

Risk Factors for Hookah Smoking Among Arabs and Chaldeans

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Published online: 12 April 2013
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Abstract Hookah smoking is more prevalent among individuals of Middle Eastern descent. This study examined general and ethnic-specific risk factors for hookah smoking among Arabs and Chaldeans. A self-administered anonymous questionnaire was conducted among 801 adults residing in Southeast Michigan. Binary logistic regression modeling was used to predict risk factors for hookah smoking. Hookah smoking was significantly more prevalent among Arabs (32 %) than Chaldeans (26 %, $p < 0.01$) and being Arab was a risk factor for lifetime hookah use. Younger age (<25 years), being male, higher annual income, and having health insurance were significant risk factors for hookah use. Chaldeans believed to a greater extent than Arabs that smoking hookah is less harmful than cigarette smoking (75 vs. 52 %, $p < 0.001$). Hookah smoking is prevalent in both ethnic groups, but significantly higher among Arabs. Results indicate that prevention efforts should target younger males with higher incomes.

Keywords Hookah · Water-pipe · Waterpipe · Prevalence · Ethnicity · Risk factors

Introduction

Hookah, or water pipe smoking, is considered a global public health threat [1], with claims that there are more than 100 million people worldwide who smoke hookah daily [2]. Hookah smoking has its origins in Africa and the Middle East [1] and is prevalent among United States immigrants from those regions [3]. However, little research has examined whether risk factors for hookah use differ between immigrant ethnic groups in which hookah smoking is common. A better understanding of such risk factors would illuminate possible targets for educational and health promotion efforts among current hookah users.

Hookah smoking is believed to have originated in Ethiopia as early as the fourteenth century, becoming more common with the appearance of public coffee-houses and the adoption of tobacco in the Middle East region near the end of sixteenth and beginning of the seventeenth century [1]. In the late nineteenth century, hookah use began to spread among women in the Middle East and has been gradually increasing in Europe and the US in the last two decades [3]. The perception that hookah smoke is filtered in the water may lead to the belief that it is less harmful than cigarette smoking [3]; this belief is independent of gender, ethnicity, or age [4–9]. However, the belief that water filters out smoke particles is scientifically inaccurate, since the volatile carcinogens in tobacco smoke and other particles will stay within the air bubbles during their passage through the water [3]. Hookah users also report that hookah smoke is less irritating than cigarette smoke, as it has a ‘smooth texture’ that allows them to smoke it for hours [1, 3, 10, 11].

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Like cigarette smoking, hookah smoking is a risk factor for cancer, respiratory disorders, heart disease, low birth weight, or periodontal disease [2, 10, 12–15]. As with other forms of tobacco use, health problems associated with hookah use are addiction [16] and secondary (environmental) smoke exposure [17]. Additional dangers which are associated with hookah but not with cigarette smoking include infectious diseases which could result from pipe sharing [2] and the frequent addition of alcohol or psychoactive drugs [9] or “Spice,” a common brand name for K2 or synthetic marijuana [18]. This refers to a series of products that are advertised and sold legally as herbal blend incense. However, they are smoked by people to gain effects similar to marijuana, hashish, and other forms of cannabis.

Ethnicity is an important factor related to hookah smoking. Studies have reported different prevalence rates of hookah in Middle Eastern countries, ranging from 6 % [19] to 41 % [9]. Hookah smoking is an old and deep-rooted tradition in the Indo-Pakistan subcontinent [20, 21]. It is a common method of socializing among people in the northern and eastern parts of India and in Pakistan [20, 21], where it is part of the cultural heritage [22]. Hookah has been recorded as a cultural activity in the Middle East for well over 500 years. It is a historical and cultural form of tobacco use common in the Middle East and North Africa. Traditionally a behavior of older males, its use is currently growing in all age groups [23]. Smokers have described hookah smoking as a pleasurable social experience embedded in cultural rituals [24]. Arab American families consider it a social event, a means of connecting to their roots, and a form of self-expression [5]. People of similar ethnicities usually attend the same hookah bars [3] and research has shown that Whites are more likely to use hookah than Latinos, Asians, and African Americans. This is in part due to the fact that individuals of Middle Eastern ethnicity are usually categorized as White in the general census [3, 25]. African American adolescents were significantly less likely than adolescents from other racial/ethnic backgrounds to use hookah [26]. Research has shown that hookah smoking is considered more socially acceptable among Arab youth. Although it is not acceptable for Arab children of any age to smoke cigarettes in front of their parents, smoking hookah is accepted [22, 27–30].

As Chaldeans and Arabs have migrated around the world, they have carried with them their tobacco use traditions [23]. Chaldeans are a group of Christian Iraqis who originate from northern Iraq and speak a modern version of Aramaic as their common language. Arabs are descended from a Semitic people that inhabited most of the Middle East and northern Africa and speak Arabic. The majority are Muslim [23]. Previous research has shown differences

between Arabs and Chaldeans in the prevalence of various self-reported health outcomes, including depression [31], asthma [5] and other chronic illnesses [23], all of which are conditions that could be related to smoking behavior.

Hookah smoking is rapidly becoming more common in the United States [19, 27–32], the United Kingdom [33], and Australia [34] and is considered a new public health challenge [5, 24]. There is therefore a pressing need to increase our understanding of factors that influence hookah use. The current study therefore examined the prevalence and perceptions of hookah use among Chaldean and Arab Americans, two ethnic groups among whom hookah use is a common practice.

Methods

Participants, Setting and Recruitment

The current study, part of a larger health and wellness study among 904 adults in Southeast Michigan, focused only on the adult Arab and Chaldean immigrant community. The study was advertised by one of the authors via two live interviews on a local Arabic radio program where the goals of the study were explained. Flyers about the study were also disseminated in community locations frequented by Arab and Chaldean people, such as churches, mosques, gas stations, stores and restaurants. Assistance with recruitment was also provided by two community volunteers and the public health division staff of the Arab American and Chaldean Council (ACC). Participants did not receive any compensation for completing the survey. Approval for this study was granted by the Human Investigation Committee at Wayne State University, Detroit, Michigan.

Procedures

Questionnaires were distributed to willing participants during different community events as well as in the offices of the ACC. All participants were given a self-administered paper questionnaire which was available in both English and Arabic. The English survey was translated into Arabic by one of the authors and then back-translated into English by a licensed translator to confirm reliability of the translation. The survey questions were based on a standardized questionnaire used in previous studies [27] while basic demographic questions were adopted from the National Health Interview Survey [35]. The questionnaire was accompanied by a detailed information sheet about the study which was also available in both English and Arabic. Questionnaires were distributed in the community between January and June of 2007. A total of 801 questionnaires were returned from a total of approximately 1000

distributed. Respondents self-identified as either Chaldean or Arab in the survey. The final sample encompassed 449 Arabs from different countries and 352 Iraqi Chaldeans. Of this total sample ($n = 801$), 37 % ($n = 295$) had ever smoked hookah and 29 % ($n = 234$) were current hookah smokers.

Questionnaire

The questionnaire was pilot-tested on a convenience sample of 30 Arabic-speaking adults in Southeast Michigan. After completing the pilot questionnaire, respondents were asked by a research assistant whether there were any items that were unclear or difficult to understand. No problems with the questionnaire were reported. The questionnaire contained a total of 40 items. Participants were asked about hookah smoking habits and related behaviors in several questions: “Have you ever smoked hookah?” (Yes, No); “How would you describe your hookah smoking behavior?” (Currently smoke; Former smoker; Never smoked); “Have you smoked hookah in the past 30 days?” (Yes, No). “At what age did you start smoking hookah?”; “Who else smokes hookah in your home?” (Friend/other; parent/grandparent; sibling/uncle/aunt); and “Why do you smoke hookah?” (Socialize with family/friends; taste; relieve stress; loneliness; more than one reason). Two items concerned participants’ perceptions of the health risks of hookah smoking: “Do you believe that smoking hookah is less harmful than smoking cigarettes?” (Yes, No, I don’t know); and “Do you think second hand smoke from hookah is harmful” (Yes, No, I don’t know).

Data Analysis

Descriptive statistics were used to present sample means and dispersion measures and percentages for dichotomous variables. Chi square tests were used to compare different groups. Binary logistic regression modeling was used to determine predictors of current hookah use. Independent variables were sociodemographic factors (age, gender, marital status, annual income, education), employment status, physical exercise, health insurance, place of birth (US or foreign-born) and ethnicity. All of these variables were included since this study was largely exploratory, although some were found to be significant predictors of hookah smoking in previous research [24]. Since we expected lifetime hookah use (“Have you ever smoked hookah?”) to be somewhat higher than current hookah use, predictors of lifetime hookah use were also examined to see whether risk factors would differ from those of current hookah use.

The IBM SPSS statistics program (version 20) was used for all data analyses.

Results

Characteristics and reported smoking behaviors of study participants are summarized in Table 1. Participants originated from all over the Middle East, including Iraq (57 %), Lebanon (22 %), Yemen (10 %), Jordan (5 %), Palestine (3 %), and “other” (3 %). All of the Chaldeans originated from Iraq although a significantly larger proportion was born in the US, compared to Arabs. There were significant differences between Chaldeans ($n = 352$) and Arabs ($n = 449$) with regard to all background characteristics except age, gender, employment status, and exercise habits. Compared to Arabs, a significantly greater

Table 1 Demographic characteristics and hookah smoking habits of the study population by ethnicity

Variable	Chaldean ($n = 352$) N (%)	Arab ($n = 449$) N (%)
Age group		
18–24 years	96 (27)	130 (29)
≥25 years	256 (73)	319 (71)
Gender		
Male	190 (54)	237 (53)
Female	162 (46)	212 (47)
Marital status***		
Single/other	184 (53)	190 (43)
Married	163 (47)	255 (57)
Education level**		
High school or less	234 (68)	256 (59)
Some college or higher	112 (32)	177 (41)
Employment status		
Unemployed	65 (21)	74 (24)
Student	27 (9)	21 (7)
Employed	215 (70)	216 (69)
Annual income***		
≥ \$40,001	156 (46)	122 (31)
Less \$40,000	184 (54)	266 (69)
Health insurance***		
No health insurance	67 (19)	122 (28)
Have health insurance	280 (81)	310 (72)
Place of birth***		
Outside USA	230 (67)	356 (82)
In USA	115 (33)	77 (18)
Regular exercise		
No	196 (56)	274 (61)
Yes	156 (44)	173 (39)
Hookah use**		
Never smoked hookah	244 (69)	262 (58)
Current hookah smoker	91 (26)	143 (32)
Former smoked hookah	17 (5)	44 (10)

** $p < 0.01$; *** $p < 0.001$

proportion of Chaldeans was single; less educated; had a higher annual income; and had health insurance. Hookah smoking was significantly more prevalent among Arabs than Chaldeans, for both current and former hookah smoking (Table 1). A comparison of non-hookah smokers revealed that Chaldeans were significantly older than Arabs ($p < 0.001$) and had higher annual incomes ($p < 0.01$). A larger proportion of Chaldean non-smokers had health insurance and was born in the US, compared to Arab non-hookah smokers.

The hookah smoking behaviors and beliefs of the current hookah smokers ($n = 234$) are summarized in Table 2. The majority of current hookah users had their first hookah puff before the age of 25. There were no significant difference between Chaldeans and Arabs concerning reports of others who smoked hookah in their home

Table 2 Characteristics of current hookah smokers ($n = 234$) by ethnicity

	Chaldean ($n = 91$) N (%)	Arab ($n = 143$) N (%)
At what age did you start smoking hookah?		
9–18 year	36 (40)	57 (40)
19–24 year	31 (35)	41 (29)
25–34 year	16 (18)	27 (19)
35–54 year	6 (7)	16 (11)
Total	89 (100)	141 (100)
Who else smokes hookah in your home?		
Friend/other	59 (70)	90 (70)
Parent/grandparent	14 (17)	23 (18)
Sibling/uncle/aunt	11 (13)	14 (11)
Total	84 (100)	127 (100)
Why do you smoke hookah?		
Socialize with family/friends	39 (46)	38 (31)
Taste	21 (25)	29 (24)
Relieve stress	6 (7)	14 (13)
Loneliness	5 (6)	4 (3)
More than one reason	14 (16)	36 (30)
Total	85 (100)	121 (100)
Do you believe that hookah is less harmful than cigarettes?*		
Yes	69 (81)	76 (63)
No	16 (19)	44 (37)
Total	85 (100)	120 (100)
Do you believe that secondhand smoke from hookah is harmful?*		
Yes	16 (19)	60 (48)
No	56 (66)	43 (35)
Don't know	13 (15)	21 (17)
Total	85 (100)	124 (100)

** $p < 0.01$

or reasons for smoking hookah. Most current hookah smokers (71 %) believed that smoking hookah is less harmful than cigarettes, with a significantly greater proportion of Chaldeans (81 %) compared to Arabs (63 %). 36 % of current hookah users believed that secondhand smoke from hookah is harmful, although 16 % stated that they did not know. Only 19 % of Chaldeans believed that secondhand smoke was harmful, compared to 48 % of Arabs ($p < 0.01$). However, it should be noted that missing values were substantial for the items related to the health dangers of hookah smoking, especially among Arabs. Among current smokers, missing values on the item related to the harmfulness of hookah compared to cigarettes were 16 % among Arabs and nearly 7 % among Chaldeans; for the item related to secondhand smoke, missing values accounted for 13 % of responses from Arabs and 7 % from Chaldeans. In the total sample ($n = 801$), Chaldeans believed to a greater extent than Arabs that smoking hookah is less harmful than cigarette smoking (75 vs. 52 %, $p < 0.001$). Chaldeans (32 %) were also less inclined than Arabs (57 %) to believe that secondhand smoke from hookah is harmful ($p < 0.001$).

Risk factors for current and lifetime hookah use in the total sample are summarized in Table 3. Risk factors for current hookah smoking included being younger than age 25; being male; and having an annual income of \$40,000 or more; ethnicity was not a risk factor. For lifetime hookah use, Arabs had a 1.6 times greater risk compared to Chaldeans. Other risk factors for lifetime use included being younger than 25; being male; having an annual income of \$40,000 or higher; and having health insurance.

Table 3 Risk factors for current and lifetime hookah smoking, respectively, in the total sample ($n = 801$)

	Sig.	Odds ratio	95 % CI for OR	
			Lower	Upper
Current hookah smoking ($n = 234$)				
Age (reference ≥ 25)	0.011	2.0	1.17	3.48
Gender (reference female)	0.000	2.4	1.58	3.64
Income (reference $< \$40,000$)	0.020	1.8	1.00	2.83
Lifetime hookah smoking ($n = 295$)				
Age (reference ≥ 25)	0.028	1.8	1.07	3.07
Gender (reference female)	0.000	2.9	1.93	4.31
Income (reference $< \$40,000$)	0.028	1.7	1.06	2.66
Health insurance (reference no insurance)	0.014	1.9	1.14	3.20
Ethnicity (reference Chaldean)	0.027	1.6	1.05	2.36

Analyses adjusted for age, gender, marital status, education, employment status, annual income, health insurance, regular exercise, and place of birth (US vs. non-US)

CI confidence interval

Table 4 Risk factors for current and lifetime hookah smoking in Chaldeans (n = 352) and Arabs (n = 449), respectively

	Sig.	Odds Ratio	95 % CI for OR	
			Lower	Upper
Chaldeans—current hookah smoking (n = 91)				
Age (reference ≥ 25)	0.001	4.0	1.73	9.15
Gender (reference female)	0.000	4.4	2.22	8.74
Income (reference $< \$40,000$)	0.013	2.6	1.22	5.59
Arabs—current hookah smoking (n = 143)				
Health insurance (reference no insurance)	0.025	2.2	1.10	4.40
Chaldeans—lifetime hookah smoking (n = 108)				
Age (reference ≥ 25)	0.003	3.4	1.5	7.5
Gender (reference female)	0.000	4.2	2.23	7.76
Income (reference $< \$40,000$)	0.042	2.1	1.03	4.22
Arabs—lifetime hookah smoking (n = 187)				
Gender (reference female)	0.014	2.1	1.16	3.74
Health insurance (reference no insurance)	0.008	2.4	1.26	4.75

Analyses adjusted for age, gender, marital status, education, employment status, annual income, health insurance, regular exercise, and place of birth (US vs. non-US)

CI confidence interval

Separate logistic regression analyses were run to identify risk factors for current and lifetime hookah smoking among Chaldeans and Arabs, respectively (Table 4). Among Chaldeans, risk factors for both current and lifetime hookah smoking were being younger than 25; being male; and having an annual income $> \$40,000$. Having health insurance was the sole risk factor for current hookah use among Arabs. Being male and having health insurance were the risk factors for lifetime hookah use among Arabs.

Discussion

The objective of this study was to assess and compare hookah smoking habits and perceptions among Arab and Chaldean Americans and to determine risk factors for hookah use in these ethnic groups. The results indicate that Arabs were 1.6 times more likely to ever smoke hookah than Chaldeans. A significantly larger proportion of Arabs (32 %) were also current hookah smokers, compared to 26 % of Chaldeans. These findings are in line with previous studies among both youth [27] and adults [23]. In a study of teenagers, Weglicki and colleagues [27] found a significantly higher prevalence of both “ever” and “current” hookah smoking among Arab-Americans compared to non-Arab youth. In a study of adults, Arab Americans smoked significantly more hookah than Chaldeans and

non-Middle Eastern Whites, respectively [23]. However, the latter study examined predictors of tobacco use in general, not hookah use, specifically. In the current study, we found no significant differences between Chaldeans and Arabs regarding other family members who smoked hookah in the home or individual reasons for smoking hookah.

It is possible that these group differences stem from the fact that hookah smoking was adopted earlier in Arab nations such as Lebanon and Egypt, but was originally less popular in Iraq. However, the regression analyses offer some insight into risk factors for hookah smoking in each respective group. In the combined sample, ethnicity was only a risk factor for lifetime hookah use, not for current hookah smoking. Being younger, male, and having an annual income of \$40,000 or higher were risk factors for both current and lifetime hookah use. Having health insurance was also a risk factor for lifetime hookah smoking. Arabs were at increased risk for lifetime hookah smoking compared to Chaldeans, but ethnicity was not a risk factor for current hookah use. In both groups, being male was a risk factor for lifetime hookah smoking.

In previous research in a community sample in Southeast Michigan, higher income was also a significant risk factor for hookah smoking [5]. In the current study, a significantly greater proportion of Chaldeans (46 %) had an annual income of more than \$40,000, compared to 30 % of Chaldeans. In the separate regressions, higher income was a risk factor for both current and lifetime hookah use among Chaldeans, while having health insurance was a risk factor only among Arabs. Both of these variables may be proxies for employment, which, however, did not differ significantly between ethnic groups. These variables—income and health insurance—suggest that an individual’s financial situation plays a role in their hookah smoking habits, i.e., the risk of hookah smoking is greater among both Chaldean and Arab males with higher incomes.

Most hookah users had their first hookah puff when they were younger than 25, with no significant difference between Chaldeans and Arabs. The increased likelihood of smoking hookah among males in this study population is in line with recent studies showing that hookah use was dominated by males in Asia. However, the habit is spreading among females in the Middle East due to the social acceptability even in traditionally conservative societies like Saudi Arabia [3, 36]. Studies indicate that there is an increasing trend in the use of hookah among females in some Arabic countries such as Kuwait and Saudi Arabia, and is gaining social acceptability even in traditionally conservative societies [2, 3, 36]. However, in this American-based sample, being male was a risk factor for hookah use in both ethnic groups.

Although the prevalence of hookah smoking was higher among Arabs, perceptions of health risks related to hookah

use were lower among Chaldeans. This is surprising, as previous studies have reported lower levels of cigarette smoking among those who perceive the health risks to be greater [27]. The belief that hookah smoking is less harmful than cigarette smoking, however, still implies a certain belief that hookah smoking is not without physical risk. Less than half of this entire study population expressed the belief that second-hand smoke from hookah was also deleterious to one's health, although Chaldeans believed so to a lesser extent than Arabs. These results suggest that any prevention efforts aimed at Chaldeans and Arabs should encompass a segment with basic education on the physiological implications of active and passive hookah smoking.

Limitations

This study is based on a convenience sample of Arabs and Chaldeans in a single geographic area of the United States and results may not be generalizable to all Arab-Americans. Furthermore, this is a cross-sectional study and cause and effect between ethnicity and hookah smoking cannot be determined. All data were based on self-report and results may also be influenced by recall bias. The items related to hookah use in this study did not specify that hookah was used to smoke tobacco, rather than marijuana or some other substance. As previous research has suggested [37, 38], standardized, validated measures of hookah use are needed. In addition, the item asking participants to describe their hookah use ("How would you describe your hookah smoking behavior?") relied on self-categorization ("Currently smoke; Former smoker; Never smoked"), rather than a measure of behavior. Although the questionnaire also asked participants if they have ever smoked hookah, it is possible that participants who only smoked once or twice might have considered themselves "non-smokers," rather than "former smokers." Finally, this study was exploratory, as few previous studies comparing hookah smoking among Arabs and Chaldeans were found. Future studies using random samples in a larger geographic area are needed to see whether these results can be replicated.

Conclusions

Hookah smoking was prevalent in both ethnic groups but was significantly higher among Arabs compared to Chaldeans. Arabs were also at increased risk for lifetime hookah use, compared to Chaldeans, but ethnicity was not a risk factor for current hookah use. Notably, perception of health risks related to hookah smoking was lower among Chaldeans. Risk factors included younger age, being male, and having a higher annual income. Results indicate that

prevention efforts should include information campaigns about the negative health effects of hookah smoking and should target the young, especially young males, with higher incomes. The fact that smoking is more prevalent among higher, as opposed to lower income persons, is in contrast to cigarette smoking and warrants further research to determine causal determinants of hookah smoking in the targeted ethnic groups.

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