



Short Communication

Hookah tobacco use and stressful life events in a sample of young non-daily cigarette smokers



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HIGHLIGHTS

- Nearly one-third of young adults reported hookah use in the past 14 days.
- Hookah use is related to exposure to stressful life events but not perceived stress.
- Exposure to more stressful events predicted greater odds and frequency of use.

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ABSTRACT

Introduction: Understanding factors that influence hookah use among young adults is important given its increasing popularity and health risks. The purpose of this study was to examine whether young adult non-daily cigarette smokers use hookah for stress regulation. We hypothesized that greater perceived stress and greater stressful life events would predict probability and frequency of recent hookah use.

Methods: Participants ($n = 598$, 50.7% male) were non-daily smokers aged 18–24 years ($M = 20.5$, $SD = 1.8$), who completed a baseline assessment online or via mobile phone as part of a longitudinal study. Participants had been non-daily smokers for at least six months but had never been daily smokers.

Results: Thirty-one percent of participants reported using hookah over the past 14 days. Full-time students were more likely to have used hookah recently. More stressful life events and more frequent alcohol use predicted likelihood and frequency of hookah use ($ps < 0.05$). Perceived stress was not associated with hookah use.

Conclusions: Findings suggest that hookah tobacco use is related to frequency of stressful life events but not perceived stress among non-daily cigarette smokers. Tobacco prevention and intervention programs should address hookah use and should include adaptive strategies for coping with stressful events.

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1. Introduction

Young adult hookah tobacco use is increasing, with recent prevalence estimates ranging from 28 to 33% (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2015; Salloum, Thrasher, Kates, & Maziak, 2015). Among adolescents, use doubled between 2013 and 2014 and some studies have suggested hookah is now more popular than cigarettes in younger populations (Arrazola et al., 2015; Gilreath et al., 2016). Hookah use has health consequences comparable to cigarettes (Maziak, 2011; Soule, Lipato, & Eissenberg, 2015). Hookah tobacco is addictive, and smoking it exposes users to harmful toxicants (Cobb, Ward, Maziak, Shihadeh, & Eissenberg, 2010); one 45 min session is associated with greater carboxyhemoglobin levels and smoke exposure, and similar nicotine levels, compared with one cigarette (Eissenberg & Shihadeh,

2009). Hookah use has long-term health risks, including respiratory issues and lung cancer (Akl et al., 2010). However, many young adults perceive hookah as less harmful, less addictive, and more socially acceptable than cigarettes (Berg et al., 2015; Heinz et al., 2013). These perceptions increase risk of use (Montgomery et al., 2015).

Another concern is the possible effect of hookah use on cigarette smoking. Hookah use may promote cigarette initiation among non-smokers (Salloum et al., 2016). A prospective college study found that hookah use predicted initiation or resumption of cigarettes among never and former smokers (Fielder, Carey, & Carey, 2013). Additionally, it may result in increased cigarette smoking among existing smokers. We found that hookah use predicted increased cigarette consumption over six months among young adults (Doran, Godfrey, & Myers, 2015). These concerns highlight the need to understand factors that influence hookah use.

Hookah use in young adults has been associated with demographic factors and other substance use, but relatively little is known about psychosocial correlates. Hookah has been associated with personality traits,

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including impulsivity and social comparison orientation (Berg, Schauer, Asfour, Thomas, & Ahluwalia, 2011; Doran & Trim, 2015; Fielder, Carey, & Carey, 2012). Hookah use has also been related to cognitions, including affect regulation expectancies (Doran & Brikmanis, 2016). While these studies have begun to explore psychosocial predictors of hookah use, further investigation is needed.

Stress is important in many models of substance use (Kassel, Stroud, & Paronis, 2003; Sinha, 2005, 2008). According to the stress-coping (Wills & Hirk, 1996) and self-medication (Khantzian, 1997) models, substance use is a maladaptive strategy for regulating stress and affect. Stress has been linked to multiple substances, including cigarettes, and predicts initiation, progression, maintenance and relapse (Kassel et al., 2003). Stress is likely associated with other tobacco products, but little is known about its relationship with hookah. In a college sample, stress relief was one of the most common motives for using hookah (Holtzman, Babinski, & Merlo, 2013), suggesting it may be a stress management strategy.

Research examining stress and hookah use among young adults has focused on subjective stress and yielded mixed findings, with users reporting higher stress levels in some studies (Berg et al., 2011; Grinberg, 2015) but not others (Fielder et al., 2012; Goodwin et al., 2014). The present study sought to address these inconsistencies by examining hookah use and both subjective and objective stress measures. We hypothesized that greater perceived stress and more stressful events would predict greater probability and frequency of hookah use in the past two weeks in a community sample of young adult non-daily smokers.

2. Methods

2.1. Participants

Participants ($n = 598$, 51% male) were young adults aged 18–24 years ($M = 20.5$, $SD = 1.8$) who enrolled in a longitudinal study of non-daily cigarette smoking. Half identified as exclusively Caucasian, 16% Asian American, 26% Hispanic or Latino, and 5% from multiple backgrounds. Eligibility criteria included smoking cigarette at least monthly for six months but no lifetime history of daily cigarette use for one month or longer, California residency, and owning a smartphone or having reliable internet access.

2.2. Procedure

Online advertisements were used to recruit participants. Interested individuals ($n = 7671$) completed a brief online assessment of eligibility. Approximately 15% met eligibility criteria; 53% of eligible individuals enrolled in the study. The primary reason for ineligibility was current (48%) or past (31%) daily smoking. Staff emailed individualized links to eligible individuals ($n = 1121$) who, if interested, provided informed consent and completed the baseline assessment online or via mobile phone app, for which they received a \$25 gift card. The University of California, San Diego Institutional Review Board approved procedures. Data were collected over 12 months beginning in March 2015.

2.3. Measures

2.3.1. Demographic characteristics

Demographic characteristics assessed included age, sex, race/ethnicity and current student status. Due to small cell sizes, race was collapsed into four categories: Caucasian ($n = 267$), Asian American ($n = 96$), Hispanic or Latino ($n = 153$), and other ($n = 52$).

2.3.2. Tobacco, alcohol, and marijuana use

Tobacco, alcohol, and marijuana use in the past 14 days were assessed using the Timeline Followback (TLFB; Sobell & Sobell, 1992, 1996). For each of the 14 individual days preceding assessment, starting

with the day before assessment, participants reported whether they used hookah, e-cigarettes, smokeless tobacco, cigars, cigarillos, and marijuana. Number of alcoholic drinks and cigarettes were also recorded for each day. The TLFB has been validated for online use (Pedersen, Grow, Duncan, Neighbors, & Larimer, 2012; Ramo, Hall, & Prochaska, 2011).

2.3.3. Stressful life events

Stressful life events were assessed using a modified version of the 45-item Life Events Scale for Students, or LESS (Nikolova, Bogdan, Brigidi, & Hariri, 2012). LESS respondents indicated whether or not specific events had occurred in the past 12 months. Items included financial and legal problems, interpersonal conflict, life and school difficulties, life transitions (e.g., moving homes, pregnancy, marriage), and loss. While the LESS was designed for college students, 40 of 45 items are equally applicable to non-students 18–24 years old. Exceptions include beginning college, failing courses, changing college programs, and getting kicked out of college. In the present sample, LESS scores did not differ by student status.

2.3.4. Perceived stress

Perceived stress was assessed using the Perceived Stress Scale-10 (Cohen, 1988; Roberti, Harrington, & Storch, 2006), which evaluates respondents' sense of control over their lives during the past month. Higher scores indicate greater perceived stress.

2.4. Analytic plan

Preliminary bivariate tests were used to assess relationships among demographic, clinical, predictor and outcome variables. Logistic regression was used to assess whether stress predicted odds of any hookah use. Because the modal number of use days was 0, negative binomial regression was used to assess whether stress predicted frequency of hookah use (Atkins, Baldwin, Zheng, Gallop, & Neighbors, 2013). All analyses were conducted using Stata IC 13 (StataCorp LP, College Station, TX), with $\alpha = 0.05$.

3. Results

3.1. Preliminary analyses

Demographic and clinical characteristics are shown in Table 1. Nearly a third (31.4%) of participants reported using hookah over the past 14 days. Those with recent hookah use averaged of 3.1 ($SD = 3.2$) days of use. Additionally, 33.8% of participants used e-cigarettes, 15.2% cigarillos, 7.2% cigars, 5.7% smokeless tobacco, 54% two or more nicotine and tobacco products, and 57.5% marijuana.

Any hookah use was associated with being male and a full-time student, and greater alcohol consumption ($ps < 0.05$). Frequency of hookah use was associated with male sex, number of cigarettes, and number of drinks ($ps < 0.05$). Therefore, sex, student status (full time vs. other), cigarettes smoked, and alcoholic drinks were included as covariates in subsequent analyses.

3.2. Hookah use

Logistic and negative binomial models are shown in Table 2. Sex, race/ethnicity, cigarettes smoked, and perceived stress were not associated with odds of recent hookah use. Full-time students were 78% more likely to have used hookah recently [Odds ratio (OR) = 1.78 (95% confidence interval 1.23, 2.60), $p = 0.003$]. Alcoholic drinks predicted likelihood of hookah use, [OR = 1.01 (1.00, 1.02), $p = 0.003$], with each additional drink associated with a 1% increase in the likelihood of hookah use. The odds of hookah use were significantly associated with exposure to stressful events [OR = 1.05 (1.01, 1.10), $p = 0.007$], with each additional event predicting a 5% increase in odds of use.

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