Air pollution in Taiwan boosts risk of ischemic stroke

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Long-term exposure to hydrocarbons in the air may be a risk factor for ischemic stroke development, according to a study published December 4, 2019 in the open-access journal *PLOS ONE* by Han-Wei Zhang of China Medical University, Taiwan, and colleagues.

Previous studies have demonstrated a link between cardiovascular diseases and increased levels of ozone and airborne particulate matter arising from air pollution. Two pollutants known as total hydrocarbons (THC) and nonmethane hydrocarbons (NMHC) play critical roles in the production of ozone. Sources of these pollutants include transportation, coal power plants, handling of fossil fuels and gaseous emissions.

In the new study, researchers retrospectively analyzed data from Taiwan's National Health Institute Research Database, which includes healthcare data on 22.96 million people under the country's universal health insurance program. Insurance claim data spanning the years 2000 to 2013 was analyzed on 283,666 patients aged 40 and over who did not have a stroke diagnosis at the outset of the study period. Information on air pollution levels was obtained from the Environmental Protection Administration of Taiwan, which measured levels of pollutants at 76 monitoring stations across Taiwan from 1993 to 2013. This data was used to determine a person's average daily exposure to pollutants.

Before controlling for multiple pollutants, there was a 2.69 times increase in ischemic stroke for each 0.16ppm increase in THC (95% CI 2.64-2.74) and a 1.62 times increase in ischemic stroke for each 0.11ppm increase in NMHC levels (95% CI 1.59-1.66). After controlling for multiple pollutants, the adjusted hazard ratio was 3.64 for the increase in THC and 2.21 for the increase in NMHC. People exposed to average daily levels of more than 2.33 ppm THC were 664% more likely to have newly diagnosed ischemic stroke than those exposed to less than 2.18ppm THC.

The study was limited by the fact that researchers were unable to adjust for confounders including genetic information and relevant clinical variables, as well as the fact that personal exposure to pollution levels is hard to gauge even with local information on pollutants.

Zhang notes: "Long-term exposure to ambient hydrocarbons may be a risk factor for ischemic stroke. These findings provide further support for the negative effects of long-term exposure to hydrocarbons in air on the human brain."

More information: Zhang H-W, Kok VC, Chuang S-C, Tseng C-H, Lin C-T, Li T-C, et al. (2019) Long-term ambient hydrocarbons exposure and incidence of ischemic stroke. *PLoS ONE* 14(12): e0225363. doi.org/10.1371/journal.pone.0225363

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