

Brief Report

Do Household Smoking Behaviors Constitute a Risk Factor for Hookah Use?

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Abstract

Introduction: Much research has focused on the role played by families in cigarette smoking behavior. However, there is a lack of such research for hookah (waterpipe) smoking. This study focuses on the role of family members' hookah smoking behaviors as a possible risk factor for hookah smoking.

Methods: Eight hundred and one adults in southeast Michigan responded to an anonymous self-administered survey regarding personal and family members' hookah smoking behavior and perceptions of health risks related to hookah smoking. Multinomial logistic regression modeling was used to examine risk factors for hookah use.

Results The prevalence of current hookah smoking in the study population was 26%. The odds ratio for an individual to smoke hookah were 9.5 (95% CI = 2.37–38.47, $p < .01$), 8.6 (95% CI = 3.92–19.02, $p < .001$), and 1.2 (95% CI = 1.14–1.41, $p < .05$) if the father, mother, or sibling, respectively, smoked hookah at home. Male gender and younger age were also significantly associated with hookah smoking. Household hookah smoking behaviors were also significant risk factors among former hookah smokers compared with nonsmokers, but there were no significant risk factors when comparing former hookah smokers with current hookah smokers.

Conclusions: Having a father, mother, or sibling smoking hookah at home, male gender and younger age are significant risk factors for current hookah smoking.

Introduction

Much research has focused on the role played by families in cigarette smoking behavior. However, there is a lack of such research on hookah (waterpipe) smoking (Tamim et al., 2007). Despite the overall decline in cigarette smoking in the United States (20.6% of adults in 2009 vs. 22.5% in 2002; Center for Disease Control [CDC], 2009), other forms of tobacco use remains high among young adults, especially college students

(American Lung Association [ALA], Tobacco Policy Project, 2007). Globally, approximately 9% of those between the ages of 13 and 15 are cigarette smokers, while 11% use other forms of tobacco, including hookah (CDC, 2006). There is less negative social stigma associated with hookah smoking, making it socially acceptable regardless of gender (Israel et al., 2003). Arab American families consider it a social event (Israel et al., 2003), a means of connecting to their roots, and a form of self-expression (Roskin & Aveyard, 2009). Just as cigarettes were considered the smoking trend of the last century, the ALA refers to hookah smoking as the first new tobacco trend of the 21st century (ALA, Tobacco Policy Project, 2007). Despite the fact that hookah is often smoked in groups and social gatherings, little is known about the role of family members' smoking behaviors in hookah use.

Ever since the invention of hookah, it has generally been considered a safer alternative to cigarettes (Chattopadhyay, 2000). However, research indicates that hookah smoking carries similar or higher risks than other forms of tobacco, increasing the risk of cardiovascular (Al Mutairi, Shihab-Eldeen, Mojiminiyi, & Anwar, 2006) and pulmonary illness (Mohammad, Kayak, & Mohammad, 2008), cancers (El-Setouhy et al., 2009), and infectious diseases (Noonan & Kulbok, 2009). Studies also show that hookah smokers have significantly higher increases in blood carboxyhemoglobin levels (a toxic form of hemoglobin resulting from carbon monoxide inhalation) in the first 5 min of hookah smoking than cigarette smokers during a single smoking session (Theron, Schultz, Ker, & Falzone, 2010). Hookah smokers also have 36 times the amount of nicotine and higher concentrations of heavy metals compared with cigarette smokers (Shihadeh & Saleh, 2005). Hookah is also a health hazard to nonsmokers due to the side stream smoke emitted from the burning of the charcoal and exhaled main-stream smoke combined (Fromme et al., 2009). In addition, research shows that hookah is attracting individuals who are traditionally considered at low risk for tobacco use (Primack, Fertman, Rice, Adachi-Mejia, & Fine, 2010).

There are no national data for prevalence of hookah smoking, but previous research has shown that it is highly prevalent

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among Arab Americans (Jamil et al., 2009). With more Arabs settling in the United States and bringing the hookah with them (Baker & Rice, 2008), the hookah is gaining popularity among non-Arab individuals in the United States as well (Jamil, Elsouhag, Hiller, Arnetz, & Arnetz, 2010). In order to better understand hookah smoking behavior, this study focused specifically on the role of hookah smoking behavior in the household among a population with a known high prevalence of hookah smoking, namely the Arab American community (Jamil et al., 2009). The effect of hookah smoking in the household by other family members was assessed as a possible risk factor for hookah smoking.

Methods

Setting and Participants

Approval for this study was granted by the Human Investigation Committee at Wayne State University, Detroit, Michigan. Information about the study was announced via a local Arabic radio channel, where one of the authors (HJ) conducted two live interviews explaining the goals of the study and encouraging people to participate. Study flyers were disseminated in different locations in greater Detroit (e.g., churches, mosques, gas stations, party stores, etc.) frequented by Arab Americans. The Arab American and Chaldean Council (ACC) and two volunteers from the Arab and Chaldean communities also assisted in recruiting study participants. The study took place at ACC in Dearborn, Michigan. A research assistant approached potential participants and, after introducing him/herself, briefly explained the purpose of the study, study procedures, benefits, and risks of the study. Interested participants received an information sheet (both English and Arabic versions were available) with a detailed description of the study, which entailed filling out an anonymous, self-administered 15- to 20-min paper questionnaire. Respondents were not compensated for their participation.

Questionnaire

The questionnaire used for this study was based on a standardized questionnaire used in other studies by our team (Weglicki, Templin, Rice, Jamil, & Hammad, 2008). Questions were also adopted from the National Health Interview Survey (CDC, 2006). Participants were asked to identify their ethnicity with the response alternatives Black, Arab, Chaldean, non-Arab Caucasian, Hispanic, and to specify if "other." Those who chose either "Arab" or "Chaldean" are hereafter referred to as Arab Americans. The survey asked participants about demographics, personal hookah and cigarette smoking habits, and behaviors (age of first puff, where he/she smokes hookah, whether he/she shares hookahs with others, with whom, and reasons for hookah smoking). Current hookah smoker was defined as smoking hookah within the past 30 days. Participants were also asked about their perceptions of the health risks of hookah smoking compared with cigarette smoking with the following questions: "Do you believe that hookah smoking is less dangerous than cigarette smoking?" (Yes or No) and "Do you believe that secondhand smoke from hookah is less harmful than that of cigarettes?" (Yes, No, or I don't know). Participants were also asked about their family's hookah smoking habits, for example, "Which of the family members in your household smokes hookah?" with response alternatives being the possible family members with the option "other" to be filled in by the respondent.

Data Analysis

Descriptive statistics were used to present sample means and dispersion measures and percentages for dichotomous variables. Multinomial logistic regression modeling was used to determine risk factors for current hookah smoking versus non smokers and former smokers, respectively. Control variables included age, gender, marital status, education, income, and exercise. The main predictors (father, mother, and sibling hookah use) were coded as 0 for no use and 1 for use to simplify the interpretation of their effects.

Results

A total of 904 participants completed the survey during the period from January to June 2007. Since the focus of this study was Arab Americans, 103 responses (74 Blacks, 8 Caucasians, 3 Hispanics, and 18 from other ethnic groups) were excluded. Thus, the final analysis was based on the responses of 801 Arab American participants.

Of these, 234 (29%) were current hookah users, 61 (8%) were former hookah users, and 506 (63%) had never used a hookah. Table 1 illustrates the demographics, behavior, and risk perceptions of the study population. Among current hookah smokers, 53.8% also currently smoked cigarettes, 41% had never smoked cigarettes, and 5.1% had quit cigarette smoking. Forty percent of current hookah smokers had their first hookah puff by the age of 18. More than half (52%) of current hookah smokers reported having one hookah session per week, while 45% had two sessions per week. Socializing and liking the taste of hookah were the most reported reasons for hookah smoking (37% and 24%, respectively). The majority of smokers (74%) shared hookah with others and 49% reported smoking with their families. Seventy-one percent reported that they had intentions of quitting hookah, and 86% believed that they could do so anytime they wanted.

Of the 801 participants, 707 had complete data and were included in the multinomial regression model. Overall, the full model fit the data very well (discrimination among the three hookah groups), χ^2 (1186, $N = 707$) = 904.42, $p = 1.00$, using a deviance criterion. For the full model, Nagelkerke R^2 is .28. Classification of subjects into groups was marginal. The model was able to correctly classify 88.4% of the non-hookah smokers, 2.1% of former hookah smokers, and 43.8% of the hookah smokers for an overall success rate of 69.3%. Table 2 illustrates the odds ratios (ORs) with 95% CIs for the portion of the model examining risk factors for current hookah smoking. Significant risk factors were living in homes where hookah was smoked by other family members, with ORs greatest for fathers (9.5), followed by mothers (8.6), and siblings (1.3). The likelihood of smoking hookah was also significantly greater among males and among younger individuals. The frequency of smoking hookah was high among the youngest Arab Americans (18–21 years) with 55.9% of these being either current (49.4%) or former (6.5%) hookah smokers. When comparing former hookah smokers with nonsmokers, male gender ($OR = 3.8$, 95% $CI = 1.89–7.54$), having siblings ($OR = 9.3$, 95% $CI = 2.72–31.71$), a father ($OR = 7.4$, $CI = 1.12–48.70$), or a mother ($OR = 6.5$, 95% $CI = 1.88–22.77$) who smoked hookah were significant risk factors for former hookah smoking. There were no significant risk factors, however, when comparing former hookah smokers with current hookah smokers.

Table 1. Demographics, Behavior, and Risk Perceptions of the Study Population

	Current hookah smokers (<i>n</i> = 234) ^a	Former hookah smokers (<i>n</i> = 61) ^a	Never smoked hookah (<i>n</i> = 506) ^a	<i>p</i> Value
Gender ^{b,c} , <i>n</i> (%)				
Male	158 (67.5)	43 (70.5)	226 (44.7)	<.001
Female	76 (32.5)	18 (29.5)	280 (55.3)	
Age, <i>M</i> (<i>SD</i>) ^{b,c}	31.4 (12.68)	35.1 (13.6)	39.5 (15.8)	.007
Marital status ^{b,c} , <i>n</i> (%)				
Single	112 (48.3)	27 (45.0)	138 (27.6)	<.0001
Married/other	120 (51.7)	33 (55.0)	362 (72.4)	
Education ^{b,c} , <i>n</i> (%)				
HS or less	132 (57.9)	30 (49.2)	328 (66.9)	.005
Some college or more	96 (42.1)	31 (50.8)	162 (33.1)	
Do you exercise regularly? ^{d,b} , <i>n</i> (%)				
No	121 (51.7)	42 (68.9)	307 (60.9)	.016
Yes	113 (48.3)	19 (31.1)	197 (39.1)	
Is hookah smoking less harmful than cigarettes? (<i>N</i> = 344) ^{d,b} , <i>n</i> (%)				
Yes	145 (70.7)	22 (52.4)	43 (44.3)	<.001
No	60 (29.3)	20 (47.6)	54 (55.7)	
Is secondhand smoke from hookah harmful? (<i>N</i> = 349) ^{d,b} , <i>n</i> (%)				
Yes	76 (36.4)	25 (54.3)	62 (66.0)	<.001
No	99 (47.4)	9 (19.6)	14 (14.9)	
Don't know	34 (16.3)	12 (26.1)	18 (19.1)	
How many children under 18 live with you in the same household? (<i>N</i> = 479) ^{b,c} , <i>n</i> (%)				
None	42 (28.0)	12 (30.0)	37 (12.8)	<.001
At least 1	108 (73.0)	28 (70.0)	252 (87.2)	

Note. HS = high school.

^aSample size differs across variables.

^bCurrent versus never is significant.

^cFormer versus never is significant.

^dCurrent versus former is significant.

Discussion

The results of this study indicate that having a parent or a sibling who smokes hookah in the household significantly increases the risk of hookah smoking. The effect of family hookah smoking behavior on adolescents has previously been reported (Tamim et al., 2007; Weglicki et al., 2008). In a study of junior high and high school students in Michigan, Weglicki et al. (2008) found that those who had one or more family members who smoked hookah were 6.3 times more likely to be current hookah smokers themselves (95% *CI* = 4.47–8.98). The current study participants were all adults and revealed that the effects of different family members vary, with fathers and mothers having more impact than siblings. Tamim et al. (2007) reported that adolescent offspring of hookah smoking fathers and mothers in Lebanon were 1.8 (95% *CI* = 1.3–2.6) and 2.3 (95% *CI* = 1.6–3.3) times, respectively, more likely to become hookah smokers. The higher ORs reported in our study may be due to the fact that participants are living in a non-Arabic country and may be more affected by the behaviors of family members. Hookah smoking may be viewed as a means of self-expression and a way of holding on to their Arabic culture (Roskin & Aveyard, 2009).

As reported in Table 1, approximately 71% of current hookah users believed that hookah is less harmful than cigarettes, which is in line with previous findings (Aljarrah, Ababneh, &

Al-Delaimy, 2009; Smith-Simone, Maziak, Ward, & Eissenberg, 2008). Other studies have reported the main reason to be the belief that the water in a hookah filters the smoke, rendering it less harmful (Kandela, 2000). Our study did not specifically ask our study population about the reason they believed that hookah was less harmful than cigarettes. Nevertheless, the fact that 63% of current hookah smokers in our study either did not believe or did not know that secondhand smoke from hookah was harmful and that 73% lived in a household with children is a public health concern. Approximately 48% of current hookah users exercised regularly, which is in agreement with recent studies showing that hookah smoking may be attracting individuals who are traditionally considered at low risk for tobacco use (Primack et al., 2010).

This study sheds light on habits and behaviors of current hookah smokers and indicates that having a father, mother, or sibling who smokes hookah at home, being male, or being younger were significant risk factors for hookah smoking in this study population. All the study participants were Arab Americans, a group with a distinct and unique culture; hence, generalization of the results is limited. This is a cross-sectional study, with its limitations in determining cause and effects relationships.

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Table 2. Logistic Regression for Risk Factors for Hookah Smoking Comparing Current Hookah Smokers Versus Nonsmokers

Variables	B	Wald chi-square	df	Sig.	OR	95% CI for OR	
						Lower	Upper
Sex ^a	1.28	40.73	1	0.000	3.60	2.43	5.34
Age	−0.03	10.88	1	0.001	0.97	0.95	0.99
Marital status ^b	0.09	0.12	1	0.73	1.10	0.65	1.84
Education ^c							
Less than high school	0.50	2.29	1	0.13	1.64	0.86	3.13
High school	0.51	3.17	1	0.08	1.67	0.95	2.94
Some college	0.48	2.34	1	0.13	1.62	0.87	2.99
Income	0.24	18.29	1	<0.001	1.27	1.14	1.41
Exercise ^d	0.06	0.10	1	0.76	1.06	0.72	1.56
Mother smokes hookah ^d	2.16	28.67	1	<0.001	8.64	3.92	19.02
Father smokes hookah ^d	2.26	10.07	1	0.002	9.55	2.37	38.47
Sibling smokes hookah ^d	1.15	4.57	1	0.03	1.27	1.14	1.41
Intercept	−2.04	16.40	1	0.000			

Note. OR = Odds ratio; Sig. = Significance.

^a0 = Female, 1 = male.

^b0 = Single, 1 = married, divorced, widowed, and separated.

^cComparison group is graduate and postgraduate.

^d0 = No, 1 = Yes.

Declaration of Interests

None declared.

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