Secondhand Smoke Exposure in Waterpipe Venues in Egypt

Fact Sheet

Waterpipe tobacco smoking (also known as shisha, nargile or hookah) is increasing worldwide.[1] Waterpipes have been used in Egypt for centuries. In 2009, 1.6 million adults (3.3 percent) smoked waterpipes in Egypt, with increasing use among non-traditional groups, including young people, women, those with higher education and urban dwellers.[2]

There is a common misperception that waterpipe tobacco smoking is less harmful than cigarette smoking.[3] In 1981, Egypt banned the use of tobacco products in all public transport and expanded legislation in 1994 and 2007 to further restrict its use in some indoor public places. However, tobacco use is still unrestricted in many indoor public places, including hospitality venues.[4] This study quantifies the magnitude and content of tobacco smoke exposure from waterpipes and demonstrates the need for continued consideration of waterpipe venues in smoke-free legislation.

Methods

To evaluate exposure to waterpipe tobacco smoking, researchers conducted a survey of waterpipe venues and their employees in Cairo, Egypt between November 2013 and April 2014. Each venue was required to have at least one non-smoking employee. Air samples in the venues and hair samples from employees were collected and analyzed (Table 1).

Table 1. Secondhand Smoke Constituents Measured in Air and Exposure Biomarkers Measured in Venue Employees

Air Markers	Exposure Biomarkers
Nicotine	Nicotine (*hair*)
Carbon monoxide (CO)	Carbon monoxide (CO) (*exhaled breath*)
Polycyclic aromatic hydrocarbons (PAHs)	
Nicotine-derived nitrosamine ketone (NNK)	
Particulate matter <2.5 µm ($PM_{2.5}$)	

Venue and employee characteristics

Fieldworkers observed venue characteristics during peak business activity and asked about smoking histories and other factors that may contribute to biomarker levels (Table 2). Venue and employee participation rates were 30 percent and 76 percent, respectively.

Table 2. Venue and Employee Characteristics

Venue Characteristics	(N = 20)
Indoor smoking policy	
Allowed in some indoor areas	5%
Allowed everywhere (no policy)	95%
Customers smoking waterpipe inside	
<24%	35%
25-49%	40%
>50%	25%
Observations during peak activity	
# people, mean (SD)*	23 (11)
# cigarette smokers, mean (SD)	6 (2)
# waterpipe smokers, mean (SD)	7 (5)

* SD = standard deviation

Employee Characteristics	(N = 106)
Age, mean (SD)	32 (12)
Male	98%
<high school education	59%
# hours worked/week, mean (SD)	79 (18)
Current waterpipe smoker√	70%
Smoking status	
Current smoker†	84%
Former smoker‡	5%
Never smoker	11%

√ Reported waterpipe smoking in the past three months (daily, <daily or "just a few puffs")
† Reported cigarette, waterpipe or pipe smoking in the past three months (daily, <daily or "just a few puffs")
‡ Reported past tobacco use >3 months ago

Air markers

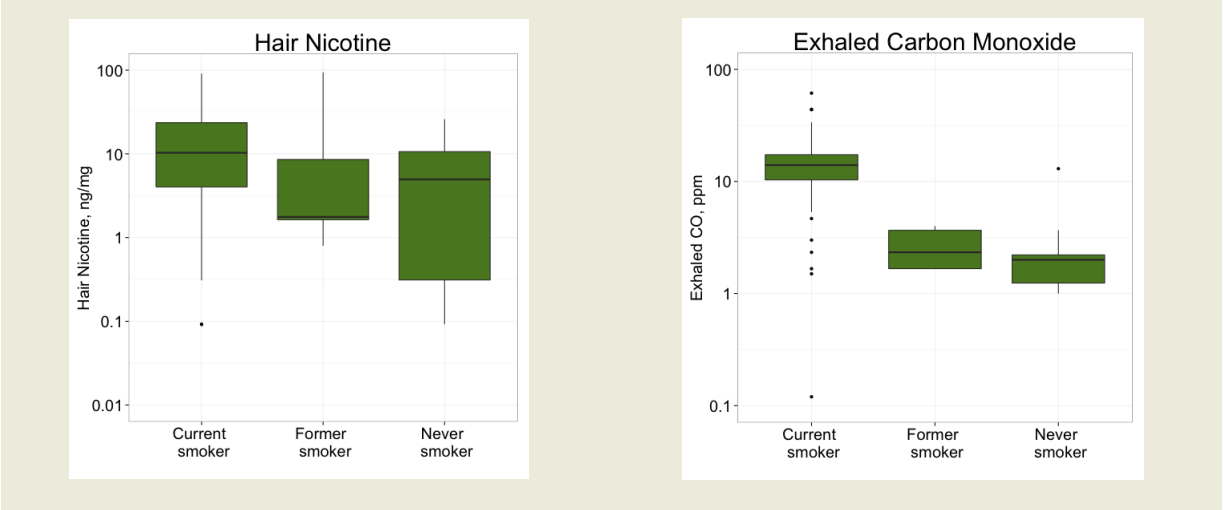
- The median PM2.5 level was 108 µg/m3, exceeding the World Health Organization (WHO) 24-hour PM2.5 standard of 25 µg/m3.
- The median CO level was 24 ppm, above the Environmental Protection Agency (EPA) 8-hour standard of 10 ppm.
- The median PAH level was 73 ng/m3.
- The median air nicotine level was 10 µg/m3, ranging from 0.04 µg/m3 to 39 µg/m3.
- The median NNK concentration was 1.1 ng/m3, ranging from 0.19 ng/m3 to 10 ng/m3.
- There are no standards for PAH, air nicotine and NNK, but the concentrations found were consistent with substantial exposure to tobacco smoke.[4]

Biomarkers in venue employees

Eighty-four percent of venue employees were current smokers, 5 percent were former smokers and 11 percent never smoked (Table 2).

- The median hair nicotine levels were 10.6 ng/mg for current smokers, 1.8 ng/mg for former smokers, and 5 ng/mg for never smokers.
- The median exhaled carbon monoxide levels were 14 ppm for current smokers, 2.3 ppm for former smokers, and 2 ppm for never smokers.
- There was a substantial overlap in hair nicotine concentrations between current, former and never smokers, potentially indicating that environmental exposure in the workplace is an important contributor of exposure to secondhand smoke.

Figure 1. Biomarkers in Venue Employees



Conclusion

There were high concentrations of PM2.5, CO, PAHs, air nicotine and NNK in waterpipe venues in Cairo, Egypt. Nicotine was found in the air, indicating exposure to tobacco smoke in waterpipe venues. CO and PAHs were much higher in Cairo than in similar studies done in Moscow, Russia and Istanbul, Turkey. These results confirm the importance of including waterpipe tobacco in smoke-free legislation in Egypt.

The study was conducted in collaboration with investigators at the Johns Hopkins Bloomberg School of Public Health and the Cairo University, Faculty of Medicine.

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[1] Maziak W, Taleb ZB, Bahelah R, Islam F, Jaber R, Auf R, Salloum RG.The global epidemiology of waterpipe smoking. Tobacco Control. 2014 October 8; [Epub ahead of print]; doi: 10.1136/tobaccocontrol-2014-051903.
[2] Global Adult Tobacco Survey: Egypt Country Report 2009. World Health Organization. Regional Office for the Eastern Mediterranean. Retrieved from http://www.who.int/tobacco/surveillance/gats_rep_egypt.pdf
[3] American Lung Association. Hookah Smoking: A Growing Threat to Public Health Issue Brief. Smokefree Communities Project, 2011. Retrieved from http://www.lung.org/stop-smoking/tobacco-control-advocacy/reports-resources/cessation-economic-benefits/reports/hookah-policy-brief.pdf
[4] Tobacco Control Laws: Explore Tobacco Control Legislation and Litigation from Around the World. Campaign for Tobacco-Free Kids. Retrieved from http://www.tobaccocontrollaws.org/legislation/country/egypt/sf-indoor 12/15/2014.