

Low income and work stress contribute to link between education, heart disease and stroke

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Association between educational attainment and cardiovascular disease and cardiovascular death after 14-year follow-up in men and women without and with cardiometabolic disease with % excess risk explained by income and job strain. Credit: *European Heart Journal*

Low educational levels predict an increased risk of developing or dying from heart disease and stroke according to the first nationwide study of the link between education and risk of cardiovascular disease.

The study, which is published in the *European Heart Journal* today, is also the first nationwide study to look at the extent to which low income and work stress plays a role in the association between [education](#) and [cardiovascular disease](#). It found that low income and work stress could explain between 21-54% of the [increased risk](#) of developing or dying from cardiovascular disease among people with and without cardiovascular or metabolic diseases at the start of the study.

Researchers led by Dr. Elisabeth Framke at the National Research Centre for the Working Environment in Copenhagen, Denmark, analysed data from 1,638,270 Danish residents aged 30 to 59 in 2000 who did not have cardiovascular disease or diabetes at the start of the study. In addition, they looked at 41,944 people who had been diagnosed already with cardiometabolic disease, which includes heart disease and metabolic conditions such as diabetes. They followed them all until the end of 2014 to see who developed or died from these medical conditions.

Dr. Framke said: "We found that among healthy individuals, those with a low educational level have a higher risk of developing cardiovascular disease than those with a high educational level. Among 10,000 men with low education, 61 would develop a cardiovascular disease within 12 months, whereas among 10,000 men with high education, only 34 would develop the disease within this time-frame. After taking some variables into account that could affect the results, such as age and migration background, this corresponds to a 1.62-fold higher risk among those with low education.

"Among women, the picture is similar, although working-age women have a much lower risk of cardiovascular disease than men. Among 10,000 women with low education, 32 would develop a cardiovascular disease within 12 months, whereas among 10,000 women with high education, only 16 would develop the disease within this time-frame. This corresponds to a 1.66-fold higher risk."

The researchers also gathered information on annual disposable household incomes and "[job strain](#)", which is a combination of the psychological demands of a job and the amount of control a person has over their work. A job with high job strain would be one where there are high psychological demands, but little control.

"When we took household income level and level of work stress, measured by the combination of high job demands and low job control, into consideration, the increased risk among those with low educational level lessened somewhat. We found a 1.46-fold higher risk among men and 1.53-fold higher risk among women," said Dr. Framke.

This means that adjusting for income and job strain reduced the risk by 25% for men and by 21% for women.

The researchers found a similar pattern when they looked at people who had cardiovascular disease or diabetes when the study started. Men and women with a low educational level had a 1.52-fold and 2.18-fold higher risk of dying of cardiovascular disease respectively than men and women with a high educational level. After adjusting for income and job strain, the risk was reduced to a 1.24-fold and 1.79-fold increased risk in men and women respectively—a reduction in risk of 54% in men and 33% in [women](#).

"Our interpretation of these findings is that low income and high job strain may play a role in how low educational level affects the risk of

developing or dying from cardiovascular disease, but that also a considerable part of this association is independent of income and job strain," said Dr. Framke.

"If low income and high job strain play a role in how educational level affects risk of cardiovascular disease, then improvement of disposable income and reduction of job strain may help to reduce the increased risk of developing or dying from cardiovascular disease among people with low educational attainment.

"Furthermore, ensuring equal treatment regardless of educational level is important, both in terms of preventing the development of cardiovascular disease amongst healthy people and of preventing death from cardiovascular disease amongst people who already have [heart disease](#), diabetes or have suffered a stroke."

A major strength of the study is its size: it included all employees in Denmark aged 30-59. Fourteen years of follow-up, with annual updates of information such as education, [income](#), job strain, development of diseases and causes of death, taken from population and nationwide registers meant that the data were accurate and comprehensive.

The study can only show that there is an association between factors such as education, [low income](#) and job strain and cardiovascular disease, not that they cause the disease. Other limitations include the fact that the findings cannot necessarily be generalised beyond the age group examined or to other countries. The data lacked information on biological and behavioural factors that can affect the risk of cardiovascular [disease](#), such as blood pressure, cholesterol levels, smoking and diet.

More information: Elisabeth Framke et al, Contribution of income and job strain to the association between education and cardiovascular

disease in 1.6 million Danish employees, *European Heart Journal* (2019). [DOI: 10.1093/eurheartj/ehz870](https://doi.org/10.1093/eurheartj/ehz870)

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