



A comprehensive examination of hookah smoking in college students: Use patterns and contexts, social norms and attitudes, harm perception, psychological correlates and co-occurring substance use



Adrienne J. Heinz^{a,*}, Grace E. Giedgowd^b, Natania A. Crane^b, Jennifer C. Veilleux^c, Megan Conrad^b, Ashley R. Braun^b, Natalia A. Olejarska^b, Jon D. Kassel^b

^a Center for Health Care Evaluation, Palo Alto Veterans Affairs Health Care System and Department of Psychiatry and Behavioral Sciences, Stanford School of Medicine, Palo Alto, CA, United States

^b Department of Psychology, University of Illinois at Chicago, Chicago, IL, United States

^c Department of Psychological Science, University of Arkansas, Fayetteville, AR, United States

HIGHLIGHTS

- 48% of the sample reported lifetime hookah use and 22% used in past 30 days.
- Hookah associated with less perceived risk and social stigma than cigarettes.
- Hookah users underestimate health-risks more than non-users.
- More non-smoking hookah users endorse intent to try cigarettes compared to non-users.
- Use associated with peer use and approval and cigarette, alcohol and marijuana use.

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ABSTRACT

The practice of waterpipe smoking (hookah) has rapidly increased in popularity among young adults yet burgeoning research suggests that its use is associated with nicotine dependence and other negative smoking-related health consequences. Moreover, descriptive studies indicate that consumers may hold the belief that hookah smoking is safer than smoking cigarettes. The current study extended previous work by conducting a comprehensive assessment of patterns and contexts of hookah use, psychological correlates of use, co-occurring substance use as well as social norms and health perceptions surrounding the practice. Participants were 143 ethnically diverse undergraduate students at a large urban US university. Approximately half of the sample (48%) reported life-time use of hookah and 22% reported use within the past 30 days. Relative to cigarette smoking, hookah smoking was associated with less perceived harm and addiction potential and higher social approval. Participants who reported life-time hookah use, as compared to those who did not, perceived less associated harm, had a greater number of friends who had tried and approved of hookah, were more likely to use cigarettes, marijuana, and alcohol and in higher frequencies and quantities and were at higher risk for problem tobacco and alcohol use. Among participants who were not current smokers, those with hookah experience were more likely to endorse intent to try a cigarette soon. Hookah users did not differ from non-users on measures of trait anxiety, depression and impulsivity though they were more likely to drink alcohol for coping, social and enhancement purposes than non-users. Implications are discussed for public health initiatives to educate young adults about the potential consequences of hookah smoking.

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1. Introduction

Waterpipe smoking (i.e., hookah smoking) is the process of inhaling tobacco smoke, passed through a heated water chamber, via a leather hose capped with a mouthpiece. Hookah smoking has been practiced in eastern countries for hundreds of years (World Health Organization (WHO), 2005), and globally there are an estimated 100 million daily hookah smokers (Wolfram, Chehne, Oguogho, & Sinzinger, 2003). More recently, demand for the hookah experience has grown exponentially in

* Corresponding author at: Center for Health Care Evaluation, Palo Alto Veterans Affairs Health Care System and Stanford University School of Medicine, 795 Willow RD (MPD-152), Menlo Park, CA 94025, United States. Tel.: +1 650 493 5000x29114; fax: +1 650 617 2736.

E-mail address: aheinz@stanford.edu (A.J. Heinz).

countries that have no previous tradition of use, including the United States (Maziak, Ward, & Eissenberg, 2007). Although hookah smoking has been linked with numerous smoking-related health problems including cardiovascular disease, oral disease, cancer and decreased pulmonary function (Al-Belasy, 2004; Bedwani et al., 1997; Jabbour, El-Roueiheb, & Sibai, 2003), burgeoning research suggests that individuals perceive hookah smoking as less stigmatizing and damaging to health than cigarette smoking (Primack et al., 2008; Smith, Curbow, & Stillman, 2007). Given the rising prevalence of hookah smoking among adolescents (Warren et al., 2009) and young adults (Maziak, 2011), and the associated negative health consequences (e.g., Akl, Aleem, Gunukula, Honeine, Jaoude and Irani, 2010; Akl, Gaddam, Gunukula, Honeine, Jaoude and Irani, 2010), it is critical to gain a better understanding of use patterns and contexts and to identify social, psychological and behavioral factors associated with hookah use, in order to better inform targeted prevention and treatment efforts.

Hookah and cigarette smoke contain many of the same toxins (Shihadeh, 2003; Shihadeh & Saleh, 2005) and there is no evidence to suggest that hookah smoke is less harmful to health than cigarette smoke. In fact, several studies have demonstrated that relative to cigarette smoking, hookah smoking can deliver the same or even significantly greater doses of nicotine and exposure to carbon monoxide (e.g., Bacha, Salameh, & Waked, 2007; Breland, Buchhalter, Evans, & Eissenberg, 2002; Neergaard, Singh, Job, & Montgomery, 2007; Shafagoj, Mohammed, & Hadidi, 2002). For example, one hookah session (i.e., amount smoked in one sitting) has been shown to expose the smoker to 3–9 times the carbon monoxide and 1.7 times the nicotine than one cigarette (Eissenberg & Shihadeh, 2009; Maziak et al., 2009). In terms of nicotine dependence, regular hookah smokers evidence similar withdrawal and craving symptoms as cigarette smokers (Maziak et al., 2009). Additionally, frequency of hookah smoking is associated with subjective ratings of being hooked (Maziak, Ward, & Eissenberg, 2004) and predicts regular cigarette use eight months later among adolescent males (Jensen, Cortes, Engholm, Kremers, & Gislum, 2010). Importantly though, greater knowledge about the health risks of hookah smoking was not associated with actual hookah use (i.e., did not prevent use) among a sample of college students (Nuzzo et al., 2013) and active hookah smokers tend to perceive hookah as less harmful and addictive than cigarettes (Aljarrah, Ababneh, & Al-Delaimy, 2009; Braun, Glassman, Wohlwend, Whewell, & Reindl, 2012; Primack et al., 2008; Smith-Simone, Maziak, Ward, & Eissenberg, 2008; Sutfin et al., 2011).

Among college students in the United States, current hookah use (i.e., in the past 30 days) has been reported to range from 6 to 20% prevalence (Eissenberg, Ward, Smith-Simone, & Maziak, 2008; Primack et al., 2008; Smith et al., 2007; Smith-Simone et al., 2008) and life-time rates of use appear similar to those for cigarette smoking in some of these samples (Eissenberg et al., 2008; Primack et al., 2008). Of note, only about half of hookah smokers are current cigarette smokers (Primack, Shensa, et al., 2013). Engagement in tobacco use among individuals that would otherwise remain tobacco naïve is of great concern, as exposure may increase later risk for development of nicotine dependence (e.g., Scragg, Wellman, Laugesen, & DiFranza, 2008). Further, hookah use has been shown to increase during the course of college (Fielder, Carey, & Carey, 2012a; Jackson & Aveyard, 2008) and may serve as a gateway to cigarette smoking among students who are not already established smokers (Hampson, Tildesley, Andrews, Barkley, & Peterson, in press). Moreover, hookah use may increase the risk or relapse to cigarette smoking among smokers who have recently reduced use or become abstinent.

Adolescents and young adults represent a particularly vulnerable population for hookah smoking, which is likely due to unique features associated with the practice. First, hookah smoking offers a convivial, communal experience in which multiple individuals can simultaneously engage. Second, the legal age to enter a hookah cafe is 18 whereas regular “bars” prohibit entrance to individuals less than 21 years of

age. Thus hookah cafes, which have increased by 400% since 1999 (Martin, 2009), are particularly appealing to younger college students under the legal drinking age who wish to socialize and/or smoke (Maziak, 2011; WHO, 2005). Third, social media messages (i.e., YouTube and Facebook), which function as a source of interpersonal persuasion, may be less likely to reference the harmful consequences associated with hookah smoking (Brockman, Pumper, Christakis, & Moreno, 2012; Carroll, Shensa, & Primack, in press). These three features likely promote social learning experiences (e.g., Bandura, 1977) that render hookah smoking more socially normative and acceptable than cigarette smoking. Finally *maassel*, a flavored tobacco fermented in molasses and fruit extracts, is commonly sold in hookah cafes and is more palatable than other forms of tobacco (i.e., cigarettes) and may appeal to younger consumers who would otherwise not use traditional tobacco products (Maziak et al., 2007). Thus a more detailed understanding of these contextual features of hookah smoking and motivations is needed to inform effective policy.

Accumulating evidence reveals that hookah smokers in the US are more likely to be younger (e.g., freshmen in college), male, Caucasian, residents in sorority and fraternity houses, engage in other health risk behavior (e.g., daily and nondaily tobacco use, alcohol use, marijuana use, and other illicit drug use), perceive hookah smoking to be less harmful than cigarette smoking, possess more positive attitudes and normative beliefs towards hookah smoking, and have a commercial hookah café nearby (Jamil et al., 2011; Primack, Shensa, et al., 2013; Schuster, Hertel, & Mermelstein, 2013; Sutfin et al., 2011). In addition, hookah use has been associated with sensation seeking among a high school sample (Hampson et al., in press), as well as impulsivity and social comparison orientation among female college freshmen (Fielder, Carey, & Carey, 2012b). At present however, knowledge about the psychosocial characteristics of individuals who elect to smoke hookah, relative to those who do not, remains incomplete. Moreover, previous research has not simultaneously and comprehensively examined psychosocial characteristics in combination with other risk factors (e.g., harm perception, social norms and attitudes, co-occurring substance use) to yield an optimally informative profile of hookah users.

The objective of the current study is to describe patterns and contexts of hookah use, assess perceived harm and social norms surrounding the practice and expand description of the psychological and behavioral profile of individuals who elect to smoke hookah. Several hypotheses are investigated with the intent to replicate and extend previous research. First, hookah use is hypothesized to be associated with less social stigma and lower perceived health-risks relative to cigarette smoking. Indeed, social learning experiences (e.g., social media, peer group, presence of hookah cafés) are posited to shape perceptions that hookah use is more socially normative and acceptable and safer than cigarette smoking. Second, based on the theory of reasoned action whereby attitudes and normative beliefs about a behavior are thought to predict engagement in the behavior (Ajzen & Fishbein, 1980), it is hypothesized that participants with hookah experience, compared to those with no experience, will report lower perceived harm and social stigma associated with hookah use (i.e., more positive attitudes about hookah). Third, engagement in other health-risk behaviors, specifically cigarette smoking, alcohol and marijuana use, as well as use severity, are hypothesized to be higher among participants who report hookah use compared to those who do not. This hypothesis is consistent with problem behavior theory whereby problem behaviors, including substance use, are believed to cluster (Jessor, 1991). Fourth, psychological constructs commonly associated with substance use (i.e., substance use motives, trait anxiety, depression, impulsivity), are hypothesized to be higher among participants with hookah experience compared to those with no experience. These common, “trans-disease” psychological factors are evidenced to operate across multiple types of substance use behavior and therefore may also impact hookah use behaviors (e.g., Bickel & Mueller, 2009).

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