Heart study suggests city center pollution doubles risk of calcium build-up in arteries

April 26 2012

City centre residents who took part in a study were almost twice as likely to suffer from coronary artery calcification (CAC), which can lead to heart disease, than people who lived in less polluted urban and rural areas, according to research published in the May issue of the *Journal of Internal Medicine*.

Researchers spoke to 1,225 men and women aged 50 and 60 years of age, including 251 (20%) who lived in the centres of major Danish cities.

Despite the fact that none of the participants showed any symptoms of heart disease, 43% of the total had CAC. The study also found that people who lived in city centres were 80% more likely to develop CAC than those living in other areas and that males, older participants, diabetics and smokers also faced higher risks.

"Our study aimed to evaluate the association between living in a city centre, which is often used by researchers to indicate exposure to air pollution, and the presence of coronary artery calcification in men and women showing no other symptoms of heart disease" explains lead author Dr Jess Lambrechtsen from the Department of Cardiology at Svendborg Hospital, Denmark.

Participants were selected at random from a national Government database of Danish adults and 69% agreed to take part and attend one of four regional hospitals in Southern Denmark. They filled out

questionnaires about their medical conditions, prescribed medication, smoking habits and family history of heart disease. The clinical examination included height, weight, blood pressure, blood tests and scans.

Three per cent were excluded from the study because of previous heart problems, leaving 1,225 people who did not display any symptoms of heart disease. Of these, 47% were male and 53% were female and they were equally split between the 50 year-old and 60 year-old age groups. One in five were city centre dwellers, with this sample including a slightly higher percentage of females and people aged 60 (both 52%).

Air pollution levels were extracted from a national surveillance source. This showed that rates were approximately three times higher in city centres than other urban areas and seven times higher than in rural areas.

Key findings included:

- CAC was more common in people living in city centres, rather than urban or rural areas – in men (69% v 56%), women (42% v 30%), 50 year-olds (48% v 32%) and 60 year-olds (61% v 53%).
- When the researchers looked at the odds ratio, this showed that people living in city centres were 80% more likely to develop CAC than those living in urban or rural areas.
- Men were more than three times as likely as women to develop CAC, with a 220% higher odds risk.
- 60 year-olds were approximately twice as likely to develop CAC as 50 year-olds (120% higher) as were smokers than non-smokers (90% higher) and people with diabetes when compared with those without diabetes (100% higher).
- High cholesterol raised the odds of developing CAC by 60% and high blood pressure and a family history of heart disease both

raised the odds by 50%.

"Our study shows that living in a city centre and traditional risk factors for heart disease were independently associated with the presence of CAC in a group of middle-aged subjects who did not display any symptoms" concludes Dr Lambrechtsen.

"The place where a person lives is often used as a surrogate for exposure to air pollution in research. In this study we found that, even after adjusting for demographic and clinical variables, where people lived was independently associated with CAC and that CAC levels were highest in people living in city centres.

"A number of factors can also influence CAC, such as noise and stress levels and it could be assumed these would be higher in city centres. However, in this study stress levels, as measured by average blood pressure, were actually lower in city centre dwellers than people living in urban areas. Heart rates, another predictor of stress, were the same across the groups.

"The mechanisms by which air pollution may contribute to CAC are not well understood. But what is clear from this study is that the links between air pollution and CAC need further investigation."

More information: The relation between coronary artery calcification in asymptomatic subjects and both traditional risk factors and living in the city centre: a DanRisk substudy. Lambrechtsen et al. *Journal of Internal Medicine*. 271, pp444. (May 2012). doi: 10.1111/j.1365-2796.2011.02486.x

Provided by Wiley