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Waterpipe tobacco smoking: Knowledge, attitudes, beliefs, and behavior in two U.S. samples

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Abstract

Despite evidence of increasing waterpipe tobacco smoking prevalence among U.S. young adults, little is known about the knowledge, attitudes, beliefs, and smoking patterns of waterpipe users in this population. To address this lack of knowledge, two convenience samples of U.S. waterpipe users were surveyed—one from a Richmond, Virginia, waterpipe café ($n=101$), the other from an Internet forum called HookahForum.com ($n=100$). Sixty percent reported first-time waterpipe use at or before age 18. Daily waterpipe use was reported by 19%, weekly use by 41%, and monthly use by 29%. Waterpipe use was more common during the weekend (75%) than during weekdays (43%). Forty-four percent reported spending ≥ 60 min smoking tobacco during a waterpipe session. The majority of waterpipe users owned a waterpipe (57%) and purchased it on the Internet (71%). Many waterpipe users smoked the sweetened and flavored tobacco (i.e., *maassel*), and fruit flavors were the most popular (54%). Past month use of cigarettes, tobacco products other than cigarettes or waterpipe, and alcohol was 54%, 33%, and 80% respectively, and 36% reported past-month marijuana use. Most waterpipe users were confident about their ability to quit (96%), but only a minority (32%) intended to quit. Most waterpipe users believed waterpipe tobacco smoking was less harmful and addictive than cigarettes. These results are from small convenience samples; more detailed study of a larger group of randomly sampled U.S. waterpipe tobacco smokers will be valuable in understanding this behavior and developing effective strategies to prevent it.

Introduction

Tobacco use is a global epidemic that kills millions of people each year (WHO, 2002), including 438,000 in the United States (CDC, 2005). Cigarette smoking accounts for the majority of tobacco-attributable morbidity and mortality, and much information is available regarding American cigarette smokers' smoking-related knowledge, attitudes, beliefs, and

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behaviors (e.g., U.S. Dept. of Health and Human Services 1998, 2001, 2004). However, there are other methods of smoking tobacco, including the centuries-old waterpipe also known as *hookah*, *shisha*, or *narghile* (Knishkowsky & Amitai, 2005; Maziak, Ward, Afifi Soweid, & Eissenberg, 2004a; Radwan, Mohamed, El Setouhy, & Israel, 2003). Using a waterpipe to smoke tobacco is often associated with the Eastern Mediterranean Region (EMR) but in recent years, its use has spread internationally (WHO, 2005). This spread is related, in part, to the use of sweetened and flavored tobacco such as apple or mint (Rastam, Ward, Eissenberg, & Maziak, 2004) and the perception that the waterpipe “filters” the smoke, rendering it less harmful than cigarette smoke (Kandela, 2000; Kiter et al., 2000).

A waterpipe has a head, body, bowl, and hose with mouthpiece. Tobacco in the head is sweetened, flavored, and very moist: it does not burn in a self-sustaining manner. Thus, charcoal is placed atop the tobacco-filled head, often separated from the tobacco by perforated foil. Users inhale through the mouthpiece and hose, drawing air over lit charcoal. The heated air, and any charcoal combustion products, passes through the tobacco, and the mainstream smoke is produced. Smoke passes through the waterpipe body, bubbles through the water in the bowl, and is carried through the hose to the user (Shihadeh, 2003). Relative to cigarettes, little is known about waterpipe use and its subsequent health effects (WHO, 2005). Studies of waterpipe users’ knowledge, attitudes, beliefs, and behavior come primarily from the EMR (Chaaya et al., 2004; Maziak et al., 2004b, 2004c).

The prevalence of using a waterpipe to smoke tobacco may be increasing in the United States, especially among college students. In 2004, *Smokeshop Magazine* (a trade journal) reported that 200–300 new waterpipe cafés had opened in the United States since 1999, usually in college towns. Also, recent media reports from over 30 U.S. states highlight waterpipe use among college students (e.g., Adler, 2005; Lewin, 2006; Osborne, 2006; Rudish, 2005; Westheim, 2005), as do anecdotal reports (e.g., Primack, Aronson, & Agarwal, 2006). One reported university survey revealed that 15.3% of 411 freshmen had used a waterpipe in the past 30 days (Smith, Curbow, & Stillman, 2007) while another revealed that past 30-day waterpipe use among 744 Introduction to Psychology students was over 20% (Smith-Simone, Maziak, Ward, & Eissenberg, 2007). Only one preliminary report discusses the behavior of U.S. waterpipe tobacco smokers: an advertisement for individuals who “smoked tobacco in a waterpipe” yielded 143 respondents who completed a survey in a university setting that focused primarily on use frequency and history (Ward et al., 2007). Results indicated that initial and current use usually occurred with a group of friends in a café/restaurant or at home, and that 44.8% of respondents smoked tobacco using a waterpipe once/month, 11.9% smoked once/week and 10.5% smoked daily (Ward et al., 2007). Over 75% considered water-pipe tobacco smoking less addictive than cigarettes, though some data suggest that the waterpipe delivers much larger nicotine doses (Shafagoj, Mohammed, & Hadidi, 2002). In sum, with prevalence point estimates between 15% and 20% in college samples, coupled with preliminary reports of weekly and daily use suggest that there is a growing need to learn more about U.S. waterpipe tobacco smoking, including users’ waterpipe-related knowledge, attitudes, beliefs, and behaviors. This study of U.S. waterpipe users comes from two samples—one from a Richmond, Virginia, waterpipe café where waterpipe tobacco smoking was verified by observation, the other from an Internet forum serving waterpipe tobacco smokers.

Method

Participants

This study, deemed Institutional Review Board (IRB) exempt by the Virginia Commonwealth University (VCU) IRB because participation of adults was anonymous, comprised two convenience samples. The first sample was recruited from one of the three

waterpipe cafés in Richmond, Virginia (the café was chosen because of its close proximity to VCU). Data collection occurred between May 25 and June 10, 2006, with most responses collected during peak business hours—8 p.m. to 1 a.m. on Friday and Saturday nights. Participants were observed using a waterpipe to smoke tobacco and were recruited via a flyer that was posted and circulated in the alcohol-free café, and also by word-of-mouth. The participants were paid \$10 upon survey completion. No records were kept regarding refusals; the number of interested potential participants often overwhelmed the capacity of research staff working with a single laptop computer.

The second sample was drawn from an Internet forum called HookahForum.com, chosen because it was the only such site that could be identified. Data collection occurred between May 24 and July 1, 2006. Participants were recruited via a forum thread entitled “IMPORTANT: RESEARCHING!!” that was posted by the forum moderator and contained two descriptions of the survey: one from the forum moderator, and another from an investigator (TE). Because the survey was conducted over the Internet, no attempt was made to verify waterpipe use, though the forum exists solely for waterpipe tobacco smokers. For this sample, no payment was offered for participation. Data analyzed from the HookahForum.com sample were associated with U.S. Internet protocol (IP) addresses.

The sociodemographic characteristics of sample participants are shown in Table 1.

Procedure, survey content, and data analysis

In the café, survey staff occupied a table with a laptop computer on which the electronic survey was completed. For the Internet forum sample, interested site visitors followed a link that brought them to the survey. The electronic survey, hosted by SurveyMonkey.com, included 56 items addressing demographics, waterpipe use knowledge, attitudes, behaviors, and smoking patterns as well as use of other psychoactive substances. Analyzed questionnaire items are listed in Tables 2 and 3.

In the two samples, 201 respondents reported ever waterpipe use, and data from these participants were analyzed using descriptive statistics to summarize waterpipe user characteristics, use patterns, and attitudes and beliefs related to waterpipes.

Results

Data were analyzed from 161 males and 40 females who reported ever use of a waterpipe to smoke tobacco. Generally, participants were young adults (86% between ages 18 and 24), single (81%), U.S. citizens (99%), White (85%), students (72%), and had more than 12 years of education (75%). Sixty percent reported first-time waterpipe use at or before age 18. Current frequency of use was daily for 19% of participants, weekly for 41%, monthly for 29%, and less than monthly for 12%. On average, waterpipe smoking was more likely to occur on weekends (Friday–Sunday, 75%) than weekdays (43%). On days when participants smoked tobacco using a waterpipe, 80% reported a single use episode (i.e., loading the head with tobacco only once), and for 44% of participants, a typical waterpipe session lasted more than 1 hr. Salient features of use included a group of friends sharing the same waterpipe in a restaurant or café (Table 2).

The majority of waterpipe users owned a water-pipe (57%) and purchased it on the Internet (71%). Many waterpipe users smoked the sweetened and flavored tobacco (i.e., *maassel*), and fruit flavors were the most popular (54%). Quick-lighting charcoal was used most frequently (61%). A little over a quarter (26.5%) of study participants reported using a waterpipe to smoke something other than tobacco, and 10% reported using the same waterpipe for smoking marijuana and tobacco. Other past 30-day psychoactive substance

use included cigarette smoking (54%), tobacco products other than waterpipe or cigarettes (33%), alcohol (80%), and marijuana (36%).

The vast majority of users were confident in their ability to quit waterpipe tobacco smoking (80% very confident) but had no intention to quit (68%), and did not believe they were “hooked” or dependent on waterpipe (87%). Most users believed that waterpipe tobacco smoking was less harmful, less addictive, and delivered less nicotine than cigarettes. The most common perceived positive attributes of waterpipe tobacco smoking were the taste, smell, relaxing effects, and the opportunity to socialize with friends (Table 3). Finally, the majority of participants (78%) anticipate increasing popularity of waterpipe tobacco smoking within the coming 5 years.

Discussion

Although this study was based on two convenience samples of waterpipe tobacco smokers, it provides much-needed preliminary information about patterns of use, beliefs, and attitudes related to water-pipe tobacco smoking in the United States. Results suggest that U.S. waterpipe tobacco smokers are young, educated U.S. citizens who, in addition to waterpipe, also use other psychoactive substances (e.g., cigarettes, alcohol, and marijuana). Intermittent (non-daily) use was the norm for waterpipe use, which occurred mainly with friends, in a social atmosphere, and involved sharing of the same pipe. The most popular type of waterpipe tobacco was flavored and sweetened, and some of its related features (e.g., smoke taste and smell) were cited by many as the motivation to use waterpipe. There was marked complacency about the potential addictive and health-damaging effects of waterpipe tobacco smoking, with most smokers perceiving waterpipe use as less harmful and addictive than cigarettes.

Some shared waterpipe tobacco smoking features between the United States and EMR include sharing the same waterpipe with friends and intermittent and social use (e.g., in cafés) (Asfar, Ward, Eissenberg, & Maziak, 2005). Some of these features may be inherent to this particular method of tobacco smoking and are thus not likely to differ across populations or societies. Another feature found across populations is the preference for sweetened and flavored tobacco (i.e., *maassel*), which is a relatively new phenomenon. Manufactured *maassel*, introduced in the early 1990s, has been hypothesized as a contributor to the recent global spread of waterpipe tobacco smoking (Rastam et al., 2004).

Other findings from this study may be more specific to the United States. These features include the use of other tobacco products and psychoactive substances such as alcohol and marijuana. For example, while over 50% of our respondents reported past 30-day cigarette use, Syrian waterpipe tobacco smokers have much lower cigarette smoking rates than the general population (Asfar et al., 2005). Additionally, the reported finding that more than a third of this sample of waterpipe tobacco smokers disclosed past 30-day use of alcohol (80.0%) or marijuana (35.8%) may be indicative of a non-risk averse population. This notion is supported by results of a national survey (NSDUH, 2005), in which much lower past 30-day use of alcohol (60.9%) or marijuana (16.6%) was reported among 18–25-year-olds.

The final distinctive feature of waterpipe tobacco smokers from this U.S. sample is related to risk perceptions. Although sizable proportions of all populations studied in the EMR believe waterpipe to be less harmful and addictive than cigarettes (Asfar et al., 2005; Varsano, Ganz, Eldor, & Garenkin, 2003; Ward et al., 2005), U.S. waterpipe tobacco smokers were much more likely to believe that the likelihood of addiction and experiencing deleterious health effects was very low. For example, 49% of waterpipe users among Aleppo

University students believed that waterpipe was more harmful than cigarettes (Asfar et al., 2005) compared with only 3% in this study sample. Further, 83% of the U.S. sample believed that switching from cigarettes to waterpipe would be associated with some health risk reduction.

Nicotine dependence maintains tobacco use, and thus users' exposure to lethal tobacco toxicants. Extant research suggests that a single waterpipe use episode can increase blood nicotine levels well beyond those observed after a single cigarette (e.g., over 50 ng/ml for waterpipe, Shafagoj et al., 2002; as compared with approximately 6 ng/ml for a cigarette, Breland et al., 2006). However, 79% of U.S. respondents considered waterpipe less addictive than cigarettes, and most respondents reported not being hooked and having no intention to quit. Although more research is needed to understand the dependence potential of waterpipe tobacco smoking, the complacency observed in this U.S. sample is disturbing.

The use of convenience samples is an important study limitation and raises concerns about generalizability. However, the fact that waterpipe tobacco smoking is becoming a common feature on U.S. college campuses, coupled with the dearth of relevant data, suggest that this report provides important preliminary information. We hope to stimulate research on this tobacco use method, in order to inform health care providers and policymakers as they plan campaigns that portray waterpipe tobacco smoking health risks accurately, and develop interventions that prevent a waterpipe use epidemic among young adults.

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Table 1

Sociodemographic characteristics of sample participants.

	Richmond café, <i>n</i> =101	Internet forum, <i>n</i> =100	Combined sample, <i>N</i> =201
	%	%	%
Sex			
Male	71.3	89.0	80.1
Female	28.7	11.0	19.9
Age			
18–20 years	79.2	43.0	61.2
21–24 years	18.8	30.0	24.4
≥25 years	2.0	27.0	14.4
Marital status			
Single	92.1	70.0	81.1
Married, divorced, cohabiting	7.9	30.0	18.9
Student status			
Student	86.1	57.0	71.6
Not student	13.9	43.0	28.4
Years of education			
≤12 years	34.7	16.0	25.4
≥13 years	65.3	84.0	74.6
Citizenship			
US citizens	97.0	100.0	98.5
Non-US citizens	3.0	0.0	1.5
Race			
White	81.2	88.0	84.6
Other	18.8	12.0	15.4

Table 2Behaviors of waterpipe tobacco smokers ($N=201$).

Survey item	%	<i>n</i>
Ever waterpipe use		201
Yes	100.0	
No	0.0	
Age of first use		201
≤15 years	8.0	
16–18 years	51.7	
≥19 years	39.3	
Companion of first use		198
Alone	5.6	
A friend	19.2	
More than 1 friend	68.2	
Family member(s)	3.5	
Other (or combination of the above)	3.5	
Place of first use		201
Own house	15.4	
Café or restaurant	49.8	
At a friend's house	21.4	
Other	13.4	
Current (past month) waterpipe use		201
Yes	94.1	
No	5.9	
Usual pattern of waterpipe use		165
Yearly	11.5	
Monthly	28.5	
Weekly	41.2	
Daily	18.8	
Seasonality of waterpipe use		201
(a) Season of year		
All year around	79.1	
More in summer	10.9	
More in other seasons	10.0	
(b) Day of week		
Weekdays (Mon–Thu, average)	42.8	
Weekend (Fri–Sun, average)	75.4	
Frequency of waterpipe use during the past month		201
0–1 time	18.4	
2–10 times	50.7	
11–20 times	18.4	
21+ times	12.5	

Survey item	%	<i>n</i>
Number of times per day waterpipe was used		187
Once per day	79.7	
More than once per day	20.3	
Usual duration of waterpipe smoking session		187
Up to 60 min	55.6	
61–90 min	13.4	
91+ min	31.0	
Share the same waterpipe		197
Yes	90.9	
No	9.1	
Typical smoking place in past month		186
Own house	39.2	
Cafe or restaurant	40.9	
Friend's house	13.4	
Other	6.5	
Own a waterpipe		197
Yes	57.4	
No	42.6	
Number of waterpipes owned		113
One	58.4	
More than 1	41.6	
Where obtained (multiple responses allowed)		113
Internet	71.1	
Tobacco shop	24.7	
Gift	18.1	
Other (convenience store, street vendor, other)	10.0	
Type of charcoal used		197
Mainly quick lighting	60.9	
Mainly traditional	25.9	
Don't know	13.2	
Type of tobacco favored		197
Flavored	95.9	
Sometimes flavored or not flavored	4.1	
Favorite flavor		197
Apple	15.7	
Other fruit	38.1	
Mint	9.1	
No particular favorite	15.2	
Other flavor	21.8	
Use waterpipe for anything other than tobacco		201
Yes	26.5	
No	73.5	

Survey item	%	<i>n</i>
Used marijuana in the same waterpipe that is used for tobacco		201
Yes	10.4	
No	89.6	
Past month use of marijuana		201
Yes	35.8	
No	64.2	
Past month cigarette smoking		201
Yes	53.7	
No	46.3	
Past month use of tobacco products other than waterpipe or cigarettes		201
Yes	33.0	
No	67.0	
Past month alcohol use		201
Yes	80.0	
No	20.0	
Past month use of any substance <i>in addition to</i> waterpipe (multiple responses allowed)		201
No other substance use	37.8	
Cigarettes	25.9	
Other tobacco products	20.0	
Marijuana	16.4	
Alcohol	34.8	
Other substance	3.0	

Table 3Beliefs and attitudes about waterpipe tobacco smoking ($N=201$).

Survey item	%	n
Believe hooked on waterpipe		186
Yes	12.9	
No	87.1	
Confidence in quitting		186
Not at all or little confident	4.3	
Moderately confident	15.6	
Very confident	80.1	
Intend to quit waterpipe		186
No intention to quit	68.3	
Yes, in next month	4.8	
Yes, in next 6 months	2.2	
Yes, in next 12 months	1.6	
Yes, sometime in future but not next 12 months	23.1	
Why smoke waterpipe (multiple responses allowed)		201
I enjoy the taste	80.1	
It's a good way to socialize with friends	79.6	
It helps me to feel relaxed	65.7	
I enjoy the smell	61.7	
It helps me to feel less stressed	42.8	
It's something to do when I feel bored	42.8	
Waterpipe smoke is less harsh than cigarette smoke	42.3	
I like trying things that are new, different, or "hip"	23.9	
It helps me not smoke cigarettes	13.9	
It helps me not use other tobacco products besides cigarettes (e.g., cigars or chew)	9.0	
Other	8.0	
It's consistent with my religious traditions or beliefs	4.5	
It helps control my appetite	2.5	
If I don't smoke waterpipe, I think about it a lot	2.5	
If I don't smoke waterpipe, I have urges or cravings for it	2.0	
If I don't use waterpipe I get irritable	0.5	
It helps control my weight	0.5	
Prospective perception of waterpipe popularity (5 years)		197
Less popular	4.5	
About the same	17.8	
More popular	77.7	
Perceived harm of waterpipe compared to cigarettes		197
Pretty much the same	30.0	
Cigarettes are more harmful than waterpipe	67.0	
Waterpipe is more harmful than cigarettes	3.0	

Survey item	%	n
Perceived addiction of waterpipe compared to cigarettes		197
Pretty much the same	20.3	
Cigarettes are more addictive than waterpipe	79.2	
Waterpipe is more addictive than cigarettes	0.5	
Perception of waterpipe smoke nicotine content compared to cigarette smoke		197
Pretty much the same	25.4	
Cigarette smoke has more nicotine	65.5	
Waterpipe smoke has more nicotine	9.1	
Reduced health risk perception of switching from cigarettes to waterpipe		197
No reduction in health risk	16.8	
Small reduction in health risk	47.2	
Moderate reduction in health risk	28.9	
Large reduction in health risk	7.1	