Published in final edited form as:
Merrill Palmer Q (Wayne State Univ Press). 2006 April ; 52(2): 327–342.

Predictors of Arab American Adolescent Tobacco Use

Virginia Hill Rice, **Linda S. Weglicki**, and **Thomas Templin**
Wayne State University College of Nursing

Adnan Hammad
Arab Community Center for Economic and Social Services (ACCESS);

Hikmet Jamil
Wayne State University Department of Community Medicine

Anahid Kulwicki
Wayne County Health Department

Abstract

This study examined personal, psychosocial, sociocultural, and environmental predictors in tobacco use for 1671 Arab American adolescents. Cigarette smoking in past 30 days was 6.9%. This increased from 1% at age 14 to 14% at age 18. Twenty-nine percent of the youths reported 'ever cigarette smoking.' Experimentation with narghile was 27%; it increased from 23% at 14 years to 40% at 18 years. All trends were significant ($p < .001$). Logistic regression analyses found ten predictors for 'smoked a cigarette in past 30 days' and nine and seven, respectively, for 'ever smoked a cigarette or narghile'. Friends and family members smoking were the strongest predictors of cigarette smoking and 'ever narghile use.' 'Ever narghile use' supported cigarette smoking.

Tobacco use, primarily cigarette smoking, is a major preventable public health risk in most of the developing countries of the world (World Health Organization [WHO] Tobacco Free Initiative, 2005a) even as rates are slowly declining in developed countries like the United States (U.S. Department of Health and Human Services [USDHHS], 2004). The WHO reports smoking as the second cause of death and disability worldwide; they found it responsible for the death of one in ten adults. There are approximately 1.1 billion smokers in the world; about one-third of the global population aged 15 years and over. One half of the people who smoke today - that is about 650 million people - will eventually die as a result of smoking-related health problems (WHO Tobacco Free Initiative, 2005b).

Tobacco use has been identified as the most important source of preventable morbidity and premature death in numerous U.S. Surgeon Generals' Reports since 1964 (U.S. Department of Health and Education and Welfare, 1964) including *Preventing Tobacco Use Among Young People* (USDHHS, 1994) and, the latest, *The Health Consequences of Smoking* (USDHHS, 2004). Tobacco use is one of the 10 Leading Health Indicators for the Healthy People 2010 agenda. Its objectives are to significantly reduce tobacco use among adults and adolescents to less than 12% (Lurie, 2000; USDHHS, 2000).

Treatment of tobacco-related diseases costs this nation more than $75.5 billion dollars annually in direct medical costs and an additional $92 billion for smoking-related lost productivity (Armour, Woollery, Malarcher, Pechacek, & Husten, 2005). On average, smokers die 13 years to 14 years earlier than nonsmokers (USDHHS, 2004). An estimated 45.8 million American

Correspondence concerning this article should be addressed to Virginia Hill Rice, PhD RN, APN BC, FAAN, Professor, Wayne State University College of Nursing & Karmanos Cancer Institute, 5557 Cass Avenue, Detroit, Michigan 48202. Email: vrice@wayne.edu.

Funded by National Institute of Child Health & Human Development (RO1 – 331-468)

adults (22.5%) are current smokers; approximately 82% smoke every day. Cigarette smoking rates are somewhat similar for males (25.2%) and females (20.0%), but inversely related to age. The highest use is among 18 to 24 year olds (28.5%) and the lowest (9.3%) among those 65 years and older (Troschair, Caraballo, Malarcher, Husten, & Pechace, 2005).

Clearly, tobacco use is a risk behavior of the young. Worldwide, more than half of the adolescents 18 years and under have experimented with smoking (WHO Tobacco Free Initiative, 2005). In America, 21.9% of all high school students are current smokers with equal numbers of boys and girls. More than half began before the age of 14 and 90% before the age of 19. Every day approximately 2000 young people experiment with smoking. Twenty-seven percent (27%) of 12^{th} graders are current users; one in four is a regular smoker by the time he/she leaves high school (Allen, et al., 2003).

Differences in tobacco use have been noted for both adults and adolescents in America by racial/ethnic identity. Among adults, American Indians/Alaskan Natives (39.9%) and African Americans (22.8%) reported higher smoking rates than Hispanics (22.3%) and Asian/Pacific Islanders (16.6%) (CDC, 2004). Cigarette smoking rates among teens declined during the 1970s and 1980s, but increased in the early to mid 1990's among white, African American, and Hispanic high school students, especially girls (Johnston, O'Malley, Bachman, & Schulenberg, 2004). On the whole, Hispanic high school students were higher tobacco users (18.4%) in the previous month than African American (15.1%) or Asian American youth (12.8%) (Johnston, O'Malley, Bachman, & Schulenberg, 2003). Differences in racial/ethnic values and beliefs about tobacco use also have been noted. Dornelas and colleagues (2005) reported black teens emphasized the familial and social pressures of smoking, higher rates of acceptance of smoking by family members, role modeling by household members, more prevalent beliefs that smoking is a way to achieve belonging, and lack of perceived support for quitting by friends compared to white and Hispanic youth. Few smoking behavior data are available for other ethnic minorities such as Arab Americans.

Arab Americans number almost four million and are one of the fastest growing immigrant groups mainly due to the war and political unrest in the Middle East. They live in all 50 states; 66% reside in ten of them. One-third of the total live in Michigan, California, and New York, and approximately 94% live in large metropolitan areas including Detroit, Los Angeles, New York City, Chicago, Washington, D.C., and northeastern New Jersey. Almost 490,000 Arab Americans live in Michigan and more than one-third (36%) identify Lebanon as their country of origin (Abraham & Shryock, 2000; Arab American Institute [http://www.aaiusa.org/], 2005)

Many come from Middle Eastern countries where tobacco use is high. On average, 45% of the men and 5% of the women in the Middle East smoke cigarettes. Traditionally, tobacco use by women in the Middle East was very low; it is now on the rise. Nations with the highest adult cigarette smoking rates include Iraq (40%), Yemen (45%), Lebanon (58%) and Tunisia (60%) (WHO, Tobacco Free Initiative, 2005).

The Global Youth Tobacco Survey (GYTS) estimated cigarette smoking among 13 to 15 year old males and females in the Eastern Mediterranean region to be 35% and 4%, respectively. As of 2004, 129 countries representing all six WHO regions had participated in at least one annual GYTS. In recent assessments, Lebanon's cigarette smoking rate was found to be 45.5% for boys and 39.6% for girls. Jordan reported almost 44% of their youth had ever smoked cigarettes; 21% were current smokers. Twenty-three percent (23%) indicated using other smoking products. In Yemen 19% of adolescents had ever smoked; 7% currently smoked cigarettes and almost 18% use other tobacco products (CDC, 2004).

Although there are no national or regional tobacco use data for Arab Americans as an ethnic group, studies in a predominately Arab American community in the Midwest provide some

direction. Rice and Kulwicki (1992) found 40.6% of the men and 38.2% of the women in their community based, randomly selected sample of adults were smokers; 97% had been born in the Middle East and 75% were Lebanese. A survey in the same community years later revealed a similar pattern (Aswad, 2001). In a Midwest health clinic study, Kulwicki and Dervartanian (1995) documented 52% tobacco use among 505 Arab American patients; 67% were men and 33%, women. Approximately 60% had lived in the U.S. ten years or less and the majority was of Lebanese descent. Jamil, Rice, Hammad, Jamil, and Pass (Unpublished data, 2005) found a 28% smoking rate in a community-based convenience sample of 6164 Arab American adults.

The only study found that has looked at tobacco use in Arab American adolescents was a pilot survey conducted by the first author and her colleagues. A 25% cigarette-smoking rate was found in a convenience sample of 119 Arab American high school youth (Rice, Templin, & Kulwicki, 2003). Noted in this pilot study was the number of teens who indicated that they did not smoke cigarettes, but did smoke the narghile. The narghile, also known as narghileh, argileh, water pipe, hubble-bubble, hookah, shisha, and goza (with variations in spelling and pronunciation) is a traditional form of tobacco use in the Middle East, Southeast Asia, and North Africa. Usually associated with older male use, it has a 400-year history that has undergone a renaissance in the last few years and is growing in popularity, particularly among the young around the world (Knishkowy & Amitai, 2005; Maziak, Ward, Soweid, & Eisenberg, 2004). The narghile has four key components: the body, bowl, tube(s), and mouthpiece. Tobacco is placed in a bowl or on a tray that is pierced with small holes atop a container half-filled with water and is burned directly using charcoal; smoke passes through the water. The water is used to clean soot belched out of the burning tobacco and to reduce some of the harmful constituents (e.g., acroleine, aldehydes) before it is inhaled through long flexible tube(s) with detachable mouthpieces. The tobacco is often flavored with molasses, honey, and other products (The Sacred Narghile, 2004).

Researchers in the Middle East are just beginning to evaluate narghile smoking among the young. Tamim and others (2003) reported an overall smoking rate of 40% in almost 2000 university students in Lebanon; 21.1% reported using only the narghile. Almost 12% smoked both cigarettes and narghile. In a cross sectional study of university students in Syria, Maziak et al. (2004) found 62.6% and 29.8% narghile use, respectively, for young men and women. Cigarette smoking rates were 25.5% for men and 4.9% for women. Seven percent (7%) of the male students reported using the narghile daily. Although the World Health Organization has monitored cigarette smoking, it has not monitored narghile use.

No information was found for narghile use among high school students and those younger in the Middle East or in the United States. As cigarette and narghile smoking rates for Arab adults and college-aged students appear to be high, it is important to examine these patterns and predictors in adolescents so that effective prevention and/or cessation programs can be initiated early.

The purpose of this study was to examine tobacco use and its predictors in a convenience sample of Arab American adolescents (14 to 18 years). Factors evaluated were those found in the Adolescent Tobacco Use Model (ATUM) adopted by the American Academy of Pediatrics (1997) and supported by the Surgeon General's report on youth smoking (USDHHS, 1994) and more recently, the findings of Johnson et al. (2002). Predictors are categorized as personal (e.g., age, gender, grade in school); psychosocial (e.g., health perception, depression, stress, self-esteem); sociocultural (e.g., income, education, ethnicity, family/parental/ sibling/peer tobacco use); and environmental (e.g., advertising, and availability of tobacco products). Twenty-four model predictors were examined.

Method

Design

This community-based cross-sectional survey examined tobacco use, defined as 'smoking a cigarette and/or the narghile within the past 30 days', and experimentation with tobacco defined as 'ever smoking a cigarette, even a few puffs' in 14 to 18 year old adolescents. It evaluated a number of predictors for tobacco use, and compared these with a national database (Brener, et al., 2004)

Setting

The setting for this study was a large, suburban community in the Midwest where roughly one-third of the population claims some Arab heritage. The majority were immigrants or first generation Arab Americans, have low incomes, tend to be under-educated, live in extended families of three to five adults, and speak Arabic as the first language in their home (Abraham & Shryock, 2000). The majority (36%) of the study sample identified Lebanon as their country of origin. Others reported family roots in Iraq, Yemen, Egypt, Palestine, Syria and Assyria.

Participants

The participants were 1671 high school aged youth (14 to 18 years) attending either a teen health clinic or a local community high school that agreed to participate in a study designed to examine tobacco use. Inclusion criteria were (a) between 14 and 18 years old, (b) able to read and write in English or Arabic, (c) willing to participate, and (d) self-identified as Arab American or have one or more parents of Arab origin. In the school year 2001 to 2002, when the data were collected, there were almost 2000 students enrolled in a local high school; 90% were Arab Americans. Based on the class rotation system, 1325 students were eligible to participate. Information letters describing the study were mailed to parents by the school administration. Parents who did not wish their child to participate were instructed to contact the school; there were no parental refusals. In addition, students were given a choice for participation when the study was described to them in the classroom. All were given a Human Investigative Committee (HIC) approved Information Sheet describing the study in detail prior to beginning the study questionnaires. Fifty students elected not to participate, leaving a school sample size of 1275.

During the same time period, 396 teens signed an approved HIC informed consent and completed the study questionnaires in a teen health clinic. Approximately 2500 Arab American youth visits occur each year at the teen health clinic. Almost 80% of these teens are between 14 and 18 years of age and more than half are return visits. The targeted population was approximately 900 'new' clinic attendees that year; 45% agreed to participate. Reasons for refusal included (a) students had already competed the survey in the high school, (b) parental refusals, (c) teen refusals, and (d) youth not having enough time to complete the survey because of the clinic schedule.

Fifty-two percent of the participants were male; the average age was 15.4 years (*SD* = 1.27). Less than half of the sample (45%) was in the 9^{th} grade, 21% in the 10^{th} grade and 17% in grades 11 and 12, respectively. Fifty-seven percent (57%) of the youth reported being born in the Middle East with a mean time in the U.S. of 6.0 years (*SD* = 4.3). Among the parents, 98% of the fathers and 95% of the mothers were born in the Middle East. Countries of origin included Lebanon (36%), Iraq (7%), Yemen (3%), Palestine (3%), Arabia (16%), Syria (6%), Assyrian/Chaldean (23%), and Others (16%). English was the first language spoken in 51% of the homes and the first language for 32% of the teens. Mean household income was $31,500 (*SD* = $17,380).

Measures/Instruments

Each of the following measures described below was carefully selected and examined for prior use with adolescents and established reliability and validity. Each was translated/back translated from English to Arabic using conventional procedures (Burns & Grove, 2005) and Arab American youth focus groups (Rice, et al., 2003). Ninety-three percent (93%) of the students elected to complete the English version of the questionnaires.

a. The Demographic and Cultural Information (DCI) (Rice, 1999, Unpublished) survey is a 20-item instrument that is used to collect information about age, gender, school grades, school and community activities, occupation of parent(s), annual income, country of origin, and primary language spoken. In addition, respondents are asked questions about receiving 'tobacco mail' and promotional items. The DCI was adapted from a tool developed by Entwisle and Astone (1994) for children and adolescents and has been widely used.

b. The Rosenberg Self-Esteem Scale (RSES) (Rosenberg, 1962) is a 10-item scale that is used to survey participants about their feelings of self worth. The tool has been used widely with ethnic populations including Arab adolescents (Abu Saad, 1999) and has well-established reliability and validity. In this study the reliability coefficient for the RSES was .76.

c. The Health Perception Ladder (HPL) is an instrument modified by Norton-Broda (1988) from the Child's Health Assessed by Self-Ladder (CHASL). Students were asked to indicate a point on the ladder that showed how healthy they felt they were and then why they choose that step in the space below. Face and concurrent validity for the CHASL have been established through expert review and pilot testing with over 1000 children (Norton-Broda, 1988).

d. The Center for Epidemiological Studies – Depression Scale (CES-D) (Radloff, 1977) is a 20-item self-report scale that is widely used in both general and clinical populations to determine frequency and severity of depression symptomatology. Adolescents were asked to rate any depressive symptoms (experienced in the past week) on a 4-point Likert-type scale ranging from 0 (none of the time) to 3 (most or all of the time). Summative scores ranged from 0 to 60. In this study the CES-D had a reliability coefficient of .85.

e. The Adolescent Hassle Scales (AHS) (Kanner, Feldman, Weinberger, & Ford, 1987) is a 28-item measure specifically developed to assess stress. It includes the stressors of family, school, friends, and leisure. In addition, youth can identify stressors that they are personally experiencing. A reliability coefficient of .91 was determined for the AHS in this study.

f. The Family & Friends Tobacco Use Survey (FF-TUS) (Kaiser & Rice, 1996) is an 8-item measure that assessed tobacco use of family members and friends and hours of exposure to secondhand smoke both inside and outside the home. In our current study all items were significantly related to smoking status. Test-retest of the FF-TUS among 55 Arab American youth ranged from .56 to .76.

g. The modified Fagerstrom Tobacco Nicotine Dependency scale (mFTND) (Fagerstrom, Heatherton, & Kozlowski, 1990) is a 6-item measure that was modified for adolescents to determine their level of nicotine dependency or addiction. How soon tobacco use began each day, which cigarette or narghile a youth could do without, how smokers coped in places where they could not smoke, and how much and how deeply they smoked are assessed with this instrument. In this study, the measure had a reliability of .68.

h. The Tobacco Use Questionnaire (TUQ) (Rice, Templin, & Kulwicki, 2003) is a 21-item questionnaire that is used to collect information on smoking history and smokeless tobacco use. The first seven items were adopted from the Youth Risk Behavior Surveillance Survey (Brener, et al., 2004). Seven similar questions were asked about narghile use. Four items focused on attempts to quit smoking, one question focused on the means for getting cigarettes, and another on the desire to quit. Three items assessed stage of change (Prochaska & DiClemente, 1982).

Procedure

The surveys were self-administered under the direction of a team of bilingual research members who were available in each of the classrooms and in the clinic to explain the study, ensure proper coding of survey measures, protect the privacy of student participants, answer questions, and collect the completed survey. The average amount of time for study participation was 50 minutes. At the time of study intake, students were informed of the study purposes and given an option to refuse to participate. School students electing not to participate quietly read a book or did their homework. There was no identifying information on any of the survey forms.

Data Analytic Strategy

Descriptive statistics are used to present the sample and logistic regressions to determine predictors of tobacco use. Prior to analysis, data were weighted so that all ages were equally represented. Significance for all analyses was set at $p \leq .05$.

Results

Twenty-nine percent (29%) of the youth reported having ‘ever tried cigarette smoking, even a few puffs’ some time in the past; 40% reported trying the narghile. Experimentation with cigarette smoking increased with age from 15% at 14 years to 22% at 15 years, 26% at 16 years, 33% at 17 years, to 44% at 18 years. Current cigarette smoking, defined as smoked a cigarette in the past 30 days, was reported by 6.9% of youth overall. It increased sharply with age from 1% at 14 years to 3% at 15 years, 7% at 16 years, 9% at 17 years to 14% at 18 years. Both of these trends were highly significant ($p < .001$). Teens reporting that they had ‘ever used the narghile’ was 27% overall. This percentage increased from 23% at 14 years to 40% at 18 years. Many youth had first used the narghile before the age of ten.

Cigarette use by any family member was reported by 51% of the adolescents: 34% of the fathers, 24% of the mothers, 13% of the brothers, and 3% of the sisters smoked. The mean number of hours youth were exposed to smoking in the home was 2.45 (*SD* = 4.50) compared to 2.75 *(SD*=2.20) of exposure outside the home. Having one or more friends who smoked varied from 16% for 14 year olds to 45% for 18 year olds. More than one third (36%) of the participants reported that tobacco products were easy to get and 17% had been offered a cigarette by family members or friends in the previous week. Twelve percent (12%) of the teens had received mail from a tobacco company and/or been exposed to tobacco use advertising products.

Logistic Regressions

Logistic regressions were used to examine the relationships of the 26 ATUM (1997) predictors to the criterion outcomes. Preliminary bivariate analysis showed that all predictors except for father smoking and father born in the US were significantly correlated with the outcomes, ‘smoked a cigarette in the past 30 days’, and ‘ever smoked a cigarette or narghile’. A forward stepwise procedure was used to identify a significant set of predictors for each outcome model; variables were entered according to improvement in chi-square reduction. Using this approach,

ten significant predictors were identified for the 'smoked a cigarette in the past 30 days,' seven for 'ever smoked a narghile,' and nine for 'ever smoked a cigarette, even a puff.'

Having one or more close friends who smoked, mother born in U.S., brother(s) smoked, and sister(s) smoked were the most important predictors of current cigarette smoking. The regression correctly classified 93.8% of participants (Nagelkerke R^2 = .39). Other predictors are presented in Table 1.

As shown in Table 2, the four strongest predictors of experimental cigarette smoking were smoking narghile, having one or more close friends who smoked, offers to smoke, and brother (s) who smoked. This regression correctly classified 82% of participants (Nagelkerke R^2 = . 47).

Significant predictors for 'ever narghile use' are presented in Table 3 and include friends smoking, sister smoking, and easy to get. This regression correctly classified 80% of participants (Nagelkerke R^2 = .45).

In summary, sibling and friends smoking were the strongest predictors of smoking. Narghile use was the strongest predictor for experimenting with cigarettes in this Arab American sample; youth were 8.42 times more likely to be smoking cigarettes if they had 'ever smoked narghile'. Use of the narghile was a predictor in the 'ever smoked a cigarette' model as well.

Discussion

Many studies have shown that youth in the Middle East as well as those in the United States initiate smoking before the age of 14 and continue smoking throughout their high school years. For Arab American youth, 14 to 18 years of age, living in a Midwest community, current cigarette smoking rates were found to be 6.9%; ever smoking was 29%. These rates are much lower than United States figures for youth of the same age (21.9%, 50%, respectively) (Allen et al., 2003; Johnston, O'Malley, Bachman, & Schulenberg, 2003).

The lower prevalence of cigarette smoking is difficult to account for. There are several possibilities. One is related to under reporting. Several events occurred over the course of this study that may have contributed to the underreporting of cigarette smoking, including a statewide debate over the tobacco settlement dollars and the promotion of the American Legacy agenda (Campaign for Tobacco Free Kids, 2005) on Arab Television with an increased focus on not smoking by youth. Another event was the attack on the World Trade Center adding the possibility that members of the Arab American community were reluctant to report doing anything seen as socially unacceptable. In addition, cigarette taxes went up making buying them more difficult for many with low incomes.

The age specific current cigarette smoking rates were an interesting and alarming finding. While the overall rates were much lower than expected, the rate of increase was similar across age groups when compared to current U.S. national smoking rates for 8^{th} through 12^{th} graders (Johnston, O'Malley, Bachman, & Schulenberg, 2003).

This pattern was not found for youth reporting 'ever narghile use'. The experimental narghile use rates were higher than cigarette smoking rates for all age groups in this sample, ranging from 23% to 40%. The highest rates were in the oldest age group. One reason for this may be because narghile use is a cultural form of hospitality among adults of the Middle East and as youth approach adulthood this behavior becomes more and more acceptable (Kandela, 2000).

Narghile use was a strong predictor of current cigarette smoking. This raises serious concerns about the role of this commonly accepted cultural practice in the Arab American community.

First, it may be the narghile smoking is a gateway tobacco product leading to higher rates of cigarette use in the long term. It is also possible that narghile smoking may be a substitute for cigarette smoking, but with as yet unrecognized and unstudied health risks. These risks may be equal to or more harmful than those related to cigarette smoking. Clearly further research is needed into this form of tobacco use.

Finally tobacco use among friends and family members appeared to have a sustaining effect for current cigarette smoking while cultural factors, offers and availability of tobacco (in addition to friends' use) contributed more to experimentation. These findings suggest further exploration and direction for the development of community prevention and cessation programs.

Limitations

Several study limitations are identified. A major one is the use of convenience sampling. It is not clear that this sample, although it is a very large one, is representative of the Arab American community from which it was drawn. Another concern was the uneven participation of the age groups. A more even distribution of ages may have provided more accurate estimates of overall prevalence by age and rates of initiation in this broad adolescent age group. Another possible limitation was the data collection process, itself. Even though two thirds of the participants reported Arabic as their first language, 97% elected to complete the English version of the study measures. There may have been difficulties in interpretation.

Conclusions

This survey study provides foundational information on tobacco use including cigarette smoking and narghile use for 1671 Arab American adolescents ages 14 to 18. Although the overall last '30 day use of cigarettes' was lower than that reported in the YRBBS data (Allen, et al., 2002), the pattern of adoption for cigarette smoking was similar. Noted was the significant use of narghile smoking even in the younger age groups. Ten predictors were determined for '30 day cigarette smoking', nine for 'ever cigarette smoking' and seven for 'ever narghile use'; most significant were tobacco use by friends and family members. This was not surprising given the importance of family and friends to members of the Arab and Arab American communities as a whole. Further research is needed to determine the pattern of adoption of narghile use, its health consequences, its relationship to cigarette smoking, and effective culturally based interventions to curb its use.

References

Abraham, N. & Shryock, A. (Eds.). (2000) *Arab Detroit: From margin to mainstream* Detroit: Wayne State University Press.

Abu-Saad I. Self esteem among Arab adolescents in Israel. The Journal of Social Psychology 1999;139:479–486. [PubMed: 10457762]

Al-Faris E. Smoking habits of secondary-school boys in rural Riyadh. Public Health Reports 1995;109:47–55.

Allen J, Vallone D, Haviland ML, Healton C, Davis KC, Farrelly MC, et al. Tobacco use among middle and high school students---United States, 2002. Morbidity Morality Weekly Report 2003;52:1096–1098.

Al-Yousaf M, Karim A. Prevalence of smoking among high school students. Saudi Medicine 2001;10:872–874.

Amine-Majed, H. (1994). *Substance abuse in Arab American adolescents* Doctoral Dissertation, Wayne State University, Detroit, Michigan.

American Academy of Pediatrics (1997). *Policy reference guide of the American Academy of Pediatrics: A comprehensive guide to AAP policy statements issued through December 1993* Elk Grove, Ill: American Academy of Pediatrics.

American Medical Association. (1994). *Guidelines for adolescent preventive services (GAPS). Recommnedations and rationale* Baltimore, Maryland: Williams & Wilkins.

Armour B, Woollery T, Malarcher A, Pechacek TF, Husten C. Annual smoking-attributable mortality, years of potential life lost, and economic costs---United States 1997–2001. Morbidity Mortality Weekly Report 2005;54:625–628.

Aswad, A. (2001) *Health survey of the Arab, Muslin, and Chaldean American communities in Michigan.* Lansing: Michigan Department of Community Health.

Bener A, al-Ketbi L. Cigarette smoking habits among high school boys in a developing country. Journal of Royal Society Promotion of Health 1999;119:166–169.

Brener ND, Kann L, Kinchen S, Grunbaum J, Whalen L, Eaton D, et al. Methodology of the Youth Risk Behavior Surveillance System. Morbidity & Mortality Weekly Report 2004;53:1–13.

Burns, N., & Grove, S. (2005). *The practice of nursing research: Conduct, critique, & utilization*, (5th ed.). W.B. Saunders, Co. Philadelphia.

Campaign for Tobacco Free Kids. (2005). New study shows anti-tobacco advertising campaigns work and should be continued. Press Release, June 29, 2005. Retrieved June, 30, 2005 from http://tobaccofreekids.org/Script/DisplayPressRelease.php3?Display=819

Centers for Disease Control and Prevention (CDC) (2004) Global Tobacco Use Survey. Retrieved on July 9, 2005 from http://www.cdc.gov/tobacco/global/GYTS/GYTS_intro.htm

Dornelas E, Patten C, Fischer E, Decker P, Offord K, Barbagallo J, et al. Ethnic variation in socioenvironmental factors that influence adolescent smoking. Journal of Adolescent Health 2005;36:170–177. [PubMed: 15737771]

Entwisle D, Astone N. Some practical guidelines for measuring youth's race/ethnicity and socioeconomic status. Child Development 1994;65:1521–1540.

Fagerstrom K, Heatherton T, Kozlowski L. Nicotine addiction and its assessment. Ear, Nose, and Throat Journal 1990;69:763–765.

Jamil, H., Rice, V.H., Hammad, A., Jamil, H., & Pass, H. (In Review, 2005). *Tobacco use among Arab American adults in Southeastern Michigan community.* Unpublished data.

Johnson C, Li D, Perry C, Elder J, Feldman H, Kelder S, et al. Fifth through eighth grade longitudinal predictors of tobacco use among a racially diverse cohort. Journal of School Health 2002;72:58–65. [PubMed: 11905130]

Johnston, L.D., O'Malley, P.M., Bachman, J.G., & Schulenberg, J.E. (2004). *Monitoring the future: national results on adolescent drug use---Overview of key findings* (NIH Publication No. 04-5506). Bethesda, Maryland: National Institute on Drug Abuse.

Johnston, L.D., O'Malley, P.M., Bachman, J.G., & Schulenberg, J.E. (2003). *Monitoring the future: national survey results on drug use, 1975–2003*: Volume I, Secondary school students. (DHHS Publication no.(NIH) 04-5507). Bethesda, MD: National Institute on Drug Abuse.

Kaiser, E., & Rice, V. H. (1996). *Intergenerational smoking patterns of adults with cardiovascular health problems* Wayne State University College of Nursing Unpublished Master Field Study. .

Kanner A, Feldman S, Weinberger D, Ford M. Uplifts, hassles, and adaptational outcomes in early adolescence. Journal of Early Adolescence 1987;7:371–394.

Kandela P. Narghile smoking keeps Arabs in wonderland. Lancet 2000;356:1175. [PubMed: 11030308]

Knishkowy B, Amitai Y. Waterpipe (Narghile) smoking: An emerging health risk behavior. Pediatrics 2005;116:e113–e119. [PubMed: 15995011]

Kulwicki, A., & Dervartanian, H. (1995). *Arab tobacco prevention and cessation project (Summary report)* Lansing: Michigan Department of Community Health.

Lurie N. Healthy people 2010: setting the nation's public health agenda. Academic Medicine 2000;75:12–3. [PubMed: 10667870]

Maziak W, Fouad FM, Asfar T, Hammal F, Bachir E, Rastam S, et al. Prevalence and characteristics of narghile smoking among university students in Syria. International Journal of Tuberculosis and Lung Diseases 2004;8:882–9.

Maziak W, Ward K, Soweid RA, Eisenberg T. Tobacco smoking using a waterpipe: A re-emerging strain in a global epidemic. Tobacco Control 2004;13:327–333. [PubMed: 15564614]

Norton-Broda, M. (1988). The relationship of parental health-promoting lifestyles to school-age children's self-esteem, perceived health status, health beliefs, and health behaviors. Doctoral Dissertation. The University of Texas-Austin (DA 88-063-88).

Prochaska JO, DiClemente CC. Transtheoretical therapy: toward a more integrative model of change. Psychotherapy: Theory, Research and Practice 1982;19:276–287.

Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement 1977;1:385–401.

Rice VH, Kilwicki A. Cigarette use among Arab Americans in the Detroit Metropolitan Area. Public Health Reports 1994;107:589–594. [PubMed: 1410242]

Rice VH, Templin T, Fox D, Jarosz P, Mullin M, Seiggreen M, et al. Social context variables as predictors of smoking cessation. Tobacco control 1997;5:280–285. [PubMed: 9130361]

Rice VH, Templin T, Kulwicki A. Arab American tobacco use: Four pilot studies. Preventive Medicine 2003;37:492–498. [PubMed: 14572433]

Rice VH, Templin T, Weglicki LS, Jamil H, Hammad A, Baker O, et al. Predictors of tobacco use among Lebanese, Yemeni, and Iraqi adolescents. In Sakr WA, Hammad A (Editors). Proceedings of the 3rd Biannual National Conference on Health Issues in the Arab American Community. Ethnicity & Disease Supplement 2005;15:S157–S159.

Rosenberg M. Self-esteem and concern with public affairs. Public Opinion Quarterly 1962;26:201–211.

Tamim H, Terro A, Kassem H, Ghazi A, Tarek A, Maher M, et al. Tobacco use by university students, Lebanon,2001. Addiction (England) 2003;98:933–9.

The Sacred Narghile (Hookah, Shisha, Waterpipe, (2004). Retrieved on July 8, 2004 from http://www.sacrednarghile.com

Troschair AR, Caraballo R, Malarcher A, Husten C, Pechace C. Cigarette smoking among adults--United States, 2003. Morbidity and Mortality Weekly Report 2005;54:509–513. [PubMed: 15917735]

U.S. Department of Health and Human Services. (USDHHS). (2000). *Healthy People 2010: Understanding and improving health.* Retrieved on July 10, 2005 from http://www.healthypeople.gov/Document/html/uih/titlepg.htm

U.S. Department of Health and Human Services. (USDHHS). (2001). *2001 National Household Survey on drug abuse: Trends in Initiation of Substance Use* Retrieved on July 8, 2005 from http://www.oas.samhsa.gov/nhsda/2k1nhsda/vol1/chapter5.htm#5.tob

U.S. Department of Health and Human Services. (USDHHS). (1994). *Preventing tobacco use among young people: A report of the Surgeon General* Washington D.C.: U.S. Govt. Printing Office No. S/N 017-001-00491-0. Atlanta: Public Health Service, Centers for Disease Control and Prevention, Office of Smoking and Health.

U.S. Department of Health and Human Services. (USDHHS). (2004). *The Health Consequences of Smoking: A Report of the Surgeon General.* Washington, DC. : U.S. Government Printing Office Number 0-16-051576-2. Atlanta: Centers for Disease Control and Prevention, Office of Smoking and Health.

U.S. Department of Health, Education, and Welfare. (1964). Smoking and health: Report of the Advisory Committee to the Surgeon General of the Public Health Service.

Table 1

Significant Predictors for “Smoked One or More Cigarettes in the Last Thirty Days.”

Variables	Sig.	Odds Ratio	95.0% C.I.	
			Lower	Upper
Friends Smoke	.00	3.95	2.06	7.58
Mother Born in US	.00	3.19	1.49	6.84
Brother(s) Smoke	.00	2.69	1.57	4.60
Sister(s) Smoke	.04	2.61	1.05	6.48
English First Language	.00	2.34	1.44	3.83
Gender (Being Male)	.00	2.17	1.28	3.66
Offers of Tobacco	.00	2.05	1.25	3.36
Narghile Use	.01	2.00	1.22	3.27
Three or More Buddies smoke	.02	1.93	1.12	3.35
School grades of C or lower	.03	1.68	1.05	2.71
Age	.00	1.46	1.21	1.76

Note. The regression correctly classified 93.8% of participants (Nagelkerke R^2 = .39).

Table 2

Significant Predictors for “Ever Smoked a Cigarette, Even a Few Puffs?”

Variables	Sig.	Odds Ratio	95.0% C.I.	
			Lower	Upper
Narghile	.00	8.42	6.32	11.21
Friends Smoke	.00	3.34	2.44	4.57
Offers of tobacco	.00	1.99	1.39	2.85
Brother(s) smoke	.00	1.80	1.24	2.60
Received clothing advertisements for tobacco	.03	1.55	1.04	2.33
Tobacco is easy to get	.00	1.55	1.16	2.08
English spoken in home	.03	1.39	1.04	1.85
School grades of C or lower	.05	1.37	1.00	1.88
Older age	.00	1.23	1.11	1.37

Note. This regression correctly classified 82% of participants (Nagelkerke R^2 = .47).

Table 3

Significant Predictors for “Ever Smoked a Narghile, Even a Few Puffs?”

Variables	Sig.	Odds Ratio	95.0% C.I.	
			Lower	Upper
Arab American	.01	5.55	4.92	7.35
Sister(s) Smokes	.05	2.04	1.26	5.01
Friends smoke	.05	1.99	1.51	2.52
Gender - Male	.05	1.90	1.37	2.54
Mother smokes	.05	1.82	1.14	2.29
Stress	.05	1.73	1.16	2.08
Easy Access	.05	1.58	1.15	1.91

Note. This regression correctly classified 65% ever naghile users (Nagelkerke R^2 = .20).