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[European Society of Cardiology](#)

Major study links chronic noise exposure to risk of heart attacks

Research published online (Thursday 24 November) in Europe's leading cardiology journal, *European Heart Journal*[1], links exposure to chronic noise with an increased risk of heart attack.

Furthermore, the risk seems to be associated more with the physiological effect of environmental and work noise than with the annoyance it causes individuals, although there are differences in effects between men and women.

Their findings have prompted researchers from Charité University Medical Centre in Berlin, Germany, to call for the level requiring workplace ear protection to be lowered from the current 85 decibels, widely used in western Europe, to somewhere between 65 and 75 decibels. They believe this is especially important for people with existing cardiovascular disease.

In a case-control study involving all 32 hospitals in Berlin between 1998 and 2001, the researchers compared over 2,000 heart attack patients with over 2,000 control patients admitted to trauma and general surgery departments. Of the 4,115 total, about three-quarters were men and a quarter were women. The mean age of the men was 56 and the mean age of the women was 58.

The NaRoMI (Noise and Risk of Myocardial Infarction) study was designed to determine the association between chronic noise and the risk of heart attack in men and in women and to assess the risks of subjective annoyance and objective noise levels in the environment and the workplace. The research team used interviews and independent environmental and work noise assessments in their analysis. The findings apply to men and women under 70 living in cities, who had non-fatal heart attacks.

Lead author Dr Stefan Willich, Director of the Institute for Social Medicine, Epidemiology and Health Economics at the medical centre, said: "Our results demonstrate that chronic noise exposure is associated with a mildly to moderately

increased risk of heart attack. The increase appears more closely associated with actual sound levels rather than with subjective annoyance. However, there were differences between men and women and these need further investigation."

General environmental noise, such as that of traffic, affected both sexes, increasing the risk of heart attack by nearly 50% for men and by about three-fold for women.

Workplace noise levels increased the risk for men by nearly a third, but did not affect women's risk.

Where the individual's subjective reaction of annoyance was concerned, environmental noise had no effect on men, but marginally increased women's risk. However, the situation was reversed for workplace noise, with the risk for men from annoyance rising by nearly a third but with no effect in women.

Dr Willich said that the differences between men and women may be because women tend to spend more time at home and were generally less exposed to loud workplace noise. Most previous studies on noise had concentrated on men and this was the first to find evidence of an effect in women, so the results on women needed confirming.

"However, gender-specific reaction and pathophysiological response also seems possible and we should investigate this," he said.

The researchers also found that risk did not rise in concert with rising noise levels.

"This means we seem to be looking at a threshold at which risk occurs and remains constant above this, and this appears to be around 60 decibels," said Dr Willich. Sixty decibels is the level of noise typically experienced, for example, in a busy large office.

The findings were consistent with a hypothesis that there is an association between long-term noise exposure and risk of cardiovascular disease, according to Dr Willich. (The study did not look at transitional exposure, such as driving to work. Nor did it include rural populations or people over 70).

A mechanism that might explain the link, said Dr Willich, was that noise could increase psychological stress and anger, leading to physiological changes in the body such as increased levels of adrenaline and noradrenaline, which are associated with increased blood pressure and plasma lipids.

"Such mechanism may be further modified by personal parameters – smoking or pressure from meeting deadlines. In that case, chronic noise would be the equivalent of an outside risk factor contributing to atherosclerosis and cardiovascular disease."

His team plan further studies. But, in the meantime, their findings have convinced them that the current levels of 85 decibels (equivalent to road construction equipment, for example) are too high. "We should definitely be looking at something lower. The exact value is unclear, but somewhere between 65 and 75 decibels," he said. "It is particularly important to focus on people with known cardiovascular disease to improve prevention for them, either by not exposing them chronically to heavy noise or by lowering the threshold for protective wear."

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[1] Noise burden and the risk of myocardial infarction. *European Heart Journal*. doi:10.1093/eurheartj/ehi658.

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