



Hookah, cigarette, and marijuana use: A prospective study of smoking behaviors among first-year college women



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HIGHLIGHTS

- Examined hookah, cigarette, and marijuana use among first-year college women
- Used a prospective design and controlled for personality factors and binge drinking
- Pre-college hookah use predicted initiating/resuming cigarette use.
- Pre-college marijuana, but not cigarette use, predicted initiation of hookah use.
- Pre-college cigarette smoking did not predict initiation of hookah or marijuana use.

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ABSTRACT

Better understanding of the temporal sequence of hookah, cigarette, and marijuana use will help to inform smoking prevention efforts. To address this gap in the literature, we assessed all three of these smoking behaviors in a sample of 424 first-year college women. Using a longitudinal design, we investigated whether hookah use predicts initiating/resuming cigarette and/or initiating marijuana use, and whether cigarette and/or marijuana use predicts initiating hookah use. Participants (67% White, M age = 18.1 years) completed nine monthly surveys. The initial (i.e., baseline) survey assessed demographics, sensation-seeking, impulsivity, and pre-college substance use. Follow-up surveys assessed past-month substance use; outcomes were initiating/resuming cigarette use, initiating marijuana use, and initiating hookah use during the first year of college. We controlled for sensation-seeking, impulsivity, binge drinking, and other smoking behaviors in our multivariate logistic regression models. The results showed that (a) pre-college hookah use predicted initiating/resuming cigarette use; (b) pre-college marijuana use predicted initiation of hookah tobacco smoking; and (c) pre-college cigarette use predicted neither hookah nor marijuana initiation. The findings highlight the co-occurrence of smoking behaviors as well as the need for bundling preventive interventions so that they address hookah, cigarette, and marijuana use.

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1. Introduction

Smoking behaviors, including cigarette, marijuana, and hookah use, all undermine the health of young people. Cigarette smoking and marijuana use have been well-characterized in the United States. For example, 15% of college students report current (past 30 days) cigarette

smoking, and 19% report current marijuana use (Johnston, O'Malley, Bachman, & Schulenberg, 2012). Much is known about the antecedents of both cigarette smoking (U.S. Department of Health and Human Services, 2012) and marijuana use (Hall & Degenhardt, 2007). However, less is known about hookah use in the US, especially with regard to the co-occurrence of hookah, cigarette, and marijuana use, and the temporal pattern of initiation among these three smoking behaviors. Given that all three behaviors involve smoking, it is reasonable to consider whether initiation of one might predispose to initiation of another. The current study provides a preliminary investigation into these relationships with a special emphasis on the role of hookah tobacco smoking, a growing trend among young adults (Cobb, Ward, Maziak, Shihadeh, & Eissenberg, 2010).

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1.1. Prevalence of hookah use

Hookah use has been increasing worldwide (Akl et al., 2011), especially among adolescents and college students (Cobb et al., 2010). In representative samples of American high school students, 10% report past month or lifetime hookah tobacco use (Barnett, Curbow, Weitz, Johnson, & Smith-Simone, 2009; Jordan & Delnevo, 2010; Manderski, Hrywna, & Delnevo, 2012; Primack, Walsh, Bryce, & Eissenberg, 2009). Among American college students, lifetime prevalence ranges from 15% to 48% (Braun, Glassman, Wohlwend, Whewell, & Reindl, 2012; Eissenberg, Ward, Smith-Simone, & Maziak, 2008; Fielder, Carey, & Carey, 2012; Jarrett, Blossnich, Tworek, & Horn, 2012; Primack et al., 2008; Sutfin et al., 2011). Hookah use is now almost as common, if not as common or more common, as cigarette smoking among American college students (Grekin & Ayna, 2012; Nuzzo et al., 2013). Hookah lounges, now ubiquitous in college towns (Sutfin et al., 2011), may be especially appealing to students under age 21, who cannot legally enter traditional bars. Hookah smoking is less common among Americans beyond traditional college age (i.e., 18–24 years old); in the 2009–2010 National Adult Tobacco Survey of over 118,000 adults aged 18 years or older, the prevalence of current waterpipe use was 7.8% among 18–24 year olds, 1.2% among 25–44 year olds, and 0.3% among 45–64 year olds, for an overall prevalence of 1.5% (King, Dube, & Tynan, 2012). Thus, the college years appear to be a particularly high risk period for hookah experimentation.

Hookah tobacco smoking is a growing public health concern (Cobb et al., 2010; Knishkowsky & Amitai, 2005). Hookah smokers inhale nicotine, carbon monoxide, and large volumes of smoke, including toxicants and carcinogens (Cobb, Shihadeh, Weaver, & Eissenberg, 2011; Daher et al., 2010). Research on the health effects of hookah smoking indicates a harmful impact on lung function (Raad et al., 2011) and increased odds of lung cancer, respiratory illness, and periodontal disease (Akl et al., 2010).

1.2. Gender differences in hookah use

Research suggests that there may be gender differences in patterns of hookah use. Several studies with adolescent samples have found that boys are more likely to report lifetime use of hookah compared to girls (Barnett et al., 2009; Primack et al., 2009; Sterling & Mermelstein, 2011). Moreover, a review of seven studies on hookah use among college students found that all but one showed a higher rate of hookah use among males compared to females (Grekin & Ayna, 2012). Nonetheless, many college women experiment with hookah use; we have reported previously that 34% of female college students used hookah during their first year on campus (Fielder et al., 2012), and 8% of women surveyed through the National College Health Assessment II reported hookah use in the past 30 days (Jarrett et al., 2012). Because tobacco use patterns (Rigotti, Lee, & Wechsler, 2000), psychosocial correlates, and reasons for smoking (Branstetter, Blossnich, Dino, Nolan, & Horn, 2012) differ by gender, it is important to examine hookah smoking behavior specifically among women.

1.3. Hookah and cigarette use

Hookah smoking has been associated with cigarette smoking (Barnett et al., 2009; Braun et al., 2012; Eissenberg et al., 2008; Jordan & Delnevo, 2010; Manderski et al., 2012; Sutfin et al., 2011). Because almost all studies of hookah use have been cross-sectional (Grekin & Ayna, 2012), it remains unclear whether hookah use may spur cigarette smoking, cigarette smoking may spur hookah use, or the two smoking behaviors simply co-occur. Hookah tobacco use may lead to uptake of cigarette smoking. Indeed, hookah, with its flavored tobacco and smoother smoke, may introduce non-smokers to nicotine in a manner that is less harsh than cigarettes. Over time, because hookah smoking requires an apparatus and is time-consuming (Braun et al., 2012), and

because cigarettes are portable and obtained more easily, hookah users may supplement their hookah use with cigarette smoking or switch to cigarettes (Rastam et al., 2011). Hookah use may also re-introduce those who have already quit smoking to tobacco, triggering relapse (Maziak, 2011). Because hookah smoking delivers nicotine, it confers risk for tobacco dependence (Cobb et al., 2011). Alternatively, cigarette smokers who try hookah may favor the latter given the flavored tobacco and less harsh smoke, leading them to substitute hookah smoking for cigarette use. At the same time, hookah and cigarette smoking may both result from shared genetic predispositions (Agrawal, Budney, & Lynskey, 2012) and underlying personality traits, such as sensation-seeking or impulsivity, which have been linked to tobacco use (Granö, Virtanen, Vahtera, Elovainio, & Kivimäki, 2004; Spillane, Smith, & Kahler, 2010).

1.4. Hookah and marijuana use

Hookah smoking is also associated with marijuana use (Braun et al., 2012; Jarrett et al., 2012; Sterling & Mermelstein, 2011; Sutfin et al., 2011). Hookah use and marijuana use reflect similar motives, such as social enhancement, relaxation, and experimentation (Braun et al., 2012; Lee, Neighbors, & Woods, 2007; Smith-Simone, Maziak, Ward, & Eissenberg, 2008). The social context is important for hookah use, as nearly all (96%) college students smoke hookah with their friends (Braun et al., 2012). Peer influence can create availability and exposure opportunity (Pinchevsky et al., 2012) as well as an environment in which use of both hookah and marijuana is encouraged (Agrawal et al., 2012). Also, the route of administration may be a factor, as some hookah users smoke marijuana out of the same waterpipe they use for tobacco (Smith-Simone et al., 2008). As with cigarette use, hookah and marijuana use may both be related to a shared genetic predisposition to disinhibition, general problem behavior, and substance use (Agrawal et al., 2012).

1.5. Longitudinal associations among hookah, cigarette, and marijuana use

Little research has addressed the prospective relationship between hookah use and cigarette/marijuana use. Only two longitudinal studies have explored hookah as a predictor of cigarette use. One study sampled Danish adolescent males and found that hookah use increased the odds of transitioning from experimentation to regular cigarette smoking over eight months (Jensen, Cortes, Engholm, Kremers, & Gislum, 2010). The second sampled Jordanian adolescents and found that hookah smokers were twice as likely as non-smokers to become cigarette smokers two years later (Mzayek et al., 2012). Interestingly, in the latter study, the reverse pattern was also true; that is, cigarette smokers were twice as likely as non-smokers to become hookah smokers, but this association was not statistically significant. To our knowledge, no longitudinal studies have sampled Americans or college students or examined hookah as a predictor of marijuana use.

1.6. The current study

The primary purpose of this study was to examine the relationship between hookah tobacco smoking and (a) cigarette and (b) marijuana use using a prospective design. We focused on college students given the high prevalence of hookah use in this population (Grekin & Ayna, 2012), especially compared to those older than 18–24 years (King et al., 2012). We focused on women because tobacco use patterns differ by gender (Branstetter et al., 2012; Rigotti et al., 2000). Using data from a larger study of women, we examined pre-college hookah use as a predictor of initiating cigarette and marijuana use during the first year of college. The secondary purpose of this study was to examine pre-college cigarette and marijuana use as a predictor of initiating hookah use during the first year of college. To control for a general propensity toward substance use, we controlled for binge drinking as well as two

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