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Waterpipe Tobacco Smoking on a U.S. College Campus: Prevalence and Correlates

Thomas Eissenberg, Ph.D.^{1,2}, Kenneth D. Ward, Ph.D.^{3,2}, Stephanie Smith-Simone, Ph.D.⁴, and Wasim Maziak, M.D., Ph.D.^{3,2}

¹Department of Psychology and Institute for Drug and Alcohol Studies, Virginia Commonwealth University

²Syrian Center for Tobacco Studies Aleppo, Syria

³Department of Health and Sport Sciences and Center for Community Health, University of Memphis

⁴Center for Health and Wellbeing, Princeton University and Robert Wood Johnson Foundation

Abstract

Purpose—To examine waterpipe tobacco smoking prevalence and smoker perceptions.

Method—Cross-sectional survey.

Results—Past 30-day waterpipe tobacco smoking was reported by 20% (151/744). Relative to never users, users were more likely to perceive waterpipe as less harmful than cigarettes.

Conclusions—Waterpipe tobacco smoking is a growing public health issue.

Introduction

Waterpipe smoking is a traditional method of tobacco use, especially in the Eastern Mediterranean Region (1). Its use is spreading worldwide (1), and its prevalence in the U.S. is uncertain. One anecdotal report suggests it may be particularly common among college students (2), and a recent survey of 411 first-year university students indicated 15.3% of respondents reported past 30-day waterpipe use (3). This use may be driven by a perception of lower health risk, relative to cigarette smoking, as has been reported elsewhere (3,4).

A waterpipe (hookah, shisha) has a mouthpiece, hose, water bowl, body, and a “head” that is filled with sweetened and flavored tobacco and then heated with charcoal (1,5). During an inhalation from the mouthpiece, charcoal and tobacco smoke pass through the body, bowl, and hose and into the user’s lungs. Waterpipe and cigarette smoke contain some of the same toxicants (6). However, waterpipe use may be associated with greater toxicant exposure because longer use episodes and more and larger puffs lead to inhalation of 100 times more smoke than a cigarette (5–7).

Only one other published study has reported the prevalence of waterpipe use in a representative sample of university students from the U.S. and this study did not examine correlates of use (3). This survey of Virginia Commonwealth University (VCU) students examined waterpipe tobacco smoking prevalence and smokers’ health-related perceptions.

Corresponding author: Thomas Eissenberg, Ph.D., Department of Psychology and Institute for Drug and Alcohol Studies, Virginia Commonwealth University, Box 980205, Richmond, VA 23298-0205, Voice: (804) 827-4617, teissenb@vcu.edu.

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Method

A cross-sectional, IRB-exempt internet survey was conducted among the 1,194 students enrolled in VCU Introduction to Psychology courses (March 8 through May 4, 2006). Participants were ≥ 18 years of age and earned course credit for research participation. Except for university-specific content, survey items were as reported elsewhere (3) and covered demographics, tobacco use, risk perceptions, and perceived social acceptability. The survey was completed by 744 respondents. The response rate of 62.3% may reflect the popularity of research participation as a method for earning course credit and the convenience of on-line surveys.

All statistical analyses were conducted using SAS Version 9.1 (SAS Institute, Cary, NC). Logistic regression was used to compare past 30-day versus never waterpipe tobacco smokers in terms of (i) sociodemographic characteristics, (ii) ever and past month cigarette and cigar use, (iii) perceptions related to harm potential, (iv) peer influences on use, and (v) social acceptability of use. Bivariate logistic analyses were conducted as a first step, after which age, sex, race/ethnicity, and income were forced into a multivariable logistic model. All variables that were statistically significant ($p < .05$) in bivariate analyses were then entered as a block and non-significant ($p > .05$) variables were removed using backwards elimination to arrive at a final model. Odds ratio and the 95% confidence interval were reported for variables in the final model.

Results

Participant demographics are described in detail in Table 1. Of the 744 participants, 65% were women, 72% were 18 or 19 years old, 57% were White, and 20% had smoked a waterpipe in the past month.

In a multivariable model (Table 2), use of waterpipe during the past 30 days, compared to never-use, was associated with greater likelihood of having smoked cigarettes (OR=10.44) and cigars/cigarillos (OR=6.31) in the past 30 days, and greater likelihood of believing that waterpipe makes peers look “cool” (OR=2.47) and that waterpipe use is socially acceptable among peers (OR=3.71). In addition, use of waterpipe was associated with younger age (OR = 0.39), lower likelihood of being African American than White (OR=0.35), lower perceived harmfulness (OR=0.31) and addictiveness (OR=0.65) of waterpipe compared to cigarettes, and lower perceived social acceptability of cigarette use among peers (OR=0.43). The negative association between social acceptability of cigarette use and waterpipe use (OR=0.43) and opposite of that observed in the bivariate model (OR=1.51), and was driven by two confounders: past 30 day cigarette use and perceived social acceptability of waterpipe use.

Discussion

Results from this survey of 744 undergraduates indicate that past 30-day waterpipe tobacco smoking was 20%. Given previous reports (2,3,8,9), waterpipe tobacco smoking seems common on U.S. college campuses and the potential health risks of this behavior (5,7) suggest that it and may become a significant public health problem. Results also indicate that past 30-day waterpipe users were much less likely than never-users to believe that waterpipe is as harmful as cigarettes. These perceptions of lower risk may contribute to the spread of waterpipe tobacco smoking in the U.S.

We also observed that, relative to respondents who had never smoked tobacco using a waterpipe, past 30-day waterpipe tobacco smokers were more likely to be men, younger than 20 years of age, and White. While the influence of sex and race is uncertain, the popularity of

waterpipe use among younger students may be related to the fact that these individuals cannot access bars where alcohol is served, and may instead socialize in alcohol-free waterpipe cafes.

Waterpipe tobacco smokers in this sample also reported using other tobacco products (see Table 2). Concurrent use of other tobacco products may contribute to development of nicotine/tobacco dependence, which can then maintain tobacco use via a variety of mechanisms (10). In addition, concurrent use of other tobacco products can make the study of long-term health effects of waterpipe tobacco smoking challenging. Controlling for other tobacco products will be essential if we are to learn the influence of waterpipe tobacco smoking on cancer, cardiovascular disease, and lung disease.

These results, from a convenience sample taken from a single university in one U.S. state, along with other reports from other states (2,3,9) should be a clarion call to the U.S. public health and medical communities. An appropriate response could include nationwide surveillance that can be used to identify the extent of waterpipe's spread and gauge the effectiveness of interventions designed to reduce it. Future studies in the U.S. should assess prevalence of waterpipe in nationally representative samples, potential health-damaging and dependence-producing effects, and whether waterpipe use among youth serves as a "gateway" for use of other tobacco products or psychoactive substances.

Acknowledgments

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Table 1
Sociodemographic and tobacco use characteristics of sample (n = 744)

	% of sample
Sex	
Men	35.1
Women	64.9
Age	
18–19 years	71.9
20 years or older	28.1
Race/ethnicity	
White	56.6
African American/Black	23.1
Other	20.3
Citizenship	
U.S.	92.2
Non-U.S.	7.8
Money spent during average week	
<\$10.00	13.6
\$10.00–\$19.99	23.4
\$20.00–\$29.99	22.8
≥\$30.00	40.2
Ever used a waterpipe	48.4
Used waterpipe in past year	43.4
Used waterpipe in past 30 days	20.4
Ever used cigarettes	73.0
Used cigarettes in past year	57.7
Used cigarettes in past 30 days	41.5
Ever used cigars/cigarillos	56.8
Used cigars/cigarillos in past year	45.0
Used cigars in past 30 days	19.7

Table 2

Characteristics of past month waterpipe users and non-users: frequencies and odds ratios from logistic regression models

	Never-users (n=381)	Past 30 Day users (n=151)	Unadjusted Odds Ratio and 95% CI ¹	Adjusted Odds Ratio and 95% CI ²
Sociodemographics				
Sex (%)				
Women (<i>reference</i>)	75.8	24.2		
Men	63.1	36.9	1.84 (1.24–2.72) *	1.24 (0.64–2.37)
Age (%)				
18–19 years (<i>reference</i>)	68.3	31.7		
20 years or older	80.0	20.0	0.54 (0.34–0.85) *	0.39 (0.19–0.80) *
Race/ethnicity (%) ³				
White (<i>reference</i>)	64.5	35.5		
African American	90.9	9.1	0.18 (0.10–0.34) *	0.35 (0.14–0.88) *
Other	66.3	33.7	0.99 (0.63–1.57)	0.94 (0.45–1.96)
Money spent during average week ⁴				
<\$10.00	74.0	26.0		
\$10.00–\$19.99	75.4	24.6	1.11 (0.93–1.32)	1.15 (0.86–1.54)
\$20.00–\$29.99	70.7	29.3		
≥\$30.00	69.4	30.6		
Tobacco Use				
Used cigarettes in past 30 days (%)				
No (<i>reference</i>)	90.0	10.0		
Yes	41.3	58.7	12.84 (8.14–20.26) *	10.44 (5.08–21.46) *
Used cigars/cigarillos in past 30 days (%)				
No (<i>reference</i>)	81.6	18.4		
Yes	33.0	67.0	8.97 (5.61–14.33) *	6.31 (2.94–13.57) *
Perceptions of tobacco products				
Compared to a regular cigarette, how harmful do you think waterpipe is? (%)				
Less (<i>reference</i>)	55.9	44.1		
As harmful or more harmful	81.2	18.8	0.29 (0.20–0.44) *	0.31 (0.16–0.58) *
What is the likelihood of getting addicted to waterpipe when using the product socially? ⁵				
None	63.2	36.8		
Low	76.7	23.3		
Medium	85.9	14.1		
High				
What is the social acceptability of using waterpipe among your peers? ⁵				
None	96.2	3.8		
Low	91.7	8.3	3.62 (2.75–4.76) *	3.71 (2.38–5.80) *
Medium	76.8	23.2		
High	43.4	56.6		
What is the social acceptability of using cigarettes among your peers? ⁵				
None	89.0	11.0		
Low	79.8	20.0	1.51 (1.23–1.85) *	0.43 (0.28–0.66) *
Medium	66.8	33.2		
High	65.7	34.3		
How “cool” do your peers look when they use waterpipe? ⁶				
Not at all	86.6	13.4		
Cool	54.0	46.0	5.34 (3.83–7.44) *	2.47 (1.53–4.01) *
Very cool	19.2	80.8		

* p < .05

¹ Odds ratios are from bivariate logistic regression models, regressing waterpipe use (past 30 days vs. never) on the selected variable.

² Odds ratios are from multivariate logistic regression models, regressing waterpipe use (past 30 days vs. never) on the selected variable and adjusting for all other variables in the table.

³ Two dummy-coded vectors for race (AA vs. White and Other vs. White) were entered in a single logistic model.

⁴ Coded as 0=<\$10.00; 1=\$10.00–\$19.99; 2=\$20.00–\$29.99; 4=≥\$30.00

⁵ Coded 0=none, 1=low, 2=medium, 3=high

⁶ Coded 0=not at all; 1=cool; 2=very cool