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Chronic aircraft noise exposure, stress responses, mental health and cognitive performance in school children

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Abstract

Background: Previous research suggests that children are a high risk group vulnerable to the effects of chronic noise exposure. However, questions remain about the nature of the noise effects and the underlying causal mechanisms. This study addresses the effects of aircraft noise exposure on children around London Heathrow airport, in terms of stress responses, mental health and cognitive performance. The research also focuses on the underlying causal mechanisms contributing to the cognitive effects and potential confounding factors.

Methods: The cognitive performance and health of 340 children aged 8-11 years attending four schools in high aircraft noise areas (16 h outdoor Leq > 66 dBA) was compared with children attending four matched control schools exposed to lower levels of aircraft noise (16 h outdoor Leq < 57 dBA). Mental health and cognitive tests were group administered to the children in the schools. Salivary cortisol was measured in a subsample of children.

Results: Chronic aircraft noise exposure was associated with higher levels of noise annoyance and poorer reading comprehension measured by standardized scales with adjustments for age, deprivation and main language spoken. Chronic aircraft noise was not associated with mental health problems and raised cortisol secretion. The association between aircraft noise exposure and reading comprehension could not be accounted for by the mediating role of annoyance, confounding by social class, deprivation, main language or acute noise exposure.

Conclusions: These results suggest that chronic aircraft noise exposure is associated with impaired reading comprehension and high levels of noise annoyance but not mental health problems in children.

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