of exposure to fine particulate matter (PM2.5) as low, moderate and high. PM2.5 is the most commonly used indicator of air pollution. High blood pressure was defined as 140/90 mm Hg. The American Heart Association/American College of Cardiology 2017 Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults defines high blood pressure as 130/80 mm Hg.

The researchers found:

Overall, people who are highly active and exposed to low levels of pollution had a lower risk of developing high blood pressure. People who were inactive and exposed to highly polluted air had a higher high blood pressure risk.

Each increase in PM2.5 level was associated with a 38% increase in risk of incident hypertension, whereas each increase in physical activity level lead to a 6% lower risk of hypertension. This suggests that reducing air pollution is more effective in preventing high blood pressure.

The benefits of regular physical activity held up regardless of pollution level. People who exercised moderately had a 4% lower risk of high blood pressure than those who didn't exercise. People who exercised at a high level had a 13% lower risk of high blood pressure than the non-exercisers.

"This is the largest study to analyze the combined effects of air pollution and regular physical activity on high blood pressure. Our findings indicate that regular physical activity is a safe approach for people living in relatively polluted regions to prevent high blood pressure. Exercise should be promoted even in polluted areas. The findings also put a spotlight on how strongly pollution can impact blood pressure, and how important it is to control pollution levels to prevent high [blood](#) pressure,"

Lao said.

In 2004, the American Heart Association issued a scientific statement concluding exposure to air pollution contributes to cardiovascular illness and death. A 2010 update elaborated on those risks, which include heart attack, stroke, arrhythmia and heart failure. Writing group author Russell V. Luepker, M.D., M.S., a volunteer expert for the American Heart Association said, "This study confirms our understanding of the role of physical activity in the prevention of cardiovascular diseases including hypertension. It also reminds us of the importance of air pollution in the development of cardiovascular diseases. The link between pollution and cardiovascular disease may include the development of hypertension along with other factors associated with particulate matter in air pollution."

The findings of this study are limited and cannot be generalized to other populations with higher exposure to [air pollution](#) because it only included people living in Taiwan, where ambient air was moderately polluted (the annual PM2.5 concentration was 2.6 times of the limit recommended by the World Health Organization). Researchers did not distinguish between outdoor and indoor physical activity, meaning they could not exclusively examine the association of PM2.5 and hypertension relative to physical activity outdoors or indoors. Researchers also included indoor cigarette smoking as a variable.

More information: Cui Guo et al, Independent and Opposing Associations of Habitual Exercise and Chronic PM 2.5 Exposures on Hypertension Incidence, *Circulation* (2020). [DOI: 10.1161/CIRCULATIONAHA.120.045915](https://doi.org/10.1161/CIRCULATIONAHA.120.045915)

Provided by American Heart Association

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