

Aircraft noise exposure and blood pressure in longitudinal DEBATS study: does air pollution moderate the association?

Lise Giorgis-Allemand¹, Mélanie Flessel¹, Minon'tsikpo kossi Kodji¹, Aboud Kourieh¹,

Anne-Sophie Evrard¹

¹Université Lyon, Université Gustave Eiffel, Ifsttar, Université Lyon 1, Umrestte, UMR T_9405, Bron, France

Corresponding author's e-mail address: lise.giorgis-allemand@univ-eiffel.fr

ABSTRACT

Aircraft noise and air pollution are both associated with cardiovascular diseases. One possible mechanism may be increased blood pressure. In the French DEBATS longitudinal study, aircraft noise was associated with increased systolic and diastolic blood pressure. The objective of this study was to investigate the moderating role of air pollution in this association. The DEBATS study included 1,244 participants living near three French major airports who answered detailed face-to-face interviews including blood pressure measurements in 2013, 2015 and 2017. Outdoor aircraft noise levels were estimated at each home address using noise maps. Exposure to air pollution (nitrogen dioxide -NO₂- and particulate matter with an aerodynamical diameter smaller than 10 µm -PM₁₀) was estimated during the month preceding each blood pressure measurement using data from the nearest air quality monitoring station. Adjusted mixed models with random intercept were used. Increased NO₂ levels were associated with increased systolic and diastolic blood pressure. No association was observed for PM₁₀. The association between aircraft noise and blood pressure remained statistically significant after adjustment for NO₂. Although the interaction term between aircraft noise and NO₂ was not statistically significant, the association between aircraft noise and blood pressure was higher in the lowest NO₂ tercile. Thus, air pollution appears to be a moderator in the relationship between aircraft noise and blood pressure in our study. These results deserve to be further investigated, in particular by considering other air pollutants that are markers of aircraft traffic.

Keywords (3-6): aircraft noise, air pollution, blood pressure, moderation analyses.