

# Short people more prone to heart disease: study

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Short people are at greater risk of developing heart disease than tall people, according to the first systematic review and meta-analysis of all the available evidence, which is published online today in the *European Heart Journal* [1].

The systematic review and meta-analysis, carried out by Finnish researchers, looked at evidence from 52 studies of over three million people and found that short adults were approximately 1.5 times more likely to develop cardiovascular [heart disease](#) and die from it than were tall people. This appeared to be true for both men and women.

Dr Tuula Paajanen, a researcher at the Department of Forensic Medicine, University of Tampere, Tampere, Finland, said that over the years there had been a number of studies that had provided conflicting evidence on whether shortness was associated with heart disease.

"The first report on the inverse association between [coronary heart disease](#) (CHD) and height was published in 1951 and, since then, the association between short stature and cardiovascular diseases has been investigated in more than 1,900 papers. However, until now, no systematic review and meta-analysis has been done on this topic. We hope that with this meta-analysis, the association is recognised to be true and in future more effort is targeted to finding out the possible pathophysiological, environmental and genetic mechanisms behind the association, with eyes and minds open to different hypotheses," she said.

Due to the many different ways that previous studies have investigated the association between height and heart disease, Dr Paaanen and her colleagues decided to compare the shortest group to the tallest group instead of using a fixed height limit.

From the total of 1,900 papers, the researchers selected 52 that fulfilled all their criteria for inclusion in their study. These included a total of 3,012,747 patients. On average short people were below 160.5 cms high and tall people were over 173.9 cms. When men and women were considered separately, on average short men were below 165.4 cms and short women below 153 cms, while tall men were over 177.5 cms and tall women over 166.4 cms.

Dr Paaanen and her colleagues found that compared to those in the tallest group, the people in the shortest group were nearly 1.5 times more likely to die from cardiovascular disease (CVD) or coronary heart disease (CHD), or to live with the symptoms of CVD or CHD, or to suffer a heart attack, compared with the tallest people.

Looking at men and women separately, short men were 37% more likely to die from any cause compared with tall men, and short women were 55% more likely to die from any cause compared with their taller counterparts.

"Due to the heterogeneity of studies, we cannot reliably answer the question on the critical absolute height," write the authors in their study. "The height cut-off points did not only differ between the articles but also between men and women and between ethnic groups. This is why we used the shortest-vs.-tallest group setting."

The findings have clinical implications. Dr Paaanen said: "The results of this systematic review and meta-analysis suggest that height may be considered as a possible independent factor to be used in calculating

people's risk of heart disease. Height is used to calculate body mass index, which is a widely used to quantify risk of coronary heart disease."

It is not known why short stature should be associated with increased risk of heart disease. Dr Paajanen said: "The reasons remain open to hypotheses. We hypothesize that shorter people have smaller coronary arteries and smaller coronary arteries may be occluded earlier in life due to factors that increase risk, such as a poorer socioeconomic background with poor nutrition and infections that result in poor foetal or early life growth. Smaller coronary arteries also might be more affected by changes and disturbances in blood flow. However, recent findings on the [genetic background](#) of body height suggest that inherited factors, rather than speculative early-life [poor nutrition](#) or birth weight, may explain the association between small stature and an increased risk of heart disease in later life. We are carrying out further research to investigate these hypotheses."

Dr Paajanen said that it was important that short people should not be worried by her findings. "Height is only one factor that may contribute to heart disease risk, and whereas people have no control over their height, they can control their weight, lifestyle habits such as smoking, drinking and exercise and all of these together affect their heart disease risk. In addition, because the average height of populations is constantly increasing, this may have beneficial effect of deaths and illness from cardiovascular disease."

In an editorial on the research published at the same time [2], Jaakko Tuomilehto, Professor of Public Health at the University of Helsinki, Helsinki, Finland, welcomed the study, writing: "The systematic review and meta-analysis on this topic . . . is well justified 60 years after the first observation and the hundreds of other papers which have been published since then on this topic. The results are unequivocal: short stature is associated with increased risk of coronary heart disease. This

meta-analysis provides solid proof for this, but, as the authors conclude 'The possible pathophysiological, environmental, and genetic background of this peculiar association is not known'."

He suspects that environmental events affecting growth before and after birth may be involved. "Socio-economic adversity in childhood is . . . associated with delayed early growth and shorter adult stature. The so-called catch-up growth during the first years of life among children who are born small has negative health effects in adulthood; much of the early growth is due to greater fat accumulation. Thus, it is most likely that short stature is the link to coronary heart disease, and that tallness is not a primary factor in preventing the disease, although it indicates healthy growth. [Short stature](#) seems to be a marker for risk."

While more work is needed to understand the exact nature of the mechanisms at work, he writes that information on height can be used now for the prevention of heart disease and other chronic diseases linked to shortness. "Full term babies who are born small are likely to be short as adults. They should receive preventive attention early on. The primordial prevention of chronic diseases should start during foetal life, and health promotion should be targeted to all pregnant women with the aim of health development of the foetus. Low birth weight and some other birth characteristics can reveal potential problems during this period of life. After that, in babies with low birth weight, it is important to avoid excessive catch-up growth, i.e. early-life fatness."

In adult life it becomes more difficult to discover best practices, but Prof Tuomilehto, thinks it is likely short adults would benefit from more aggressive risk factor reduction.

He concludes: "Most of us know approximately our own height ranking, and, if we are at the low end, we should take coronary risk factor control more seriously. On the other hand, tall people are not protected against

coronary heart disease, and they also need to pay attention to the same risk factors as shorter people."

**More information:** [1] "Short stature is associated with coronary heart disease: a systematic review of the literature and a meta-analysis."

European Heart Journal. [doi:10.1093/eurheartj/ehq155](https://doi.org/10.1093/eurheartj/ehq155)

[2] "Is tall beautiful and the heart healthy?". European Heart Journal.

[doi:10.1093/eurheartj/ehq183](https://doi.org/10.1093/eurheartj/ehq183)

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