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Psychosocial Factors and Health-Risk Behaviors Associated with Hookah use among College Students

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Abstract

Introduction—Prevalence of hookah or waterpipe smoking is increasing in the United States, particularly among college-aged students. Little research has examined the relationship between hookah smoking, other risk-seeking behaviors, and specific personality factors. The current study aims to address this gap in the literature.

Methods—A random sample of 10,000 students at two southeastern state universities were recruited to complete an online survey containing 230 questions assessing sociodemographics, other substance use, and psychosocial factors. Of students invited to participate, 2,206 (22.1%) returned a completed survey.

Results—Past 30-day hookah use was found among 6.8% (n=141) of the sample. Binary logistic regression indicated that, after controlling for age, ethnicity, and highest parental education, hookah use was associated with being male ($p<.001$), being a nondaily or daily smoker versus a nonsmoker ($p<.001$), more frequent alcohol consumption ($p<.001$), greater sensation seeking ($p<.001$), lower levels of conscientiousness ($p<.001$), and greater openness to experiences ($p=.01$).

Conclusions—Understanding the psychological and personality profiles of hookah users may allow public health practitioners and health care providers to identify high-risk individuals and design targeted interventions addressing users and those at risk for use.

Keywords

Tobacco use; Tobacco control; Hookah; Health risk behaviors; College students

Introduction

The prevalence of hookah smoking (i.e., tobacco smoked from a waterpipe) is increasing both in the United States [1,2] and globally [3,4]. Hookah use in the U.S. is particularly prominent among college-aged individuals [5,6]. Research has documented high rates of past 30-day hookah use among college students in the eastern U.S., ranging from 9.5% [7] to

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20% [8], with one study documenting 30.6% reporting hookah use in the past year [7]. However, there is limited research examining the prevalence in hookah use in different regions and among different subpopulations in the U.S.

Similar to cigarette smoking, hookah smoking has been associated with lung malignancy, respiratory diseases, periodontal diseases, and low birth weight [6] and negatively affects the cardiovascular system [9,10]. Despite the growing evidence of deleterious health effects associated with hookah smoking, it is perceived as a less harmful and less addictive method of tobacco use [6,11–14]. The vast majority of hookah smokers in United States believes that they were not addicted to hookah smoking and are confident in their ability to quit hookah smoking at any time, despite limited desire to quit [8]. Moreover, college students perceive hookah smoking to be the most socially acceptable form of tobacco use [15]. The unique social beliefs about hookah use may be major contributing factors to its growing popularity [16].

The aforementioned literature suggests that the factors associated with hookah use are important to identify and understand in order to ultimately intervene appropriately. However, little research has examined the factors associated with hookah smoking, particularly other health-related behaviors and specific psychosocial factors. Prior research has documented an association between use of hookah, cigarette, and alcohol [17]. Moreover, research has also found that substance use in general is associated with risky sexual behavior [18]. Prior research has also indicated relationships between cigarette smoking and depression [19–21] and perceived stress [20,22,23]. An association between cigarette smoking and sensation has also been well-established [24]. In addition, a recent meta-analysis [25] based on nine studies and a total of 4,730 participants indicated that cigarette smoking was associated with three specific five-factor traits, including low conscientiousness, low agreeableness, and high neuroticism. However, this has not been investigated in relation to hookah use.

Given the aforementioned literature and the dearth of research identifying factors related to hookah use, the current study aims to document the relationship of hookah use to other health-related behaviors and psychosocial factors. Specifically, we will examine past 30-day hookah use in relation to cigarette smoking, alcohol consumption, number of past-year sexual partners, depressive symptoms, perceived stress, sensation seeking, and the five-factor personality traits among college students.

Materials and Methods

In October, 2010, 10,000 randomly selected students at two southeastern state universities (5,000 per university) were recruited to complete an online survey. Students received an e-mail containing a link to a consent form. Students who consented to participate were directed to the online survey [26]. Of students who were invited to participate, 2,206 (22.1%) returned a completed survey. The Emory University Institutional Review Board approved this study, IRB# 00030631.

Measures

The online survey contained 230 questions assessing a variety of health topic areas and took approximately 20–25 minutes to complete. For the current investigation, only the following variables were included.

Demographic characteristics

We assessed students' age, gender, ethnicity, and highest parental educational attainment. Ethnicity was categorized as non-Hispanic White, Black, or Other due to the small numbers

of participants who reported other race/ethnicities. Highest parental educational attainment was categorized as < versus Bachelor's degree.

Current hookah use

To assess current hookah use, students were asked, "In the past 30 days, on how many days did you smoke tobacco from a water pipe (hookah)?" [27,28]. Current users were considered to be individuals who smoked at least one day in the past 30 days.

Smoking status

We asked, "In the past 30 days, on how many days did you smoke a cigarette (even a puff)?" [27,28]. Students who reported smoking on at least one day in the past 30 days were considered current smokers, with further categorization into daily smokers versus nondaily smokers (i.e., smoked 1 to 29 days of the past 30 days) [29,30].

Alcohol Use

We asked, "In the past 30 days, on how many days did you drink alcohol?" [28,29].

Number of Sexual Partners. We asked, "During the past 12 months, with how many people did you have sexual intercourse?"

Depressive symptoms

We administered the Patient Health Questionnaire (PHQ-2) [31], which is a 2-item depression screening tool, based on DSM-4 diagnostic criteria, assessing frequency of depressed mood ("feeling down, depressed or hopeless") and anhedonia ("little interest or pleasure in doing things") over the past two weeks. Responses were rated on a 4-point Likert scale (0 = not at all to 3 = nearly every day). A total score ≥ 3 has been used to screen for clinical depression [31]. Cronbach's alpha in the current study was 0.74.

Perceived stress

We administered the Perceived Stress Scale (PSS-4) [23] to assess the amount of stress they experienced in the past month using a 5-point Likert scale (0 = never to 4 = very often). Higher total scores indicate greater levels of perceived stress. Psychometric analyses revealed appropriate internal consistency, convergent validity, and test-retest reliability [23]. Cronbach's alpha in the current study was 0.74.

Sensation seeking

The Brief Sensation Seeking Scale – 4 item (BSSS-4) [32] assesses sensation seeking using four items: I would like to explore strange places; I like to do frightening things; I like new and exciting experiences, even if I have to break the rules; and I prefer friends who are exciting and unpredictable. Psychometric analyses revealed appropriate internal consistency, convergent validity, and test-retest reliability [32]. Cronbach's alpha in the current study was 0.75.

Five-Factor personality traits

The Ten-Item Personality Inventory (TIPI) [33] organizes personality theories into five primary non-cognitive personality factors, called the "Big Five" (Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience). Items are rated on a 7-point scale (1= disagree strongly to 7=agree strongly). The TIPI has demonstrated appropriate internal consistency, adequate convergent validity, test-retest reliability, and appropriate patterns of predicted external correlates [33]. Cronbach's alphas

for the Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience subscales were 0.53, 0.45, 0.51, 0.60, and 0.40, respectively.

Data analysis

Participant characteristics were summarized using descriptive statistics. Bivariate analyses were conducted comparing current hookah users versus nonusers using chi-squared tests for categorical variables and independent samples t-tests for continuous variables. Binary logistic regression was used to examine personality factors and health behaviors associated with hookah use, taking into account sociodemographic factors. To control for the potential influence of sociodemographic characteristics on the primary outcomes of interest (i.e., hookah use), age, gender, ethnicity, and parental education were entered into the model, and then factors associated with hookah use at the $p < .10$ were entered using backwards stepwise entry, as this approach allows the maintenance of a set of variables that have considerable predictive capability even though any subset of the potential predictors may not. SPSS 18.0 was used for all data analyses. Statistical significance was set at $\alpha = .05$ for all tests.

Results

In our sample, 6.8% ($n=144$) used hookah in the past 30 days, with the majority (86.8%; $n=125$) smoking hookah between 1 and 5 days out of the past 30 days and an additional 9.7% ($n=14$) using hookah 6 to 10 days. Table 1 presents participant characteristics and bivariate analyses comparing hookah users versus nonusers. Hookah users (versus nonusers) were younger ($p < .001$), more likely to be male ($p = .004$), white ($p < .001$), and from parents with greater education ($p = .03$). They also were more likely to be current smokers (either nondaily or daily smokers; $p < .001$), consumed alcohol more frequently ($p < .001$), and had more sexual partners in the past year ($p = .04$). Hookah users versus nonusers were more likely to report significant depressive symptoms ($p = .001$), marginally greater stress ($p = .07$), higher levels of sensation seeking ($p < .001$), greater extraversion ($p = .03$), marginally greater openness ($p = 0.6$), and lower levels of conscientiousness ($p = .002$).

In the multivariate model indicating factors associated with hookah use (see Table 2), significant factors included being male ($p < .001$), being a nondaily or daily smoker (versus a nonsmoker) ($p < .001$), greater sensation seeking ($p < .001$), lower levels of conscientiousness ($p < .001$), and greater openness to experience ($p = .01$). Reporting greater perceived stress was also marginally associated with hookah use ($p = .06$).

Discussion

This study documented important factors that are associated with hookah use in college students. We found that hookah use was positively associated with cigarette smoking, alcohol use, sensation seeking, and openness to experience; negatively associated with conscientiousness; and marginally associated with greater perceived stress. These findings are novel and may inform future research and practice.

In terms of psychosocial factors, these findings are in line with prior research indicating that cigarette smoking is associated with sensation seeking [24,34] and low conscientiousness [25]. However, the current findings also add to the existing literature by documenting these relationships with hookah smoking and unique relationships between hookah smoking and openness to experience. These findings suggest that certain personality profiles may predict not only hookah use, but use or experimentation with tobacco products in general.

Consistent with existing research [17], these data indicate that hookah use is highly correlated with the use of other substances, specifically current cigarette smoking and

alcohol use. However, these data do not demonstrate a strong association between risky sexual behavior and hookah use, which is surprising given the breadth of research associating risky sexual behavior with substance use [18]. It is possible that additional questions are needed to truly assess risky sexual behavior, including questions about having sex that was unplanned, having casual sex, or having unprotected sex.

The current findings have important implications for research and practice. First, identifying characteristics related to hookah use is a pivotal part of developing interventions that are relevant to the target population. One critical element is understanding the messages relayed about hookah and hookah bars and why these settings may attract specific personality types, such as sensation seekers and those more open to new experiences and low in conscientiousness. Perhaps media messages promote hookah bars or social interactions among peers frame hookah use in ways that appeal to these types of individuals. Current findings also suggest that one way of approaching young adults at risk for using hookah is to appeal to their sensation seeking and openness to experimentation by offering other healthy alternatives that also satisfy these characteristics, such as intense physical activities (e.g., mountain biking, skiing). Potentially highlighting the impact of using tobacco products on being able to live a lifestyle conducive to engaging in new and intense experiences may be a relevant message delivered through interventions, media messages, or health promotion campaigns. Further research is needed to identify and test messages that are successful in motivating young adults to avoid hookah use. Moreover, future research should more fully examine young adult attitudes about the perceived appeal, perceived harm, and anticipated effects of hookah use in order to frame intervention strategies in a more effective way.

Limitations

Limitations include the sample being largely female and drawn from two southeastern colleges. Despite the fact that this sample reflects the characteristics of these school populations and has good representation of ethnic backgrounds, it may not generalize to other college populations. Second, the survey response rate was 22.1%, which may seem low, suggesting responder bias. However, previous online research has yielded similar response rates (29–32%) among the general population [35] and a wide range of response rates (17–52%) among college students [36]. We are also unable to ascertain how many participants did not open the e-mail or had inactive accounts, which impacts what the true “denominator” for this response rate may have been. In addition, prior work has demonstrated that, despite lower response rates, internet surveys yield similar statistics regarding health behaviors compared to mail and phone surveys [37]. Also, the cross-sectional nature of the data prohibits the establishment of causality, as temporality, frequency and dose/response issues cannot be assessed. In addition, data are derived from self-report and may be subject to recall bias. Finally, we did not include any other items assessing history of hookah use or other items specific to hookah use.

Conclusions

This study demonstrated a relationship between hookah use and psychosocial factors, as well as other health risk factors, among college students. We found that hookah use was positively associated with cigarette smoking, alcohol use, sensation seeking, and openness to experience; negatively associated with conscientiousness; and marginally associated with greater perceived stress. Personality characteristics should be further examined in relation to risk for hookah use and may be used as potential intervention targets for addressing hookah use.

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Table 1

Participant characteristics and bivariate analyses comparing hookah users and nonusers.

Variable	Total N=2106 N (%) or M (SD)	Nonusers N=1962 (93.2%) N (%) or M (SD)	Users N=141 (6.8%) N (%) or M (SD)	Statistic*	p
<i>Sociodemographics</i>					
Age (SD)	21.03 (2.79)	21.10 (2.83)	20.10 (1.94)	4.20	<.001
Gender (%)					
Male	614 (29.2)	557 (28.4)	57 (39.6)		
Female	1492 (70.8)	1405 (71.6)	87 (60.4)	8.14	.004
Ethnicity (%)					
White	1014 (48.1)	929 (47.3)	85 (59.0)		
Black	654 (31.1)	634 (32.3)	20 (13.9)	21.40	<.001
Other	438 (20.8)	399 (20.3)	39 (27.1)		
Parental education (%)					
< Bachelors degree	1045 (49.6)	985 (50.2)	60 (41.7)	3.91	.03
Bachelors degree	1061 (50.4)	977 (49.8)	84 (58.3)		
<i>Other risk behaviors</i>					
Cigarette smoking past 30 days (%)					
Nonsmoker	1660 (78.8)	1599 (81.5)	61 (42.4)		
Nondaily smoker	333 (15.8)	268 (13.7)	65 (45.1)	124.81	<.001
Daily smoker	113 (5.4)	95 (4.8)	18 (12.5)		
Alcohol use past 30 days (SD)	3.85 (5.51)	3.63 (5.35)	6.84 (6.71)	-6.82	<.001
Sex partners in the past year (SD)	1.37 (2.82)	1.34 (2.82)	1.85 (2.73)	-2.09	.04
<i>Psychosocial factors</i>					
Depressive symptoms (%)					
No	1773 (91.8)	1665 (92.4)	108 (83.1)	14.18	.001
Yes	158 (8.2)	136 (7.6)	22 (16.9)		

Variable	Total N=2106 N (%) or M (SD)	Nonusers N=1962 (93.2%) N (%) or M (SD)	Users N=141 (6.8%) N (%) or M (SD)	Statistic [*]	p
Perceived stress (SD)	6.26 (3.36)	6.22 (3.34)	6.77 (3.52)	-1.82	.07
Sensation seeking (SD)	3.42 (0.88)	3.39 (0.87)	3.81 (0.89)	-5.37	<.001
Big 5 factors (SD)					
Extraversion	8.73 (2.94)	8.70 (2.94)	9.28 (2.92)	-2.19	.03
Agreeableness	9.84 (2.31)	9.86 (2.32)	9.61 (2.27)	1.17	.24
Conscientiousness	10.86 (2.45)	10.91 (2.43)	10.23 (2.59)	3.11	.002
Emotional stability	9.37 (2.69)	9.39 (2.69)	9.11 (2.64)	1.14	.25
Openness	10.63 (2.31)	10.60 (2.32)	10.99 (2.24)	-1.87	.06

* independent samples t-test for continuous variables (df = 2104); chi-squared tests for categorical variables

Table 2

Binary logistic regression model identifying correlates of hookah use.

Variable	OR	95% CI	p-value
<i>Sociodemographics</i>			
Age	0.96	0.90, 1.01	.10
Gender			
Male	Ref	--	--
Female	0.54	0.40, 0.73	<.001
Ethnicity			
White	Ref	--	--
Black	1.12	0.78, 1.61	.55
Other	0.81	0.55, 1.20	.30
Parental education			
< Bachelors degree	Ref	--	--
Bachelors degree	1.06	0.79, 1.41	.71
<i>Other risk behaviors</i>			
Cigarette smoking past 30 days			
Nonsmoker	Ref	--	--
Nondaily smoker	2.68	1.90, 3.77	<.001
Daily smoker	3.67	2.23, 6.02	<.001
Alcohol use past 30 days	1.09	1.07, 1.12	<.001
Sex partners in the past year	1.06	0.99, 1.12	.12
<i>Psychosocial factors</i>			
Perceived stress	1.04	1.00, 1.09	.06
Sensation seeking	1.57	1.30, 1.89	<.001
Big 5 factors			
Conscientiousness	0.87	0.82, 0.92	<.001
Openness	1.10	1.02, 1.18	.01

Nagelkerke $R^2 = 0.263$