

URBAN ENVIRONMENTAL NOISE AND DEPRESSION CAUSAL PATHWAY: POTENTIAL ROLE OF CHRONIC CONDITIONS AS MEDIATOR



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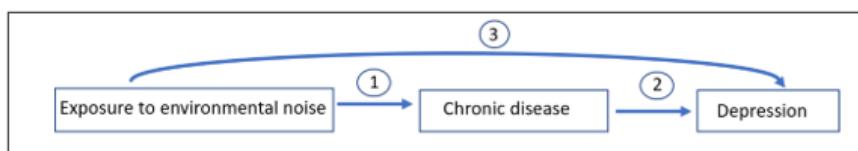
Introduction

Accepting the fact of a growing urban population and associated health risks, such as increased exposure to pollutants, and considering the high prevalence of chronic diseases, this study aims to investigate the relationship between exposure to environmental noise and depression. The primary objective is to determine the potential mediating role of chronic diseases in this relationship. This study is part of the European H2020 URBANOME project, designed to explore the relationship between the environment and health in urban settings. The main goal of the project is to promote urban health, well-being, and liveability by systematically integrating health concerns into urban policies and civic activities.

Material and Methods

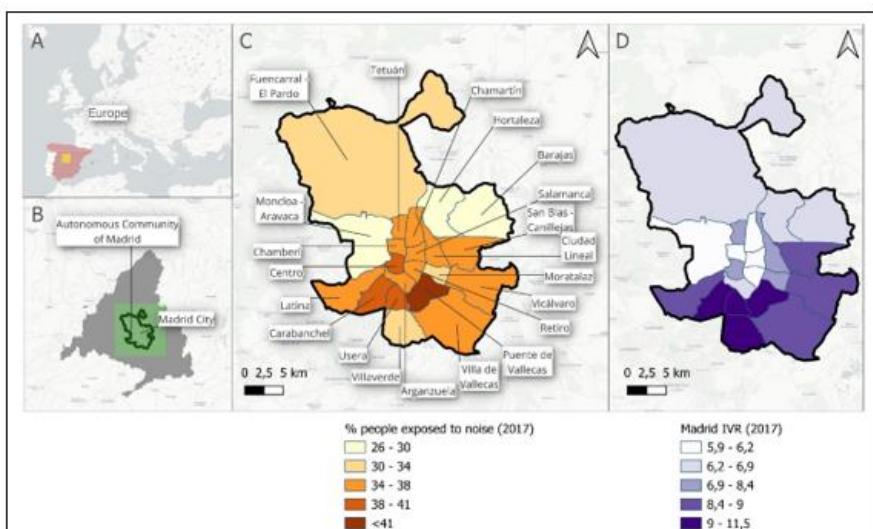
We obtained the data for this study from the Madrid City Health Survey, conducted through computer-assisted telephone interviews. Outcome variables assessed through self-reports included depression, exposure to environmental noise, and the presence of chronic diseases. We used a counterfactual mediation framework (Figure 1), implemented by the R package multimediate, to evaluate the potential mediating role of chronic diseases in the relationship between exposure to environmental noise and depression.

Figure 1.



Conceptual mediation model

Figure 2. A: Europe map. B: Central Spain map. C: the % of reported noise exposure by districts map. D: vulnerability index map.



Results

The study included 8,445 interviews, with a higher percentage of women (54.67%) than men. 23.29% were over 65, and 17.17% under 30. Notably, 7.82% reported depression, 39.53% had chronic diseases, and 35.43% acknowledged noise exposure. In our regression model, those exposed to environmental noise were 1.24 times more likely to have a chronic disease, and individuals with a chronic disease were 2.93 times more likely to suffer from depression. The relationship between noise exposure and depression showed a 12% mediation by chronic diseases, with a 95% confidence interval from 5% to 22%. (Table)

Table. Odds ratios (OR) and their respective 95% confidence intervals (95% CI) for the mediation analysis.

Parameter	OR	95% CI	p-value
ACME (control)	1	(1.00,1.00)	<0.001
ACME (treated)	1	(1.00,1.01)	<0.001
ADE (control)	1.03	(1.02,1.04)	<0.001
ADE (treated)	1.03	(1.02,1.04)	<0.001
Total Effect	1.03	(1.02,1.04)	<0.001
Prop. Mediated (control)	1.1	(1.05,1.22)	<0.001
Prop. Mediated (treated)	1.14	(1.06,1.27)	<0.001
ACME (average)	1	(1.00,1.01)	<0.001
ADE (average)	1.03	(1.02,1.04)	<0.001
Prop. Mediated	1.12	(1.06,1.25)	<0.001

*ACME: average causal mediator effects. ADE: average direct effects. Prop. Mediated: proportion mediated.

Conclusions

Our findings suggest a link between environmental noise exposure and depression, potentially mediated by chronic diseases. This points out the need for public health interventions to reduce urban noise exposure and improve mental health. Furthermore, prospective studies are needed for confirmation, incorporating noise level measurements and temporal data on the onset of chronic diseases and depression.