

Smoking linked to bleeding in the brain in large, long-term study of twins

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An investigation of the Finnish Twin Cohort reaffirmed a link between smoking and subarachnoid hemorrhage (SAH), a type of bleeding stroke that occurs under the membrane that covers the brain and is frequently fatal. The new study by researchers in Finland is published today in *Stroke*.

In a 2010 study of nearly 80,000 twins from Denmark, Finland and Sweden, results suggested that SAH had more to do with external risk factors and very little to do with genetic influence. Twins share either all or half their genes (identical vs. fraternal) so they are valuable for studies designed to evaluate the role of genetics versus [environmental factors](#) in disease development.

In this study, researchers sought to clarify the factors involved when only one twin suffered from fatal bleeding in the [brain](#) and hypothesized that smoking—the most important environmental risk factor—could play a significant role. This study utilized health care data from the Finnish Twin Cohort, a [national database](#) of 32,564 individuals (16,282 same-sex, twin pairs in Finland) who were

born before 1958 and alive in 1974, and followed for over 42 years between 1976 and 2018.

Researchers identified 120 fatal bleeding stroke events among the twins, and the strongest link for a fatal brain bleed was found among smokers.

"Our study provides further evidence about the link between smoking and bleeding in the brain," said corresponding researcher Ilari Rautalin, B.M., a sixth-year medical and Ph.D. student at the University of Helsinki in Finland.

Data collected from surveys included smoking; high blood pressure (diagnosis or use of antihypertensive medications); physical activity; body mass index; education; and alcohol use. Participants were separated into two groups: smokers (occasional or current) or non-smokers (never and former). Current smokers were classified according to the number of cigarettes smoked per day: light, less than 10; moderate, 10-19; heavy, 20 or more.

The analysis of the 120 fatal bleeding events found:

- Four fatalities occurred among both twins in two pairs. In the remaining 116 fatalities, one twin died of bleeding in the brain, while the other died of another cause, migrated during the follow-up or was still alive at the end of the study follow-up.
- Heavy and moderate smokers had 3 times the risk of fatal bleeding in the brain, while light smokers had slightly less at 2.8 times the risk.
- Median age at the fatal brain bleed was 61.4 years.

Risk factors such as [high blood pressure](#), lower [physical activity](#) rates and being female were not found to be significant influences in this investigation, unlike prior studies. Smoking was associated with fatal bleeding in the brain consistently in both men and women and with

bleeding stroke deaths within twin pairs where only one of the twins died from a SAH.

The current study did not have data on non-fatal SAH events and researchers were not able to estimate the impact of former smoking on these brain bleeds. Former smokers and never [smokers](#) were combined in the non-smoking category. Researchers were also not able to confirm the aneurysmal origin of SAHs (no patient data was available) and may have included a few non-aneurysmal SAH events.

"This long-term study in twins helps to confirm the link between [subarachnoid hemorrhage](#) and smoking," said Rose Marie Robertson, M.D., FAHA, the American Heart Association's deputy chief science and medical officer and co-director of the AHA Tobacco Center for Regulatory Science, who was not involved in the study. "Not [smoking](#) or quitting if you've already started, is an essential component of primary prevention."

More information: Smoking Causes Fatal Subarachnoid Hemorrhage, *Stroke* (2020). DOI: [10.1161/STROKEAHA.120.031231](https://doi.org/10.1161/STROKEAHA.120.031231)

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