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Patterns of Waterpipe Use among Arab Immigrants in the USA: A Pilot Study

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Authors' contributions

This work was carried out in collaboration between all authors. Author SA conceived and drafted the manuscript. Author LH planned the design and method, monitored data collection and management, and analyzed the data. Author LH was the principle investigator, planned the design and method, monitored laboratory analyses, and drafted and revised the paper. Author OES extracted the data and revised the paper. Author KK monitor the data analysis. Author KAA contributed to the paper's final format. Author RG contributed to the paper's final format. Author YJ contributed to the final paper editing. All authors read and approved the final manuscript.

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ABSTRACT

Aim: Waterpipe smoking is becoming increasingly popular in the U.S., especially among minority groups. The purpose of this preliminary study was to explore the patterns of waterpipe use, as well as the association between acculturation factors and waterpipe use among Arab immigrants living in the Richmond, Virginia (VA) metropolitan area.

Methods: We surveyed self-identified Arab American Immigrants in Middle Eastern

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restaurants/lounges and Middle Eastern groceries, in the Richmond, VA metropolitan area. A total of 221 Arab Americans participated in this study.

Results: In this sample, higher rates of waterpipe use were found among male subjects (66.6%) than females (31.4%). Our results indicated no significant association between the type of tobacco used (exclusive versus dual) and desire or future intentions to quit waterpipe use. Upon examining the proxy indicators of acculturation, none of them was significant for the entire sample. However, upon stratifying the results by group (exclusive vs. dual), exclusive waterpipe use was significantly correlated with proportion of life lived in the US as $r(16)=0.56$, $p=0.02$ but the correlation remained not significant among dual smokers $r(23)=0.08$, $p=0.6$.

Conclusion: Further studies are needed to confirm the relatively high prevalence of waterpipe use among Arab Americans. There is a need to develop effective prevention strategies that will consider the acculturation process when trying to control the spread of waterpipe use among minority groups in the U.S.

Keywords: Arab Americans; waterpipeuse; minority health.

1. INTRODUCTION

Tobacco use is projected to cause up to 7.5 million deaths globally every year by 2020 [1,2]. Numerous studies indicate an alarming increase in waterpipes mokings [3-10]. Waterpipe smoking, also known as narghile and goza/shisha, involves the inhalation of smoke after passage through water [11,12]. Waterpipe fumes result in a nice aromatic smell, unlike the relatively offensive smell of cigarettes. Waterpipe smoking started as a centuries-old tobacco use method associated traditionally with Middle Eastern societies, but its popularity has increased worldwide in the past two decades.

Waterpipe smoking is a sociable event that traditionally occurs in group settings [13] or in specialized "hookah bars" in which patrons purchase waterpipe tobacco and share waterpipes. This social aspect of smoking waterpipe is what makes it a threat to establishing a non-smoking norm because it is more "socially" accepted than cigarettes [9,14-16]. Several studies have conveyed that [17] a single session of waterpipe use may possibly be equivalent to the smoke inhaled from consuming approximately 100 or more cigarettes. A precise estimate of the standardization of a waterpipe smoking session is very difficult to ascertain. However, like any form of smoking tobacco, waterpipe smoke is associated with lung cancer, respiratory illness, low birth weight, periodontal disease, and heart disease [8,17-19].

1.1 Arab Americans' Tobacco Use

Arab Americans are considered to have one of the highest rates of cigarette smoking in the U.S. [20]. The 1998 Surgeon General Report detailed tobacco use data for the four major ethnic groups in the United States; however tobacco use among Arab American was not included within the report [21]. Accurate tobacco use rates among Arab Americans remain unknown. However, it is expected to be higher than other ethnic minority groups since Arab Americans emigrate from countries where smoking rates are among the highest in the world [22].

In addition to the lack of precise national data on the prevalence of tobacco use among Arab Americans, research describing the patterns of waterpipe use among adult Arab Americans is available but limited. The use of waterpipe among adults in the U.S. is not as widely studied as it is among adolescents or youth. The few studies conducted among samples of Arab immigrants living in the state of Michigan used different types of sampling methods and youth as their target population [5,23-25]. However, all these studies reported the prevalence of tobacco use among Arab immigrants to be relatively higher than the U.S. average of 20% [5,6,23-25,]. Recently, McMillen and colleagues [10] studied a nationally representative sample of American adults, and found that 11.4% of subjects were current waterpipe smokers, 8.8% used waterpipe at least once in their lifetime, and 12.9% were daily waterpipe smokers. Age, sex, region, race, and education were all significantly associated with waterpipe use over a smoker's lifetime.

Furthermore, acculturation, which is defined as the process by which individual's norms, values, attitudes, beliefs and behaviors change as a result of continuous direct contact with a different culture than his\her own [26], is affecting smoking habits among minority groups. Haddad et al. [21] found that the less the acculturation the less quitting rate among Arab Americans. Existing literature [27] showed that better understanding of how acculturation interact with other smoking behavior related factors will help improve the understanding of the cultural aspect of waterpipe smoking behaviors. As such, the purpose of this pilot study is to explore the possible patterns of Arab American waterpipe users, including current use, previous use, and intentions to quit. The study explores the relationship between acculturation and waterpipe smoking among Arab immigrants in the Richmond, VA metropolitan area. The identification of waterpipe use and other smoking related patterns may help understand the extent of the problem among Arab Americans. This understanding may provide further insights for potential programs targeting tobacco use, especially those future projects specifically aiming at enhancing program sensitivity regarding Arab American waterpipe use.

2. MATERIALS AND METHODS

2.1 Population and Study Sample

The current work is a part of a larger study that was conducted among Arab Americans [26]. Subjects from the Richmond VA metropolitan area (Richmond city, Chesterfield County, Henrico County, and Hanover County) were recruited through convenience sampling. Subjects volunteered in response to widespread advertisements through local media, as well as fliers distributed at Middle Eastern grocery stores, restaurants, lounges, and faith-based organizations in Richmond. The recruitment process was explained in a previous published paper by Haddad et al [21]. Inclusion criteria included being older than 18 years of age, being from a country of Arabic origin, and reading and speaking either Arabic and/or English language up to a level of fluency sufficient to complete a self-reported questionnaire. However, all subjects preferred to use the English version. The current paper is based on a secondary data analysis of an original data [21] collected for a similar purpose with a total of 221 subjects in the sample.

2.2 Data Collection Procedure and Sites

The ethical approval was obtained from the Virginia Commonwealth University Institutional Review Board. The research assistant and/or the PI conducted the initial screening to make

sure that subjects met the inclusion criteria. Detailed information about the data collection process and sites used was published in a previous paper [21]. Data were collected from June 2010 through December 2010. All subjects signed a consent form; there was no identifying information on any of the instruments used.

2.3 Measures

The measures used in this study are composed of the following:

Demographic and Cultural Information (DCI) – This is a 21-item instrument form that was used to obtain background and cultural information about participants: age, gender, occupation, country of origin, income, primary language spoken, and whether or not they lived with one or more family members who were current smokers.

Tobacco and Waterpipe Use Questionnaire (TUQ)– This 32-item questionnaire asks about smoking history, smokeless tobacco use, smoking habits, past attempts to quit smoking, attitudes and beliefs towards tobacco use, and the desire to quit. In addition, the last four questions measured stage of change: if a subject is planning on decreasing his/her tobacco use in the next week, month, 6 months, or a year, and whether he/she is trying to stop smoking. Haddad and Petro [28] previously used the same questionnaire, which showed a high level of validity and reliability. The internal consistency for the tobacco use measure was evidenced by an alpha of 0.79. Eleven questions developed by Maziak et al. [29] were added into the TUQ to measure waterpipe smoking, examining current level of waterpipe use and situational characteristics of waterpipe use. They also assess motivation and efficacy regarding quitting waterpipe, cognitions, and behaviors that support waterpipe use. Only results pertaining to waterpipe smokers are presented in the study.

The main variable for this pilot study is the “waterpipe use profile”, which was operationalized based on the number of times a participant smokes any type of the following tobacco products (i.e., waterpipe, manufactured cigarettes, hand rolled cigarette, cigar, pipe). Subjects were classified into three categories: 1) those who only smoke cigarettes were defined as *Exclusive Cigarette Users (104 subjects)*, 2) those who only smoke waterpipe were defined as *Exclusive Waterpipe Users (23 subjects)*, and 3) those who used both cigarettes and waterpipe were defined as *Dual Users (29 subjects)*. For the purpose of this study, the researchers aimed to include and report results pertaining to waterpipe use only. Therefore, if a subject currently smokes waterpipe – at least once in the last month, he or she were then grouped into further categories that were drawn in the final analysis, while exclusive cigarette users were excluded from the final analysis.

Acculturation Indicators – For the purpose of our study, three indicators of acculturation were used, which were previously tested in acculturation research in general [30,31]. First we included the proportion of life lived in the U.S. It was computed by dividing the number of years living in the U.S. by the age when participants moved to the U.S. Thus, this new variable represented the proportion of time of an immigrant stayed in the U.S. over his/her life course, which was a continuous variable. Second, the language spoken at home, which was assessed by asking the participants, “What language do you speak at home?” This resulted in an ordinal variable correlating to progressive acculturation in the following order (Arabic only, Arabic and English, English only). Third, the first learned language, which was assessed by asking, “What is your native language?” which resulted in an ordinal variable correlating to progressive acculturation in the following order (Arabic, English).

All instruments were translated from English to Arabic and then translated back from Arabic to English. The translated version was found to be reliable and valid. Bilingual English/Arabic instruments were available in this study; however, all subjects voluntarily selected the English version of the questionnaire.

2.4 Analysis

SPSS Version 17 statistical package was used to analyze the data of the study. Relevant statistics were calculated for the entire sample and stratified according to age, gender, country of origin, and water-pipe smoking status when applicable. First, we calculated univariate statistics to describe the sample. Second, we examined waterpipe use and the number of demographic variables (i.e. proxy measure of acculturation, age, gender, and country of birth) using bivariate statistics. Correlation analysis was used to examine the association between desire and intentions to quit waterpipe use and being an exclusive or dual waterpipe user. Distributions and trends of the data were examined. The level of significance was set at the $p < 0.05$ level.

3. RESULTS

3.1 Sample Characteristics

A total of 221 Arab immigrants living in the Richmond, VA metropolitan area participated in the study. Among the participants, 70% of them reported being current smokers, defined by having either waterpipe or cigarettes in the last 30 days. Table 1 describes the characteristics of smokers in this sample. There were no significant differences between the characteristics of the three participant groups in our study. Among the participants, 56.8% of them were male and 43.2% of them were female. The average age was 28.4 years (SD=10.3), ranging from 18 to 60 years old. Sixty-nine percent of the subjects reported being current smokers. Prevalence of the tobacco use is shown in Fig. 1. There were 52 waterpipe users in the present study. Slightly more than half of the subjects were dual smokers (55.8%), and less than half of the subjects (44.2%) were exclusive waterpipe users.

Table 1. Demographic Characteristics of the smokers sample (N=156)

	Exclusive waterpipe users (n=23)N (%)	Dual users (n=29)N (%)	Exclusive cigarette users (n=104)N (%)	P
Age (mean, SD)	28.9 (9.3)	27.8 (10.4)	28.00 (10.2)	>0.05
Gender				
Males	12 (52.2)	21 (77.8)	71 (68.9)	>0.05
Females	11 (47.8)	6 (22.2)	32 (31.1)	
Country of birth				>0.05
Iraq	4 (17.4)	10 (34.5)	27 (25.9)	
Gulf countries	2 (8.7)	2 (6.9)	23 (22.1)	
Syria	6 (26.1)	6 (20.7)	18 (17.3)	
Egypt	4 (17.4)	7 (24.1)	10 (9.6)	
North African	1 (4.3)	1 (3.4)	10 (9.6)	
Yemen	1 (4.3)	-- (--)	5 (4.8)	
Primary language/spoken at home				>0.05
Arabic and English	13 (56.5)	16 (55.2)	48 (46.6)	
Only Arabic	8 (34.8)	10 (34.5)	43 (41.7)	
Only English	2 (8.7)	3 (10.3)	10 (9.7)	

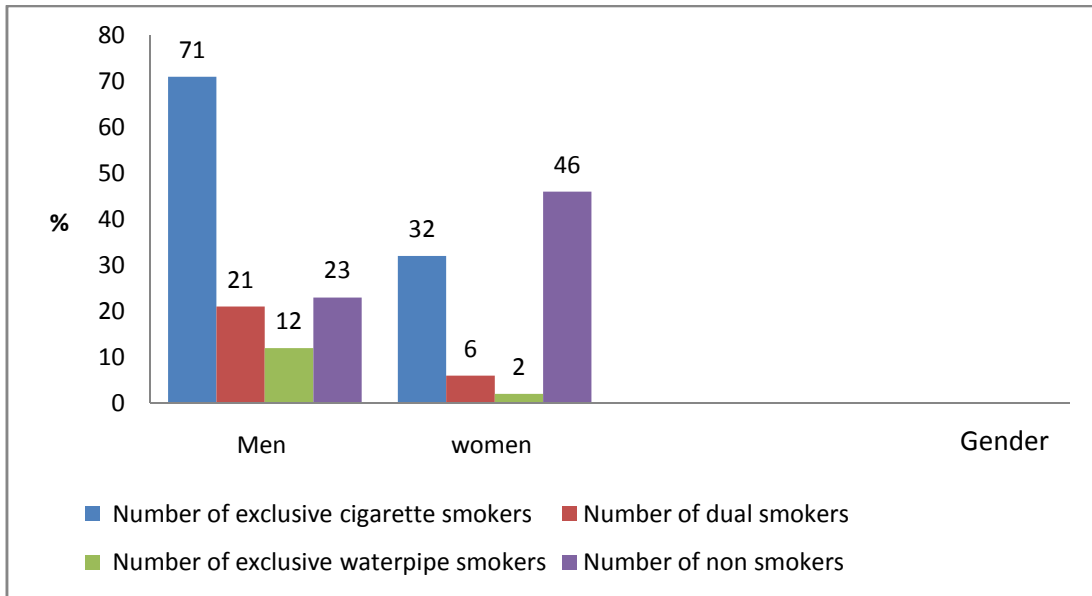


Fig. 1. Prevalence of Tobacco Use in the Sample (n=221)

3.2 Patterns of Waterpipe Use

The current study report results of waterpipe profile only. Thus, two groups are identified: exclusive waterpipe users and dual users (smoking waterpipe and cigarettes in the last 30 days). The tobacco use profile of each group is presented in Table 2. Notably, this table only reports results for those who answered “yes” to waterpipe smoking. Based on the self-reported data, subjects began experimenting with waterpipe smoking as young as 12 years of age. Exclusive waterpipe users reported significantly more daily smoking than the dual users, while the dual users demonstrated significantly higher weekly smoking frequency. There was no significant differences between the two groups in other characteristics.

Table 2. Waterpipeuse profile n = 52

Waterpipe Use	Waterpipe and cigarette users(n=29)	Exclusive waterpipe users(n=23)	P
Share Waterpipe			
Yes	24 (85.7)	19 (82.6)	>0.05
No	4 (14.3)	4 (17.4)	
Smoking Frequency			
Daily	2 (7.4)	13 (56.5)	<0.05
Weekly	20 (68.9)	7 (30.4)	
Monthly	5 (17.2)	3 (13.0)	
Age Started (Mean, SD)	17 (3.7)	19.2 (5.8)	>0.05
Number of Waterpipe Sessions on a Given Day (Mean, SD)	1.1 (0.3)	1.2 (0.6)	>0.05

Our results showed that 82.6% of waterpipe users tended to share the same waterpipe with others. There was no significant difference in sharing waterpipe between dual users and

exclusive users. Sixty-four percent of subjects thought they could quit waterpipe smoking anytime they wished to do so. When asked about their intentions of quitting waterpipe smoking, almost half of the subjects (44.6%) had no intention to quit at any point in the future (Fig. 2).



Fig. 2. Distribution of participants' intentions to quit

Our results indicated no significant association between the type of tobacco used (exclusive versus dual) and desire or future intentions to quit waterpipe use. However, exclusive waterpipe users significantly smoked more weekly waterpipe sessions than dual users. The average number of weekly waterpipe sessions among exclusive users was 17.33 and for dual smokers it was 8.85 ($F=5.79$, $p=0.02$). Frequency of smoking was not correlated to the time lived in the US when we analyzed the whole sample as $r(52)=0.30$, $p=0.06$, however after stratifying the sample by the smokers type, only frequency of smoking for those who were exclusive waterpipe users was significantly correlated with proportion of life lived in the US as $r(16)=0.56$, $p=0.02$ and the correlation remained not significant among dual users $r(23)=0.08$, $p=0.6$.

4. DISCUSSION

This is one of the first studies that examine waterpipes smoking among adult Arab immigrants. The data from our study of Arab American immigrants indicate that previous and current waterpipe use in this sample is relatively high (33.3%). These findings may reflect the popularity of waterpipe smoking over the past few years, and are consistent with other studies among the same group of immigrants [21-24]. Noticeably, all of these studies were conducted among Arab adolescents and not adults. Furthermore, the current study indicates that waterpipe smoking among Arab immigrants is more prevalent among males as compared to females. These results are consistent with cigarette smoking rates among the same group of immigrants [23,27]. However, these results contrast waterpipe smoking rates in the participant's country of origin, where waterpipe smoking is more prevalent among

females, especially adolescent girls [29]. One explanation for this discrepancy could be that some female subjects may be reluctant to admit to their tobacco use for the fear of social stigma. This effect may be more salient for Arab American women, especially since the recruitment process took place through public venues [30,31,32].

The current results on the socio-demographic characteristics of waterpipe smoking were consistent with previous studies in other Western countries [36-38], indicating that primarily younger people use waterpipes. Waterpipe smoking, hardly seen a decade ago, is becoming the second-most common form of smoking among this population [33,34]. For example, in a survey conducted in 2008 among 3,770 college students from eight universities in North Carolina, prior waterpipe smoking was reported by 40% of students, while current waterpipe smoking was reported by 17% of the sample [35]. Findings based on Waterpipe users in the current study suggest a pattern of higher waterpipe use among younger males. One possible reason for this result is that experimentation with new recreational substances typically occurs during later adolescence [10,39]. In addition, the higher prevalence of waterpipe use among youth might be due to the fact that waterpipes are seen as fashionable and trendy among their peers, which make their group gatherings more enjoyable and socially acceptable [5,7,29,40,41].

Consistent with other studies [42,43], the current study found that waterpipe users reported higher rates of concurrent cigarette use. Among our sample of waterpipe smokers, more than half (66.6%) reported smoking cigarettes, which suggests that adults who have reported smoking cigarettes tend to have a much higher prevalence of waterpipe use. This might be explained by the fact that smokers are trying to experiment with alternative tobacco products as they adjust to the recent public policies that have sought to restrict smoking in public places. An issue that has received considerable attention in the field is the temporal relationship between waterpipe use and the use of other tobacco products. Several studies have questioned whether waterpipe smoking leads to cigarette use, or if it is a substitute behavior for those who have quit smoking cigarettes [16,44]. Our current findings agree with the literature and add additional evidence for an emerging public health concern, particularly for those with a history of tobacco use.

Acculturation indicators measured in this study were not evidenced as a significant indicator of waterpipe smoking. However, for exclusive waterpipe smokers the proportion of stay in the U.S. was associated with more smoking. The longer they stayed in the U.S., the more likely their number of waterpipe sessions increase. This is consistent with the literature asserting that more acculturated immigrants smoke more cigarettes per day than less acculturated [27]. These findings are consistent with the results of other research in terms of the implication that there could be a negative acculturation effect or a positive acculturation effect in relation to smoking and other risk behaviors among different ethnic groups [21,27].

Our results are also consistent with other studies concerning minorities living in the U.S. and studies conducted from participants' countries of origin [45,46]. On the other hand, our results contradict previous studies conducted in the U.S. where waterpipe smokers reported no desire or intent to quit waterpipe smoking in the future [44,47]. The stated desire to quit, in particular, could rest in the fact that subjects in the current study may have been aware of the harmful effects of waterpipe smoking. Lipkus and colleagues [42] found that waterpipe smokers who received information about the dangers of waterpipe smoking reported greater perceived risk and worry about harm and addiction, and expressed a stronger desire to quit [44,47]. Moreover, Abughosh and colleagues [48] found that subjects of Indian or Pakistani

minority groups were more likely to have an intention to quit compared to white American participants.

The limitations of this study include the use of a non-random sample; therefore, it does not reflect the actual prevalence among Arab immigrants in Richmond, VA. In addition, the acculturation association was assessed using a rough proxy measure, instead of a psychometric tool. Although this rough indicator has been used in many studies, its lack of high degree of precision suggests that future studies exploring acculturation effects might consider using more rigorous, psychometric approach. Finally, the measure of tobacco use was based on self-report only, which might have missed out smokers due to those participants' reluctance of admitting their tobacco use for the fear of social stigma.

5. CONCLUSION

Waterpipe smoking among Arab immigrants is established by connections to the Middle East culture of viewing the practice as an enjoyable social and family activity. The scope of waterpipe smoking prevalence among minority groups, including Arabs, is still uncertain. More research is urgently needed in order to understand the epidemic and determinants of waterpipe smoking among Arab Americans.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

CONSENT

Not applicable.

ETHICAL APPROVAL

All authors declare that institutional approval for human subjects' extermination was given by the Virginia Commonwealth University for this project.

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