Exposure to Air Pollution Linked to Higher Risk of Fatty Liver Disease

Abdominal obesity worsened the impact of air pollution on MAFLD development.

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Long-term exposure to air pollution is associated with the development of metabolic dysfunction-associated fatty liver disease (MAFLD), especially in the presence of obesity and an unhealthy lifestyle, according to study results published in the Journal of Hepatology.

Arising from the accumulation of fat in the liver, non-alcoholic fatty liver disease (NAFLD) and its more severe form, NASH, are responsible for a growing proportion of advanced liver disease in the United States and worldwide. In many cases, fatty liver disease is associated with obesity and diabetes, so it is sometimes referred to MAFLD. Fatty liver disease can lead to fibrosis, cirrhosis and even liver cancer. With no effective approved medical therapies, disease management is dependent on lifestyle changes such as weight loss and exercise.

While animal studies have shown that air pollution contributes to fatty liver disease, epidemiological research on the subject has been limited. A different study, presented at the 2021 AASLD Liver Meeting, reported a link between environmental pollutants and fatty liver disease along with liver cancer, despite the absence of severe fibrosis.

“A growing number of studies have suggested that ambient air pollution, which is the biggest environmental problem caused by industrialization, may increase the risk of metabolic disorders such as insulin resistance and dyslipidemia, and related diseases such as type 2 diabetes mellitus and metabolic syndrome,” Xing Zhao, PhD, of Sichuan University in China, said in a .

Zhao and colleagues examined the link between air pollution and MAFLD in a Chinese population. They recruited 90,086 people between 2018 and 2019. MAFLD status was established based on radiologically determined liver fat along with the presence of diabetes, overweight or obesity. The team conducted participant interviews to collect information on lifestyle, medical history and demographic and social factors, and obtained biological samples and liver imaging scans.

High-level exposure to air pollution was strongly linked to higher risk of MAFLD. This association was seen with particulate matter with diameters of ≤1, ≤2.5 and ≤10 micrometers (PM_1, $PM_{2.5}$ and PM_{10}, respectively) as well as nitrogen dioxide (NO_2).

“This study provides evidence that long-term exposure to ambient PM_1, $PM_{2.5}$, PM_{10}, and NO_2 may increase the odds of MAFLD in the real world,” wrote the researchers. “Our findings add to the growing evidence of ambient pollution’s damaging effects on metabolic function and related organs.”

The researchers also noted that men, people who drank alcohol, present or past smokers, those with high-fat diets and those with abdominal obesity were more likely to be affected by long-term exposure to air pollution.

“[W]hereas physical activity together with a healthy diet stand as a primary pillar in the fight against metabolic syndrome-associated morbidities, including MAFLD, the findings that ambient pollution could exacerbate MAFLD risk might offer new clues to refining the counseling of these patients, for instance by restricting exposure of risk populations to open air settings at high levels of pollution, as is recommended for patients suffering from severe asthma,” Massimo Colombo, MD, of San Raffaele Hospital in Italy, and Robert Barouki, MD, PhD, of the University of Paris, wrote in a commentary on the study.

Click here to read the study in the Journal of Hepatology.

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