

Indicators for risk of heart disease are higher in passive smokers

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Exposure to second-hand smoke at work, home or elsewhere results in a disproportionate rise in markers that increase the risk of cardiovascular disease, University of Nottingham researchers have found.

A new study published in *Circulation*, a journal of the American Heart Association, measured the level of cotinine in participants' blood, rather than relying on participants' self-reporting of exposure to second-hand smoke. Cotinine is the major metabolite of nicotine that indicates levels of nicotine intake.

Since nicotine is highly specific for tobacco smoke, blood serum cotinine levels track exposure to tobacco smoke and its toxic components.

Dr Andrea Venn, lead author of the study and associate professor in the Division of Epidemiology and Public Health at The University of Nottingham, said: "Our study provides further evidence to suggest low level exposure to second-hand smoke has a clinically important effect on susceptibility to cardiovascular disease.

"This is the first epidemiological study to relate the levels of these markers to an objective measure of second-hand smoke exposure, rather than self-reported exposure, which can be biased."

Dr Venn and co-author Professor John Britton checked to see if people exposed to second-hand smoke had increased levels of fibrinogen,

homocysteine and C-reactive protein — all markers of cardiovascular disease. Researchers examined data from the third National Health and Nutrition Examination Survey (NHANES III, 1988–94), which included 7,599 adults who had never smoked.

Sixty-eight percent of the participants were women, with participants' median age being 38. Eighteen percent of participants had no detectable levels of cotinine; the rest were classified as having either low or high cotinine. Eighteen percent of participants with low levels of cotinine and 56 percent of subjects with high levels of cotinine reported living with a smoker at home or being exposed to tobacco smoke at work, the primary places for long-term exposure.

Researchers found the low- and high-cotinine groups had significantly higher levels of fibrinogen and homocysteine than the 'no detectable' group, with fibrinogen levels estimated at 9–10 milligrams per decilitre higher and homocysteine levels at 0.8 micromoles per litre higher.

Dr Venn said: "The increased levels of fibrinogen and homocysteine seen in relation to second-hand smoke exposure were equivalent to about 30 per cent to 45 per cent of those seen for active smoking."

The researchers also investigated elevated C-reactive protein, another inflammatory marker, and white blood cell count in participants with elevated cotinine levels. They found no significant association.

The effect levels seen for fibrinogen and homocysteine were about twice as high when measuring cotinine levels compared to previous studies based on self-reported exposure.

The association changed little even after researchers adjusted for participants' self-reported fruit and vegetable consumption — one of the more influential aspects of diet on cardiovascular health — and for

lifestyle factors such as physical activity, social class and obesity. Restricting analysis to those 70 or younger with no history of heart attack, heart failure or stroke also made little difference in the association.

Dr Venn said: "Our study shows that very low levels of exposure to second-hand smoke may be associated with appreciable increases in cardiovascular risk. While the cotinine levels were on average only about 0.1 percent of those in active smokers, the apparent effects of passive smoking on the biomarkers were about one-third to one-half those for active smoking."

The associations with fibrinogen and homocysteine observed in the study translate into an increase in a disease risk of five per cent, although the combined effect due to other processes is likely to be closer to 30 percent, Dr Venn said.

"Even when participants weren't exposed to smoke at the workplace or at home, many had low or high levels of cotinine in their blood," Dr Venn said. "These people may be exposed in bars or restaurants or perhaps in other people's homes such as those of relatives or friends. This suggests that even people exposed to low levels of second-hand smoke may be at increased risk.

"This study supports existing evidence that exposure to second-hand smoke is an important avoidable cause of cardiovascular disease. It also highlights the importance of implementing measures to protect the public from second-hand smoke such as banning smoking in enclosed public places and workplaces," Dr Venn added.

A smoking ban applying to all UK public spaces comes into force on July 1, 2007.

Source: University of Nottingham

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