

Water pipe smoking causes significant exposure to nicotine and cancer-causing agents

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Young adults who smoked water pipes in hookah bars had elevated levels of nicotine, cotinine, tobacco-related cancer-causing agents, and volatile organic compounds (VOC) in their urine, and this may increase their risk for cancer and other chronic diseases, according to a study published in *Cancer Epidemiology, Biomarkers & Prevention*, a journal of the American Association for Cancer Research.

"This study reports systemic intake of tobacco-specific nitrosamines and VOCs after a typical [water pipe](#)-smoking session in a hookah bar setting, thus making the findings generalizable to most water pipe users in the United States," said Gideon St.Helen, Ph.D., postdoctoral fellow in the Division of Clinical Pharmacology and the Center for Tobacco Control Research and Education at the University of California, San Francisco.

After a single evening of water [pipe smoking](#) in a hookah bar, young men and women had in their urine a 73-fold increase in nicotine; fourfold increase in cotinine; twofold increase in NNAL, a breakdown product of a tobacco-specific nitrosamine, NNK, which can cause lung and pancreatic cancers; and 14 to 91 percent increase in the breakdown products of VOC such as benzene and acrolein that are known to cause cancer and cardiovascular and respiratory diseases.

"There was also a substantial increase in nicotine levels, which raises concerns about the potential addictiveness of water pipe smoking and

possible effects on the developing brains of children and youths who use water pipes," added St.Helen. "Water pipe smoking is generally perceived to be a safe alternative to cigarette smoking, even for children and youths. Our study shows that water pipe use, particularly chronic use, is not [risk](#)-free."

St.Helen and colleagues recruited 55 healthy, experienced water pipe smokers, ages 18 to 48 years, to the study. Participants were instructed to refrain from any type of smoking for a week.

At the end of this period they provided a "before" urine sample and smoked water pipes at a hookah bar of their choice in the San Francisco Bay area. Soon after the visit, they provided the "after" urine sample, and filled a form to provide detailed information on their smoking session including total time spent smoking, number of bowls smoked, and number of shared users. They also provided a first-voided urine sample the next morning, which helped researchers estimate the clearance of the tobacco-related chemicals of interest.

The study participants spent on average 74 minutes smoking water pipes and smoked an average 0.6 bowls of water pipe tobacco per person.

The researchers found that the elevated levels of nicotine, cotinine, and NNAL, which were detected immediately after the water pipe-smoking session, remained significantly elevated in the next-day urine samples, compared with the "before" samples: Nicotine was 10.4-fold higher; cotinine, 3.2-fold; and NNAL, 2.2-fold.

Water pipe-smoking duration correlated significantly with the increase in post-exposure urine nicotine levels, and number of bowls smoked per person significantly correlated with the increase in post-exposure and next-day [urine](#) cotinine levels, respectively. The average increase in nicotine levels was comparable to [levels](#) obtained after smoking at least

one cigarette, explained St.Helen.

"I have seen entire families, including young children, smoking water pipes. I have even been offered a smoke by my friend who thought water pipe smoking was 'totally safe,'" St.Helen added. "Our study provides evidence that water pipe smoking leads to significant intake of tobacco-related addictive and harmful substances, and is therefore not without risk, particularly among children and youths."

Provided by American Association for Cancer Research

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