



Traffic noise in relation to self-reported mental health

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ABSTRACT

Noise can cause physiological and psychological stress. Our aim was to study whether outdoor traffic noise levels in Finland are associated with self-reported mental health. Data from the FINRISK 2002 and FINRISK 2007 studies regarding Helsinki, Vantaa, and Turku ($n=4,167$) were used. Data on the current use of sleep medication, sedatives, and antidepressants, feelings of depression, and doctor-diagnosed depression and other psychiatric illnesses within the past 12 months were obtained from a self-administered questionnaire. Noise (L_{den}) at the most exposed facades of the residential buildings was modelled using Nordic prediction method and ESRI ArcMap 10 software. Poisson regression models to calculate relative risks (RR) were stratified by sex and adjusted for age, marital status, education, occupation, neighbourhood income, smoking, alcohol consumption, physical activity, BMI, chronic disease, and exposure to traffic-related air pollution. Among those exposed to ≥ 55 dB, the RR estimates for psychotropic medication use and the prevalence of depression and other mental illnesses were statistically non-significant and varied between 0.86 and 2.02 (men) and 0.74 and 1.05 (women) when compared with the lowest exposure category (<45 dB). Outdoor traffic noise levels in urban areas in southern and south-western Finland were not associated with decreased self-reported mental health.

ABSTRACT (Extended)

1. Background

Noise can cause both physiological and psychological stress. The most investigated potential effects of noise exposure are sleep disturbance, annoyance, cognitive impairment of children, and cardiovascular effects (1) but the evidence on the potential effects on mental health is relatively scarce. In a previous Finnish study, traffic noise levels (L_{den}) >60 dB were associated with poor self-rated health among men and especially those with high trait anxiety (2). However, in the same study, traffic noise had no association with register-based use of psychotropic medication. The aim of the present work was to study whether outdoor traffic noise levels in Finland are associated with self-reported mental health.

2. Methods

The national FINRISK study is a series of cross-sectional population surveys carried out every 5 years in 3–5 large study areas in Finland by the National Institute for Health and Welfare (3). The FINRISK aims at assessing risk factors of chronic diseases and health behaviour of the general working age population of Finland. In the present study, surveys of years 2002 and 2007 in Helsinki, Vantaa, and Turku ($n=4,167$) were used, and data on the current use of sleep medication, sedatives, and antidepressants, feelings of depression and having lost interest in most things, and doctor-diagnosed depression and other psychiatric illnesses within the past 12 months were obtained from a self-administered questionnaire.

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Latitude and longitude coordinates of the participants' homes were acquired from the Population Register Center. Noise from major highways and main/collector streets was calculated in accordance with the Environmental Noise Directive (2002/49/EC) and using the Nordic prediction method (4). ESRI ArcMap 10 software (Environmental Systems Resource Institute, Redlands, CA, USA) was used to model outdoor noise (L_{den}) at the most exposed facades of the residential buildings.

Relative risk (RR) estimates were calculated with Poisson regression models using GENMOD procedure in SAS 9.3 (SAS Institute Inc., Cary, NC, USA). The analyses were stratified by sex and adjusted for age, marital status, education, occupation, neighbourhood income, smoking, alcohol consumption, physical activity, BMI, chronic disease, and exposure to traffic-related air pollution.

3. Results

Approximately 55% of the participants were women, and the mean age was 49 years. The average outdoor noise level (L_{den}) was 52 dB (SD 7.8 dB). The proportions of participants in different noise categories were 23% in <45 dB, 24% in 45–49.9 dB, 21% in 50–54.9 dB, 14% in 55–59.9, and 18% in \geq 60 dB.

Among those exposed to \geq 55 dB, the RR estimates for psychotropic medication use, the prevalence of feelings of depression and having lost interest in most things, doctor-diagnosed depression and other mental illnesses were statistically non-significant and varied between 0.86 and 2.02 (men) and 0.74 and 1.05 (women) when compared with the lowest exposure category (<45 dB).

4. Discussion

In the present study, no associations were observed between traffic noise exposure and mental health. This is in line with some previous studies that did not observe any associations in the general population (5, 6) and studies suggesting that the association could be seen only in vulnerable sub-groups such as those with poor sleep quality (7) or high trait anxiety (8), or those sensitive to noise (9).

One of the limitations of the present study is that there were no data available on the amount of time spent daily at the home address used in noise modelling. This is a potential problem since people typically work and commute for an average of 8–9 hours per week day. In addition, there were no data on building characteristics, e.g., room orientation which can affect to noise exposure. Further, it was not possible to assess the amount of attenuation of outdoor noise due to well-insulated building structures and double- or triple-glazed windows typical in Finland and other Nordic countries.

In conclusion, outdoor traffic noise levels in urban areas in southern and south-western Finland were not associated with decreased self-reported mental health in the general population in this cross-sectional setting.

Keywords: traffic, noise, mental health I-INCE Classification of Subjects Number(s): 63.2, 63.4 (mental health not included in the classification)

(See . <http://www.inceusa.org/links/Subj%20Class%20-%20Formatted.pdf> .)

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