Association of early-life exposure to air and noise pollution with youth mental health: findings from the ALSPAC cohort

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Abstract

Background Increasing evidence suggests that air pollution exposure contributes to the development of mental health problems, including psychosis and depression. However, little is known about the importance of early-life exposure, nor the potential role of noise pollution, a correlate of air pollution. We examined the association of exposure to air and noise pollution from pregnancy to age 12 years with three mental health problems assessed at ages 12, 18, and 24 years.

Methods Data were from the Avon Longitudinal Study of Parents and Children (ALSPAC), which tracks the development of about 14 000 babies who had expected delivery dates between April 1, 1991, and Dec 31, 1992, in Avon, UK. This was linked with novel data on nitrogen dioxide, $PM_{2.5}$, and noise pollution in pregnancy, childhood (ages 1–9 years), and adolescence (ages 10–12 years). Psychotic experiences, depression, and anxiety were measured at ages 12, 18, and 24 years. Logistic regression models were controlled for individual-level, family-level, and area-level confounders, and e-values were calculated to estimate residual confounding.

Findings Participants exposed to higher $PM_{2.5}$, particularly during pregnancy, had greater odds for psychotic experiences (adjusted odds ratio 1·17 [95% CI 1·05–1·30]) and depression (1·11 [1·01–1·22]). There was little evidence associating nitrogen dioxide or noise pollution with psychotic experiences or depression. Conversely, higher nitrogen dioxide (but not $PM_{2.5}$) exposure in pregnancy (1·16 [1·01–1·33]), and higher noise pollution in childhood (1·20 [1·06-1·37]) and adolescence (1·17 [1·02-1·35]), were associated with greater odds for anxiety.

Interpretation Our study builds on evidence linking air pollution to psychosis and depression and provides rare longitudinal evidence linking noise pollution to anxiety. Our findings indicate that air pollution exposure earlier in development (eg, during pregnancy) might be particularly important, and suggest a degree of specificity in terms of pollutant-outcome associations. If causal, our findings suggest that interventions to reduce air pollution would improve global mental health.

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JBN designed the study, did the analysis, and wrote-up the study. All other authors guided the analysis and contributed to the content of the study.

Declaration of interests
We declare no competing interests.

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