

# Cardiovascular disease risk boosted by stress

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The risk of cardiovascular disease rises with an increasing burden of perceived stress, financial problems and adverse life events, a major international study with University of Gothenburg researchers as main authors shows. They were able to link the risk of both heart attack and stroke with high stress levels.

The study, published in the journal *JAMA Network Open*, included 118,706 individuals in 21 countries, five of which were [low-income](#), twelve middle-income, and four high-income countries. The participants, both men and women, were aged 35–70, 50 years being the average when the study began).

Initially, they were asked questions about perceived [stress](#) in the past year. "Stress" was defined as feeling nervous, irritable or anxious because of factors at work or at home, being in financial difficulties, or having experienced difficult events and challenging times in their lives.

Such events and times included divorce, unemployment, bereavement, or serious illness in a family member. The stress was rated on a scale from zero (no stress) to three (severe stress).

## **More heart attacks and strokes**

Of the participants, 7.3 percent were found to have been subject to severe stress, 18.4 percent to moderate stress, 29.4 percent to low stress, and 44 percent no stress. Those under severe stress were slightly younger, more frequently characterized by [risk factors](#) such as smoking or abdominal obesity, and more often in high-income countries.

The individuals were followed until March 2021, which meant that the median follow-up period was ten years. During this time, 5,934 cardiovascular events in the form of myocardial infarction, stroke, or heart failure were recorded.

After adjustments for differences in risk factors between those with high and low stress, it was found that in the participants with high stress the risk of some form of cardiovascular event was elevated by 22 percent, that of heart attack by 24 percent and that of stroke 30 percent.

The results confirm previous research in the field, with the difference that in this study the stress levels were classified before the cardiovascular events. Previous studies sought to determine stress levels in people who had already undergone a [heart attack](#) or stroke, which may have affected the responses.

## **Stress a key global risk factor**

The study was based on the Prospective Urban Rural Epidemiological (PURE) population study and led by Annika Rosengren, Professor of Medicine, with her research colleague Ailiana Santosa, first author of the paper. Both work at the Institute of Medicine at Sahlgrenska Academy, University of Gothenburg.

The present study cannot answer such questions as whether stress has a more acute or chronic effect, or whether its effect differs among the country income categories. According to the researchers, however, one strength of the study involves is that it involves surveying aspects of stress that may be relevant even in countries where the term "stress" may be less current than in western high-income countries.

"It's not known exactly what causes the elevated risk of cardiovascular disease among the severely stressed people. But many different processes in the body, such as atherosclerosis and blood clotting, may be affected by stress," Rosengren says.

"If we want to reduce the risk of cardiovascular disease globally, we need to consider stress as another modifiable risk factor," she continues.

The PURE study, which includes 200,000 people from 26 countries, has currently followed them for about a decade. Lead investigator is professor Salim Yusuf of the Population Health Research Institute, at McMaster University and Hamilton Health Sciences, in Canada.

"The impact of stress on cardiovascular disease has been long recognized, and approaches to reducing stress is potentially promising in reducing CVD" he says.

**More information:** Ailiana Santosa et al, Psychosocial Risk Factors and Cardiovascular Disease and Death in a Population-Based Cohort From 21 Low-, Middle-, and High-Income Countries, *JAMA Network Open* (2021). [DOI: 10.1001/jamanetworkopen.2021.38920](https://doi.org/10.1001/jamanetworkopen.2021.38920)

Provided by University of Gothenburg

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