NORAH
Lärmwirkungsstudie

Overview of the blood pressure study

Noise can generate stress, stress increases the blood pressure in the short term – this is the basic thesis of the study. But how does the blood pressure respond to chronic traffic noise? Can effects be measured in the residents around Frankfurt Airport which cannot be explained by the typical risk factors such as age, smoking or obesity alone, but are linked with the noise level?

High number of participants, precise acoustic calculations

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In contrast to other studies, the 844 randomly selected participants in the NORAH Blood Pressure Study measured their own blood pressure every morning and evening over a period of three weeks. They repeated these measurements one year later. This allowed the scientists to examine whether changes in the noise exposure had any effect on the blood pressure. All of the participants lived in the environs of Frankfurt Airport. The participants were not selected, however, solely on the basis of the distance of their address from the airport, but on the basis of the actual noise exposure: only people at whose addresses the average air traffic noise during the day was at least 40 decibels were allowed to take part in the study. They measured not only their blood pressure, but also completed a

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questionnaire. This allowed the NORAH team to take account of possible confounding factors in their investigations. The blood pressure team took detailed information on the respective, address-specific noise exposure from the NORAH acoustics database.
For a more detailed account of the methods of the Blood Pressure Study, please refer to NORAH Knowledge No. 8. (https://www.laermstudie.de/media/norah_knowledge-8.pdf)

Central results

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Connection between air traffic noise and blood pressure
The NORAH Blood Pressure Study was not able to verify a statistically significant connection between air traffic noise and the parameters blood pressure, heart rate and pulse pressure which are relevant for cardiovascular disease. The same applies for road and rail noise. Here also, it was not possible to verify such an connection for any of the investigated parameters.
Indications of especially sensitive sub-groups
The study provided indications that not all people respond to the same extent to traffic noise. There are, rather, more sensitive sub-groups. Differences in noise sensitivity, age, gender, residential duration and high blood pressure also play a role, although this is not equal for all three types of noise.

The state of research up to now

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1. Of all types of transportation noise, air transportation noise is what is mentioned first when study participants are asked what they perceive as the greatestnoise-related annoyance and as the cause of sleep disturbances. This is followed by road transportation noise and rail transportation noise.
2. If a human being is acutely exposed to very high noise levels, this increases blood pressure and heart rate due to the release of stress hormones. This does not tell us anything, however, about the effects of chronic noise.
3. Even low levels of noise can trigger an acute stress response in the body while sleeping or in a relaxed state. Noise at night has a greater impact on the body than noise during the day.
4. People can get used to noise to a certain extent. For example, study subjects in the sleep lab have been found to respond more strongly to noise in the first nights than in the last nights of the experiment.

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5. Up to now there have been just a few long-term studies and epidemiological studies with a large number of participants on the effect of air transportation noise on blood pressure and the risk of heart attack. The largest study so far is the HYENA Study (Hypertension to Noise near Airports).

   This study, which surveyed residents around five European airports, comes to the conclusion that severe air transportation noise increases the risk of hypertension. Another large epidemiological study which was carried out on male residents around Stockholm Airport suggests that, particularly in older persons, the risk of developing hypertension increases to high noise levels.

Do you have any questions?

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