Water Pipe Smoking: Not Risk Free

By Judy Peres

For young adults who frequent hookah bars, water pipe smoking leads to elevated levels of nicotine, cotinine, tobacco-related carcinogens, and volatile organic compounds (VOCs) in urine. These findings, published May 16 in Cancer Epidemiology, Biomarkers, and Prevention, raise alarms about a practice rapidly gaining in popularity.

“We should forget the myth that hookah smoking is not harmful,” said Mirjana Djordjevic, Ph.D., program director of the National Cancer Institute’s Tobacco Control Research Branch. “This behavior is spreading because people think it’s harmless fun. But this study and others show that there is exposure to the same toxicants and carcinogens as in cigarette tobacco—plus high levels of carbon monoxide and polycyclic aromatic hydrocarbons from the burning charcoal.”

The study, from the University of California, San Francisco, examined urine samples from 55 healthy, experienced water pipe smokers aged 18–48 years both before and after a session at a hookah bar of their choice. Participants refrained from any type of smoking for a week before the first sample was drawn. Researchers took a second sample soon after the session, and participants supplied a third sample of first-voided urine the next morning, which helped researchers estimate clearance of tobacco-related chemicals.

Participants’ “after” urine samples contained an average 73-fold increase in nicotine; fourfold increase in cotinine; twofold increase in NNAL, a breakdown product of a tobacco-specific nitrosamine called NNK, which can cause lung and pancreatic cancers; and 14%–91% increase in break-NNK, which can cause lung and pancreatic cancers; and 14%–91% increase in breakdown products of VOCs such as benzene, 1,3-butadiene, and acrolein, which cause cancer, cardiovascular, and respiratory diseases.

Elevated levels detected immediately after smoking remained elevated in next-day urine samples compared with “before” samples: Nicotine was 10.4-fold higher; cotinine, 3.2-fold higher; and NNAL, 2.2-fold higher.

The average hookah-smoking session lasted 74 minutes, with participants consuming 0.6 bowl of tobacco on average. Increased nicotine and cotinine levels after smoking statistically significantly correlated with duration of smoking and amount of tobacco consumed.

Christopher Loffredo, Ph.D., a professor of oncology and biostatistics at Georgetown Lombardi Comprehensive Cancer Center in Washington, D.C., who has studied hookah smoking in Egypt, praised the approach of the researchers.

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He said that taking repeated samples over a short time, under uniform conditions, and with precise measurements, yielded very solid results.

“There are multiple sources of nitroamines and VOCs in the environment,” Loffredo said, “and it’s hard to discern what fraction comes from the hookah. This paper isolated that effect.”

“Our findings have policy implications,” said Gideon St. Helen, Ph.D., a postdoctoral fellow in the Division of Clinical Pharmacology and the Center for Tobacco Control Research and Education at UCSF, the study’s first author.

One concern, St. Helen said, “is the exposure to cancer-causing compounds in water pipe smoke, such as benzene, which is known to cause leukemia, the most common cancer in children and teens.”

Another public-health concern, especially among young people, is the potential for nicotine dependence.

“This area warrants further research,” said St. Helen. “Our study showed substantial intake of nicotine in users of water pipes in the hookah bar setting. Previous studies suggest that the average nicotine levels we measured in these water pipe users are high enough to cause physiologic changes in the brain that can sustain nicotine addiction. Other studies also suggest that exposure to nicotine during childhood and youth increases the severity of nicotine dependence later on.

“Thus,” he concluded, “restrictions on sale to minors and banning the use of water pipes by minors in public places or commercial establishments are sensible public-health policies. Water pipe smoking is not risk free.”

Bruce Johnson, M.D., a lung cancer researcher at Boston’s Dana–Farber Cancer Institute and professor of medicine at Harvard Medical School, agrees. In banning cigarette smoking in bars, restaurants, and workplaces, he said, “we’ve tried to take these levels of carcinogens out of public areas. This [set of findings on water pipe smoking] rises to that level of evidence.”

Benjamin Toll, Ph.D., program director of the smoking-cessation service at Yale Comprehensive Cancer Center in New Haven, Conn., added, “We should attempt to control these products as much as we attempt to control cigarettes. There’s a proliferation...
Researchers Push Back Against Overhauling Clinical Trials

By Susan Jenks

Despite an aging population expected to increase the U.S. cancer burden, the National Cancer Institute faces diminishing federal funding—down at least 20% in purchasing power over the past decade.

Not only is this trend coming at a time of “unmatched promise in the oncological sciences,” according to NCI director, Harold Varmus, M.D., it’s coming during a dramatic restructuring of NCI’s clinical trial system.

NCI officials say the overhaul, which a 2010 Institute of Medicine report recommended, brings new efficiency and focus to an outdated system, using fewer but larger groups of investigators and distributing tight resources more effectively. But scientific group leaders and patient advocates say inadequate study funding threatens patient access to potentially lifesaving treatments offered nowhere else and reflects a major shift in NCI research priorities.

On March 1, the NCI Clinical Trials Cooperative Group Program became the National Clinical Trials Network. The streamlined entity, now composed of five instead of 10 cooperative groups, has new caps on yearly patient enrollment and 25%-40% in cuts to operational expenses, according to the groups’ chairs. Also, they say, the fiscal year 2014 budget of $151 million is $25 million less than anticipated, even though the NCI’s board of scientific advisors had approved the increase.

NCI officials within the Division of Cancer Treatment and Diagnosis were unavailable for comment, but division director, James Doroshow, M.D., has often indicated NCI’s support for clinical trials and its willingness to meet with individual groups.

of these hookah bars that appeal to young smokers. What they do not appear to realize is that there are high levels of dangerous compounds in the hookah vapor.”

The Centers for Disease Control and Prevention estimated that, among high school seniors, 17% of boys and 15% of girls have used hookahs. From 2011 to 2012, “current use” of hookahs among all high school students (defined as at least once in the past 30 days) increased from 4.1% to 5.4%.

Studies of U.S. college students estimate that 22%-40% have used water pipes.

A study from the University of California, San Diego, found that hookah use increased by more than 40% in California between 2005 and 2008, and use by young adults (aged 18–24 years) far outstripped that of older adults. Nevertheless, hookah smoking is not regulated.

Michael Schivo, M.D., a pulmonary specialist at the University of California, Davis, who has led research in this area, said he believes that water pipe smoking is an increasingly appealing social practice, partly because it involves cheaper and more flavorful forms of tobacco than cigarettes.

In a water pipe (also called a hookah, narghile, shisha, goza, or bubble-bubble), smoke produced by burning flavored tobacco with charcoal or embers is drawn through a pipe connected to a liquid-filled base. The smoke passes through the liquid before users inhale through a hose and mouthpiece, which is often shared. The result is a smooth, easily tolerated, and social smoking experience.

According to CDC, hookah tobacco comes in flavors, including apple, mint, cherry, chocolate, coconut, licorice, cappuccino, and watermelon.

Djordjevic was appalled to hear a TV announcer describe a visit to a hookah bar with her children: “She said it smelled like baked apples!”

“It doesn’t make sense that a package of cigarettes has warning labels regarding their harmful effects, yet none of the same warnings apply to hookah tobacco,” Schivo said. “Given that water pipe use has the potential to be the next big tobacco epidemic, education efforts should focus on informing the public of its harms and reducing access among minors.”

Researchers say hookah use is the most understudied of all cigarette alternatives, and some believe it is potentially the most dangerous. That’s because water pipe smokers inhale more deeply and longer than in other types of smoking, which exposes them to noxious particles in lower portions of the lungs. Although the water absorbs some nicotine, levels of arsenic, chromium, and lead that reach the user may be higher.

According to CDC, an hour-long hookah smoking session involves 200 puffs, whereas smoking an average cigarette involves 20 puffs. The amount of smoke inhaled during a typical hookah session is about 90,000 mL, compared with 500–600 mL inhaled when smoking a cigarette.

A World Health Organization study group came to a similar conclusion: “The water pipe smoker may therefore inhale as much smoke during one session as a cigarette smoker would inhale consuming 100 or more cigarettes.”

Although the behavior is increasing in popularity in the U.S., it is more popular in other parts of the world, such as North Africa and Southwest Asia, where “it is not uncommon for children to smoke with their parents,” the study group said.

© Oxford University Press 2014. DOI:10.1093/jnci/dju275
First published online August 13, 2014