Nicotine & Tobacco Research Advance Access published March 22, 2010

Brief Report

Sociodemographic risk indicators of hookah smoking among White Americans: A pilot study

Hikmet Jamil, M.D., Ph.D., F.F.O.M.I.,[1] Dalia Elsouhag, M.D., M.S.,[1] Spencer Hiller, B.S.,[2] Judith E. Arnetz, Ph.D., M.P.H., P.T.,[1,3] & Bengt B. Arnetz, M.D., M.P.H., M.Sc., Ph.D.[1]

[1] *Division of Occupational and Environmental Health, Department of Family Medicine and Public Health Sciences, Wayne State University, Detroit, MI*

[2] *University of Michigan*

[3] *Department of Public Health and Caring Sciences, Uppsala University, Uppsala, Sweden*

Corresponding Author: Hikmet Jamil, M.D., Ph.D., *Division of Occupational and Environmental Health, Department of Family Medicine and Public Health Sciences, Wayne State University, 3800 Woodward Ave., Suite 808, Detroit, MI 48201, USA. Telephone: 313-577-2048; Fax: 313-577-2744; E-mail: hjamil@med.wayne.edu*

Received December 16, 2009; accepted February 8, 2010

Abstract

Background: Despite the sustained public health efforts to decrease cigarette smoking, there is an increasing trend in the use of alternative tobacco products that are perceived by some as less harmful. One example is hookah smoking. This study aimed to assess hookah trends among White Americans.

Methods: Two hundred and forty-five White American adults residing in southeast Michigan answered a self-administered standardized questionnaire that included basic demographics, socioeconomic status, and questions related to hookah smoking behavior. Logistic regression was used to determine risk indicators for hookah smoking.

Results: The combined prevalence of hookah smoking in the White American study population was 19%, with 10% of the sample smoking hookah only and 9% smoking both hookah and cigarettes. Approximately 19% of respondents believed that smoking hookah was less harmful than smoking cigarettes. Significant risk indicators for smoking hookah were being younger than 22 years and living with a family member who used tobacco.

Discussion: In addition to reporting the prevalence of use in this important group of potential users, we outline important sociodemographic risk factors for hookah use in a non-Arab American population. More research is needed with a larger population to better understand this new tobacco trend in order to curb a new potential health threat.

Introduction

There has been a recent trend in increasing tobacco smoking among adolescents and young adults (Centers for Disease Control and Prevention [CDC], 2009). Of special concern is evidence that other forms of tobacco consumption, for example, hookah (water pipe) smoking, are on the rise (Dybing et al., 2005). Much research has been devoted to smokeless tobacco, but considerably fewer studies concern hookah smoking, especially among Whites (Barnett, Curbow, Weitz, Johnson, & Smith-Simone, 2009). The fact that White youth increasingly appear to adopt hookah smoking is of great public health concern since it might be a new trajectory into cigarette smoking, as well as other gateway drugs (Duan, Chou, Andreeva, & Petnz, 2009). The risk of dispersion is especially great since hookah smoking is done in social groups and is cheaper than cigarettes (Roskin & Aveyard, 2009). The American Lung Association (ALA) actually referred to hookahs as the first new tobacco use trend in the 21st century (ALA, 2007).

Although incorrect, hookah smoking is commonly believed to be a less dangerous alternative to cigarette smoking (Roskin & Aveyard, 2009; Weglicki, Templin, Rice, Jamil, & Hammad, 2008). To the contrary, there is evidence that use of hookah is linked to various types of diseases (Al Mutairi, Shihab-Eldeen, Mojiminiyi, & Anwar, 2006; El-Setouhy et al., 2009; Maziak et al., 2009; Mohammad, Kayak, & Mohammad, 2008; Noonan & Kulbok, 2009; Sajid, Chaouachi, & Mahmood, 2008; Shaikh, Vijayaraghavan, Sulaiman, Kazi, & Shafi, 2008).

The national prevalence of hookah smoking in the United States is unknown. Most prior studies are typically based on convenience samples with a disproportionate number of subjects of Arabic descent (ALA, 2007; Jamil et al., 2009; Weglicki et al., 2008). Studies suggest that hookah smoking is a significant predictor of subsequent cigarette smoking (Rice et al., 2006; Weglicki et al.). Thus, there is a need for more research on hookah's public health risks, especially in terms of smoking initiation and retention behavior among adolescents and young adults, since most adult cigarette smokers started smoking before the age of 18 years (ALA, 2009).

doi: 10.1093/ntr/ntq026

Numerous factors have been found to increase the appeal for hookah. Smokers reported that hookah was a pleasurable social experience embedded in cultural rituals (Hammal, Mock, Ward, Eissenberg, & Maziak, 2007). It is commonly viewed as a social activity, typically done in groups of people who might share one pipe and try different flavors (Knishkowy & Amitai, 2005). The smoother texture, together with the use of added flavor, promotes extended hookah smoking (Roskin & Aveyard, 2009). Family acceptance also plays a role in choosing hookah over cigarettes (Tamim et al., 2007). Whether hookah smoking exhibits the same socioeconomic gradient as cigarette smoking is not known (Nisar, Qadri, Fatima, & Parveen, 2007; Ward, Mark, Relyea, DeBon, & Klesges, 2006). The aim of this pilot study was to determine the prevalence and sociodemographic risk indicators for hookah use in a sample of White American adults, a previously little studied group.

Methods

The study of hookah smoking behavior involved 315 predominantly White adults residing in southeast Michigan. Since the U.S. census does not distinguish Arab Americans from other non-Hispanic Whites and we wanted to target non-Arab Whites, we excluded Americans with Middle Eastern descent, for example, Arabs and Chaldeans. The Human Investigation Committee, Wayne State University, approved the study protocol. One of the authors (SH) was a graduate student who was trained how to approach people at community gatherings, such as university clubs, community college clubs, cafeterias, and restaurants, and to ask them if they were interested in participating in a voluntary tobacco survey. If so, they received oral and written information. Potential participants then received the survey with the information sheet. The student remained on the premises in case there would be any questions. The survey was handed back to the student after completion. The survey was confidential, only information on the respondent's zip code and the person's first and last initial of their name was registered in order to control for possible duplicate answers. The self-administered survey was based on a standardized questionnaire, which was based on the National Health Interview Survey. The revised survey had been used in a prior study (CDC, 2006; Weglicki et al., 2008). Data were collected during the period June through August, 2007. Adults aged 18 years and older were asked to participate. Less than 2% refused. Most common reasons given for not participating were lack of time and/or lack of interest.

Analysis

The analyses were limited to Whites, 78% ($n = 245$) of the total 315 participants. Other ethnicities were excluded due to relatively small numbers of participants, including Americans of Middle Eastern descent, since the focus of the study was non-Middle Eastern non-Hispanic Whites. The survey asked participants if they were current or former tobacco users (cigarettes or hookah) or had never used tobacco. Current hookah use ($n = 46$) was defined as having smoked hookah in the previous 30 days. All others ($n = 199$) were counted as non–hookah users when calculating the prevalence rate. There were 17 former hookah users who were included among current hookah users for a total of 63 current hookah users. There was some internal loss to follow-up, that is, not all respondents answered all questions. This is reflected in the sometimes different total respondents to various questions. Descriptive statistics, chi-square tests, and logistic regressions were used for all analyses using version 17 of the Statistical Package for Social Sciences.

Results

Characteristics of the study population are presented in Table 1. The mean age of the sample was 31 years. The majority were women, single, nonstudents, and with some college education or less. Approximately 29% were current tobacco users. Of these, 10% smoked either hookah or cigarettes and 9% smoked both. Among those who only smoked hookah, 25% had previously smoked cigarettes, while the majority (75%) had never smoked cigarettes. Among both current and former hookah users, nearly half (48%) had begun smoking hookah between the ages of 15 and 16 years. Altogether, 77% had started smoking hookah at age 18 or younger. The mean age for initiating hookah use was 16.6 years (*SD* 2.3), with a range between 10 and 21 years of age.

The prevalence of hookah smoking varied significantly across the three age groups, and the highest prevalence was found for those in the age range 20–21 years (Table 1). It was also more common among students, as opposed to nonstudents. Hookah smoking was significantly more common among those

Table 1. Sociodemographic variables for hookah users versus nonusers

	Hookah smokers, *n* (%)	Nonsmokers, *n* (%)	Total *N*	*p*[a] value
Age group (years)				
18–19	14 (38.9)	22 (61.1)	36	.001
20–21	25 (47.2)	28 (52.8)	53	
22+	7 (4.5)	149 (95.5)	156	
Gender				
Female	25 (16.7)	125 (83.3)	150	n.s.
Male	21 (22.1)	74 (77.9)	95	
Marital status				
Single	44 (28.9)	108 (71.1)	152	.001
Married	2 (2.2)	91 (97.8)	93	
Education				
Some college or less	40 (29.9)	94 (70.1)	134	.001
College or higher	6 (5.4)	105 (94.6)	111	
Profession status				
Student	31 (41.3)	44 (58.7)	75	.001
Non student	12 (7.5)	147 (92.5)	159	
Health insurance				
Yes	44 (19.4)	183 (80.6)	227	n.s.
No	2 (11.8)	15 (88.2)	17	
Income level				
≤$10,000	5 (23.8)	16 (76.2)	21	n.s.
>$10,000	41 (18.3)	183 (81.7)	224	
Exercise regularly				
Yes	37 (22.8)	125 (77.2)	162	.01
No	9 (11.0)	73 (89.0)	82	

Note. n.s. = nonsignificant.
[a]*p* values based on chi square.

who exercised regularly. No significant differences in hookah use were found in terms of gender, income, or health insurance.

Logistic regression was used, adjusting for gender, marital status, education, annual income level, health insurance, and regular exercise, to determine which of the significant demographic characteristics in Table 1 predicted hookah use. Being younger than 22 years of age (odds ratio [*OR*] 15.26; 95% *CI* = 3.77–61.69) and having one or more tobacco users at home (*OR* 19.24; 95% CI = 7.27–52.51) were significant predictors of hookah use. However, the majority of hookah users (65%) had no other family members who used hookah at home, apart from themselves (Table 2). Furthermore, a majority of the respondents (71%) did not smoke hookah with family members. Some 60% of hookah smokers borrowed the tobacco or got it from cafés, and 74% of hookah smokers smoked outside their home. Approximately 20% of respondents believed hookah to be less harmful than cigarettes. In terms of the perceived harmfulness of secondhand smoke from hookah exposure, only 21% believed it to be harmful. However, 60% of the total sample did not respond to either of these questions. Almost everyone (99%) shared hookahs with others. More than 90% considered smoking hookah to be a socializing event with family and friends. However, 30% of hookah users reported that they had no intention of quitting, while the rest said that they would do so sometime in the future.

Table 2. Behavior and percentages regarding hookah among survey respondents

	N (%)
Smoking behavior	
Hookah only	24 (9.8)
Cigarettes only	24 (9.8)
Both hookah and cigarettes	22 (9)
Former hookah smoker	9 (3.7)
Former cigarette smoker	25 (10.2)
Formerly smoked both	8 (3.3)
Never smoked	133 (54.3)
No. of people who smoke cigarettes or hookah in your home	
No one	160 (65.3)
One person	49 (20)
Two+ persons	34 (13.9)
No response	2 (0.8)
How do you usually get your hookah tobacco	
Borrow from someone else	17 (32.1)
Purchase in a café	15 (28.3)
Purchase in a store	11 (20.8)
Someone buys it for me	6 (11.3)
From my home	4 (7.5)
Where do you usually smoke hookah	
Friend's house	16 (30.2)
Home	14 (26.4)
Café	13 (24.5)
Different places	10 (18.9)
Do you smoke hookah with family members	
Yes	13 (28.3)
No	33 (71.7)
Why smoke Hookah	
Socialize with family/friends	43 (93.5)
Taste	3 (6.5)
Do you intend to quit Hookah	
Not at all	14 (30.4)
In the future	32 (69.5)
Hookah is less harmful than cigarettes	
Yes	46 (18.8)
No	51 (20.8)
No response	148 (60.4)
Secondhand smoke from hookah is harmful	
Yes	51 (20.8)
No	17 (6.9)
Don't know	31 (12.7)
No response	146 (59.6)

Discussion

The objective of this study was to assess hookah smoking habits in White American adults in order to determine prevalence and determinants of hookah use. Since most previous U.S. studies have concerned Americans of Middle Eastern descent, a known high hookah consumption group, they were excluded from our sample. Results showed surprisingly widespread use of hookah smoking in a population that was recently introduced to hookah. The same percentage (9%) reported smoking only hookah, only cigarettes, or smoking both cigarettes and hookah, respectively. This might imply that hookah smoking is more prevalent than expected. Actually, hookah might have become a substitute for cigarette smoking following public health campaigns informing about the dangers of cigarettes. Current cigarette use for the whole study sample was 29%. This is similar to other studies reporting 23% current cigarette smokers among American military (Ward et al., 2006). Smoking hookah was most common in the age group 20–21 years of age (47%). This is considerably higher than the reported hookah prevalence rate (15%) among undergraduate students at Wayne State University with a high proportion of Arab Americans (Grekin & Ayna, 2008). Since our study was done more recently, these rate differences might reflect the fact that tobacco consumers increasingly prefer tobacco products that are perceived as "less risky" (Stratton, Shetty, Wallace, & Bondurant, 2001). Another viable explanation might be that the current national economic crisis has led consumers to search for more affordable tobacco products, such as hookah (Roskin & Aveyard, 2009).

Hookah smoking was found to be significantly more common among those who were single, supporting findings by Sarrafzadegan et al. (2010), who reported that singles were almost twice as likely to smoke hookah as compared with married. The current study showed that less education was significantly correlated with hookah smoking, which is similar to findings by Jamil et al. (2009). On the other hand, Ward et al. (2006) found that higher education levels among American military recruits were associated with increased hookah use. This might be due to the fact that military recruits are more highly educated than the equivalent general population (Kane, 2005), with higher stress levels (Stetz, Bouchard, Wiederhold, Riva, & Folen, 2009), and more commonly use tobacco smoking to counteract stress and boredom (Haddock et al., 2009). We did not find male gender to be associated with hookah use, which is in contrast to another study (Eissenberg, Ward, Smith-Simone, & Maziak, 2007).

Hookah smoking is commonly viewed as a relatively inexpensive social activity (ALA, 2007). Traditionally, it is practiced in groups, where the hookah is the center of the social activity while passing the hose from person to person (Knishkowy & Amitai, 2005). Our study showed that 94% of those who smoked hookah did so to socialize with family/friends and 30% did so at a friend's house.

Although 19% of hookah smokers in our study believed that hookah was safer than cigarettes, 60% of the participants did not respond to the question. This could indicate that they did not know whether it was dangerous. Our study also found that hookah smoking was significantly more prevalent among those who exercise regularly. Since individuals who exercise regularly tend to be more concerned about their health, this finding might also suggest a belief that hookah smoking is less detrimental to one's health than cigarettes.

Limitations

This study has a number of limitations worthy of consideration. First, results are based on a convenience sample of White Americans. Second, although surveys were offered to all individuals present at each study site and very few refused, we know very little about nonrespondents. Third, this study relied on self-reports since there are no established objective markers of hookah consumption specifically. Based on studies of cigarette smoking, self-reports have been found to be reasonably valid as compared with objective measures, such as cotinine, a metabolite of nicotine (Nelson, Holtzman, Bolen, Stanwyck, & Mack, 2001; Patrick et al., 1994). Finally, this is a limited study carried out in southeast Michigan. Data can therefore not be considered to be representative for all the U.S. White adults.

Conclusions

To our knowledge, this study is the first to assess hookah smoking habits in predominantly White Americans and to report that they tend to follow the traditional pattern associated with hookah use. We have identified important sociodemographic risk factors for hookah use in this rarely studied ethnic group. More research is needed to better understand this new tobacco trend in order to implement effective public health countermeasures.

Funding

None declared.

Declaration of Interests

None declared.

References

Al Mutairi, S. S., Shihab-Eldeen, A. A., Mojiminiyi, O. A., & Anwar, A. A. (2006). Comparative analysis of the effects of hubble-bubble (Sheesha) and cigarette smoking on respiratory and metabolic parameters in hubble-bubble and cigarette smokers. *Respirology, 11*, 449–455.

American Lung Association. (2007). *An emerging deadly trend: Waterpipe tobacco use. Tobacco policy trend alert*, Retrieved 16 November 2009, from http://www.lungusa2.org/embargo/slati/Trendalert_Waterpipes.pdf

American Lung Association. (2009). *Why kids start*, Retrieved 16 November 2009, from http://www.lungusa.org/stop-smoking/about-smoking/preventing-smoking/why-kids-start.html

Barnett, T., Curbow, B. A., Weitz, J., Johnson, T., & Smith-Simone, S. Y. (2009). Water pipe tobacco smoking among middle and high school students. *American Journal of Public Health, 99*, 2014–2019.

Centers for Disease Control and Prevention (CDC). (2006). Use of Cigarettes and other Tobacco Products among Students age 13–15 worldwide, 1995–2005. *Morbidity and Mortality Weekly Report, 55*, 553–556.

Centers for Disease Control and Prevention (CDC). (2009). Cigarette smoking among adults—United States, 2008. *Morbidity and Mortality Weekly Report, 58*, 1227–1232.

Duan, L., Chou, C. P., Andreeva, V. A., & Pentz, M. A. (2009). Trajectories of peer social influences as long-term predictors of drug use from early through late adolescence. *Journal of Youth and Adolescence, 38*, 454–465.

Dybing, E., Ashley, D., Burns, D., Djordjevic, M., Gray, N., Hammond, S. K., et al. (2005). *TobReg—Advisory note waterpipe tobacco smoking: Health effects, research needs and recommended actions by regulators*. Geneva, Switzerland: World Health Organization.

Eissenberg, T., Ward, K. D., Smith-Simone, S., & Maziak, W. (2007). Waterpipe tobacco smoking on a U.S. College campus: Prevalence and correlates. *Journal of Adolescent Health, 42*, 526–529.

El-Setouhy, M., Loffredo, C. A., Radwan, G., Abdel Rahman, R., Mahfouz, E., Israel, E., et al. (2009). Genotoxic effects of water pipe smoking on the buccal mucosa cells. *Mutation Research, 675*, 36–40.

Grekin, E. R., & Ayna, D. (2008). Argilch use among college students in the United States: An emerging trend. *Journal of Studies on Alcohol and Drugs, 69*, 472–475.

Haddock, C. K., Taylor, J. E., Hoffman, K. M., Poston, W. S., Peterson, A., Lando, H. A., et al. (2009). Factors which influence tobacco use among junior enlisted personnel in the United States Army and Air Force: A formative research study. *American Journal of Health Promotion, 23*, 241–246.

Hammal, F., Mock, J., Ward, K. D., Eissenberg, T., & Maziak, W. (2007). A pleasure among friends: How narghile (waterpipe) smoking differs from cigarette smoking in Syria. *Tobacco Control, 17*, e3.

Jamil, H., Templin, T., Fakhouri, M., Rice, V. H., Khouri, R., Fakhouri, H., et al. (2009). Comparison of personal characteristics, tobacco use, and health states in Chaldean, Arab American, and non-Middle Eastern White adults. *Journal of Immigrant and Minority Health, 11*, 310–317.

Kane, T. (2005). *Who bears the burden? Demographic characteristics of U.S. military recruits before and after 9/11*, Retrieved 30 November 2009, from http://www.heritage.org/research/nationalsecurity/cda05-08.cfm

Knishkowy, B., & Amitai, Y. (2005). Water-pipe (narghile) smoking: An emerging health risk behavior. *Pediatrics, 116*, 113–119.

Maziak, W., Rastam, S., Ibrahim, I., Ward, K. D., Shihadeh, A., & Eissenberg, T. (2009). CO exposure, puff topography, and subjective effects in waterpipe tobacco smokers. *Nicotine & Tobacco Research, 1*, 806–811.

Mohammad, Y., Kayak, M., & Mohammad, Y. (2008). Chronic respiratory effect of nargulleh smoking in women from the East Mediterranean region. *International Journal of Chronic Obstructive Pulmonary Disease, 3*, 405–414.

Nelson, D. E., Holtzman, D., Bolen, J., Stanwyck, C. A., & Mack, K. A. (2001). Reliability and validity of measures from the Behavioral Risk Factor Surveillance System (BRFSS). *Sozial- und Präventivmedizin, 46*, S3–S42.

Nisar, N., Qadri, M. H., Fatima, K., & Parveen, S. (2007). A community based study about knowledge and practices regarding tobacco consumption and passive smoking in Gadap Town, Karachi. *Journal of the Pakistan Medical Association, 57*, 186–188.

Noonan, D., & Kulbok, P. A. (2009). New tobacco trends: Waterpipe (hookah) smoking and implications for healthcare providers. *Journal of the American Academy of Nurse Practitioners, 21*, 258–260.

Patrick, D. L., Cheadle, A., Thompson, D. C., Diehr, P., Koepsell, T., & Kinne, S. (1994). The validity of self-reported smoking: A review and meta-analysis. *American Journal of Public Health, 84*, 1086–1093.

Rice, V. H., Weglicki, L. S., Templin, T., Hammad, A., Jamil, H., & Kulwicki, A. (2006). Predictors of Arab American adolescent tobacco use. *Merrill Palmer Quarterly, 52*, 327–342.

Roskin, J., & Aveyard, P. (2009). Canadian and English students' beliefs about waterpipe smoking: A qualitative study. *BMC Public Health, 9*, 10.

Sajid, K. M., Chaouachi, K., & Mahmood, R. (2008). Hookah smoking and cancer. Carcinoembryonic levels (CEA) levels in exclusive/ever hookah smokers. *Harm Reduction Journal, 5*, 19.

Sarrafzadegan, N., Toghianifar, N., Roohafza, H., Siadat, Z., Mohammadifard, N., & O'Loughlin, J. (2010). Lifestyle-related determinants of hookah and cigarette smoking in Iranian adults. *Journal of Community Health, 35*, 36–42.

Shaikh, R. B., Vijayaraghavan, N., Sulaiman, A. S., Kazi, S., & Shafi, M. S. (2008). The acute effects of waterpipe smoking on the cardiovascular and respiratory system. *Journal of Preventive Medicine and Hygiene, 49*, 101–107.

Stetz, M. C., Bouchard, S., Wiederhold, B. K., Riva, G., & Polen, R. A. (2009). The receptiveness of stress management techniques by military personnel. *Study in Health Technology and Informatics, 144*, 125–127.

Stratton, K., Shetty, P., Wallace, R., & Bondurant, S. (2001). Clearing the smoke: The science base for tobacco harm reduction—Executive summary. *Tobacco Control, 10*, 189–195.

Tamim, H., Al-Sahab, B., Akkary, G., Ghanem, M., Tamim, N., El Roueiheb, Z., et al. (2007). Cigarette and nargileh smoking practices among school students in Beirut, Lebanon. *American Journal of Health Behavior, 31*, 56–63.

Ward, K. D., Mark, W. V., Relyea, G., DeBon, M., & Klesges, R. C. (2006). Waterpipe smoking among American military recruits. *Preventive Medicine, 43*, 92–97.

Weglicki, L. S., Templin, T. N., Rice, V. H., Jamil, H., & Hammad, A. (2008). Comparison of cigarette and water-pipe smoking by Arab and non-Arab-American youth. *American Journal of Preventive Medicine, 35*, 334–339.