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Emerging adulthood themes and hookah use among college students in Southern California

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Abstract

Introduction—Hookah (or waterpipe) use is increasing worldwide with implications for public health. Emerging adults (ages 18 to 25) have a higher risk for hookah use relative to younger and older groups. While research on the correlates of hookah use among emerging adults begins to accumulate, it may be useful to examine how transition-to-adulthood themes, or specific thoughts and feelings regarding emerging adulthood, are associated with hookah use. This study determined which transition-to-adulthood themes were associated with hookah use to understand the risk and protective factors for this tobacco-related behavior.

Methods—Participants (n=555; 79% female; mean age 22) completed surveys on demographic characteristics, transition-to-adulthood themes, hookah, and cigarette use.

Results—Past-month hookah use was more common than past-month cigarette use (16% versus 12%). In logistic regression analyses, participants who felt emerging adulthood was a time of experimentation/possibility were more likely to report hookah use. However, transition-to-adulthood themes were not statistically significantly related to cigarette use.

Conclusions—The profile for hookah use may differ from that of cigarettes among emerging adults. Themes of experimentation/possibility should be addressed in prevention programs on college campuses and popular recreational spots where emerging adults congregate. These findings can inform future studies of risk and protective factors for hookah use among emerging adults.

Keywords

Hookah use; waterpipe use; cigarette use; Emerging Adults; Young Adults; Prevention

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Contributors:

Jon-Patrick Allem designed the concept of the study, was responsible for the analysis and interpretation of data, and drafted the first version of the manuscript. Jennifer B. Unger provided critical revisions of the manuscript for important intellectual content and approved the final manuscript.

Conflicts of Interest:

The authors declare no conflicts of interest.

1. Introduction

Hookah (or waterpipe) use is increasing worldwide with implications for public health. Hookah has deleterious effects on health akin to those of combustible cigarettes (Maziak, 2011), and is smoked slowly with individuals partaking in the activity for 30 minutes or more resulting in high levels of nicotine exposure (Nelson, 2015). In the United States (U.S.), tobacco control policies that apply to cigarette smoking do not similarly apply to hookah (Jawad, Kadi, Mugharbil, & Nakkash, 2014). For instance, in a study of the largest 100 U.S. cities, researchers found that 73 disallowed cigarette smoking in bars, but 69 of those cities may allow hookah use via exemptions (Primack et al., 2012). The Food and Drug Administration (FDA) Family Smoking and Prevention Control Act specifies (Section 907, titled ‘Tobacco Product Standards’) a ban on flavored cigarettes, but does not currently include hookah tobacco (United States, 2009). Policies also allow tobacco companies the ability to market and sell hookah, and related products, to vulnerable populations like emerging adults (ages 18 to 25) (Haddad, El-Shahawy, Ghadban, Barnett, & Johnson, 2015). Lax tobacco control policies may have allowed for hookah use to grow in popularity in the U.S.

Emerging adults have a higher risk for hookah use, relative to younger and older age groups (Cavazos-Rehg, Krauss, Kim, & Emery, 2015; Grekin & Ayna, 2012; Smith et al., 2011). In the U.S., recent research demonstrated that 25% of emerging adults reported lifetime hookah use (Villanti, Cobb, Cohn, Williams, & Rath, 2015), and demonstrated that 10% of college students reported past 30-day use (Jarrett, Blosnich, Tworek, & Horn, 2012). A systematic review of the literature suggested that the majority of hookah smokers were unaware of its potential risks (Haddad et al., 2015), and research has suggested that emerging adults perceive fewer negative consequences of hookah use compared with combustible cigarette use (Holtzman, Babinski, & Merlo, 2013; Heinz et al., 2013). Low perception of harm and low perceived addictiveness were positively associated with hookah use in the past year among emerging adults (Primack, Sidani, Agarwal, Shadel, Donny, & Eissenberg, 2008). Additional reasons for hookah use among emerging adults include believing that it is a good way to socialize with friends, and finding enjoyment in trying new things that are new and “hip” (Holtzman et al., 2013). Positive attitudes (e.g., hookah seems fun) and normative beliefs (e.g., hookah is socially acceptable) have been positively associated with hookah use among college students (Sidani, Shensa, Barnett, Cook, & Primack, 2014). Recent research demonstrated that hookah use predicted increased cigarette smoking over six months in a college sample in the U.S. (Doran, Godfrey, & Myers, 2015). Research has also shown that hookah smokers are significantly more likely to use other substances, including alcohol, cigarettes, marijuana, and cocaine compared to those who refrain from smoking hookah (Goodwin et al., 2014).

Emerging adulthood affords young people the opportunity for identity exploration in love, work, and perspective (Arnett, 2006). Arnett (2000) argued that a function of emerging adults’ identity exploration is engaging in risky behaviors. Sensation seeking, the yearning for intense experiences, motivates emerging adults to engage in risky behaviors, such as tobacco use, other substance use, and unprotected sex (Arnett, 2000). Young people may even engage in substance use as a function of identity exploration in emerging adulthood

(Schwartz, Zamboanga, Luyckx, Meca, & Ritchie, 2013). In other words, emerging adults may use nicotine or other substances as a way of exploring a variety of different experiences, or they may use nicotine in order to alleviate uneasy feelings due to identity uncertainty. Risky behaviors like hookah use may be tolerated or encouraged during emerging adulthood (Sussman & Arnett, 2014).

While research on the correlates of hookah use among emerging adults begins to accumulate, it may be useful to examine how transition-to-adulthood themes, or specific thoughts and feelings regarding emerging adulthood, are associated with hookah use. Transition-to-adulthood themes have previously been found to be associated with risky behaviors (Allem, Lisha, Soto, Baezconde-Garbanati, & Unger, 2013; Lisha et al., 2014). For example, feeling that emerging adulthood was a time for experimentation and possibility was associated with electronic cigarette (e-cigarette) use among college students (Allem, Forster, Neiberger, & Unger, 2015). The present study determined which transition-to-adulthood themes were associated with hookah use in order to better understand the risk and protective factors of this tobacco-related behavior among this population. Findings should prove useful for prevention/intervention programs, and in formulating future tobacco control policies.

2. Methods

2.1 Procedure

Study investigators worked with administrators from two colleges in the California State University (CSU) system in order to survey an ethnically and sociodemographically diverse sample of emerging adults. These colleges were among the most diverse in the CSU system (College Portraits, 2013), and located in the greater Los Angeles area. The sample of emerging adults ($n=555$; 79% female; mean age 22) was ethnically diverse with 46% Hispanic/Latino(a), 18% non-Hispanic white, 14% other, 12% African American, and 10% multiracial. Campus wide emails were distributed and administrators from each college campus posted flyers, and announced the current study on their respective CSU portal systems (accessible by their homepage). The recruitment material did not reference hookah or tobacco use but stated in general terms that the study was focused on college students' health behaviors. Students received a description of the study, were informed about confidentiality, and electronically signed consent forms. A web-based survey allowed participants to click on a link on a computer or smart phone and electronically submit responses. Respondents were offered a five-dollar gift card after they had completed the survey. Data were de-identified for analytic purposes, and the IRB of the principal investigator's university approved all procedures.

2.2 Measures

Transition-to-adulthood themes were assessed with the Inventory of the Dimensions of Emerging Adulthood (IDEA) (Reifman, Arnett, & Colwell, 2007). The IDEA instrument has six subscales, which measure the main themes or pillars of emerging adulthood (Arnett, 2000). The survey items were prompted with "Please think about this time in your life. By 'time in your life,' we are referring to the present time, plus the last few years that have gone

by, and the next few years to come, as you see them. In short, you should think about a roughly five-year period, with the present time right in the middle. Is this time in your life a ...” Responses for each item included “strongly disagree” coded 1, “somewhat disagree” coded 2, “agree” coded 3, and “strongly agree” coded 4. The subscales, corresponding reliability coefficient, and an example question are as follows: Identity Exploration (Cronbach’s alpha [α]=0.83) e.g., “time of finding out who you are?”, Experimentation/Possibilities (α =0.78) e.g., “time of many possibilities?”, Negativity/Instability (α =0.82) e.g., “time of confusion?”, Other-Focused e.g., (α =0.66) “time of responsibility for others?”, Self-Focused (α =0.77) e.g., “time of personal freedom?”, and Feeling “In-Between” (α =0.72) e.g., “time of feeling adult in some ways but not others?”.

The outcome of interest was past-month hookah use coded 1 “yes” and 0 “no”. Age was coded in years, and gender was coded 1 “male” or 0 “female.” Race/ethnicity was classified into five categories: 1) non-Hispanic white, 2) Hispanic or Latino/a, 3) Black or African American, 4) Other (Asian, American Indian, Alaska Native, Native Hawaiian, or Pacific Islander), and 5) multiracial. When race/ethnicity was included as a covariate in regression models it was coded 1 “non-Hispanic white” and 0 “not non-Hispanic white”.

2.3 Analysis plan

Initially, past-month hookah use was regressed on the subscales of emerging adulthood. Past-month hookah use was then regressed on the significant subscales while controlling for age, gender, and race/ethnicity. The events per variable (EPV) rule in logistic regression suggested separate models were appropriate. The EPV rule recommends 10 to 15 cases (“1s” in the dependent variable in this circumstance) for each explanatory variable in the model. This study had 91 past-month hookah smokers, suggesting more than 6 explanatory variables in any one model would run the high risk of being overfit (Greenland, 1989; Harrell, Lee, & Mark, 1996).

Given the two colleges used as sampling sites, students attending the same college may have similar hookah use behavior relative to those who do not. Appropriate diagnostics revealed that intraclass correlation (ICC) was small in this study (ICC = .04). Conclusions did not differ between fixed effects models and hierarchical models with a random intercept for school, so results from the fixed effects models were reported. In order to determine how hookah use may differ from combustible cigarette use, analyses were repeated for past-month combustible cigarette use (coded 1 “yes” and 0 “no”). For all analyses, the quantity of interest was calculated using the estimates from a multivariable analysis by simulation using 1,000 randomly drawn sets of estimates from a sampling distribution with mean equal to the maximum likelihood point estimates, and variance equal to the variance-covariance matrix of the estimates, with covariates held at their mean values (King, Tomz, & Wittenberg, 2000).

3. Results

Among the participants, 16% reported past-month hookah use, and 12% reported past-month cigarette use. Hookah use did not differ by gender, but significantly varied by age with older emerging adults being less likely to report past-month hookah use ($p < .001$). For example,

going from 18 to 26 years of age was associated with a -20 (95% CI, -32 to -9) lower probability in hookah use. Hookah use varied by ethnicity with 44% of non-Hispanic whites, 28% of African Americans, 26% of multiracial, 15% of other, and 11% of Hispanics/Latino(a)s reporting past-month use, respectively. The difference in prevalence between non-Hispanic whites and other, as well as Hispanics/Latinos, was statistically significant ($p < .01$).

Participants who felt emerging adulthood was a time of experimentation/possibility were more likely to report hookah use ($p < .05$). A difference in score on the experimentation/possibility subscale between the 10th percentile and the 90th percentile was associated with a 20% (95% Confidence Interval [CI], 6% to 34%) higher probability of hookah use (Figure 1A). Conclusions did not change after controlling for age, gender, and race/ethnicity. The remaining IDEA subscales were insignificantly associated with hookah use. The IDEA subscales were insignificantly associated with past-month cigarette use.

4. Conclusion

The present study identified one transition-to-adulthood theme that was associated with past-month hookah use. Feeling that emerging adulthood was a time of experimentation/possibility was associated with an increased probability of hookah use, but not combustible cigarette use. Hookah use may be perceived as more experimental than cigarettes because of its growth in popularity in recent years making the behavior seem more new and exciting to emerging adults.

The profile for hookah use may differ from that of cigarettes among emerging adults, requiring specific intervention programs and policies to curb further use (Haddad et al., 2015). For example, in contrast to combustible cigarette use, hookah has not been associated with mental health problems or stress among college students in the U.S (Goodwin et al., 2014). Themes of emerging adulthood should be addressed in prevention programs on college campuses, and popular recreational spots where emerging adults congregate. Encouraging emerging adults to fulfill their need for experimentation with activities (e.g., mountaineering, snowboarding, surfing, scuba diving, business ventures, community service, internships) apart from engaging in hookah use could prove effective.

In the present sample, non-Hispanic whites were more likely than other racial/ethnic groups to report past month-hookah use which is in line with previous research on emerging tobacco products (Arrazola et al., 2015). Younger emerging adults were more likely than older emerging adults to report hookah use. This suggests prevention programs may need to be implemented for emerging adults right out of high school. Additionally, hookah use was more common than combustible cigarette use among this sample of emerging adults, which is similar to prior research (Lee, Bahreinifar, & Ling, 2014). A convenience sample of young adult hookah smokers in Southern California suggested that a majority of participants believed that hookah was not harmful to their health (Rezk-Hanna, & Macabasco-O'Connell, 2014), which may in part explain the higher prevalence in hookah use in the present sample.

4.1 Limitations

The lack of significance in the associations between hookah use and all the subscales of the IDEA instrument may be a result of measurement error. The IDEA instrument may not be a perfect measure of transition-to-adulthood themes, but it is gaining in popularity in assessing these constructs. Age of initiation in cigarette use may in part influence the current results. If initiation in cigarette smoking occurs earlier than hookah use, then the feeling of experimentation/possibility likely would not be associated with cigarette use in emerging adulthood. In other words, the earlier the behavior started the less likely that the behavior would feel like a form of emerging-adulthood experimentation. This study however does not know the age in which initiation in cigarette use or hookah use started. Hookah use was a dichotomous outcome, limiting the understanding of frequency of use. However, past-month measures of tobacco use are in line with prior research among emerging adults (Allem, Soto, Baezconde-Garbanati, & Unger, 2013; Allem, Soto, Baezconde-Garbanati, & Unger 2015a; Allem, Soto, Baezconde-Garbanati, & Unger, 2015b). Emerging adults generally report smoking flavored tobacco in a hookah, however some use other substances such as marijuana (Sutfin, Song, Reboussin, & Wolfson, 2014). The present study did not determine whether participants placed tobacco, or some other substance, in their hookah over the past month. While the present study's sample overrepresented females, the findings did not differ by gender. Findings may not generalize to emerging adults in other regions of the U.S. or to those not enrolled in college. Future research should focus on sampling a nationally representative sample of emerging adults and testing additional hypotheses.

By appreciating the unique characteristics in emerging adulthood, the present findings move forward the literature on hookah use among emerging adults. Hookah use poses concerns to public health including emerging adults initiating in cigarette smoking (Doran et al., 2015), and other substance use (Goodwin et al., 2014). Emerging adults who initiate in hookah use, may transition to other nicotine products and struggle with nicotine dependence. With these public health concerns in mind, understanding the correlates of hookah use among a vulnerable population like emerging adults is of utmost importance. Findings from this study should be a point of departure for future studies looking to understand the risk and protective factors of hookah use among emerging adults.

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Highlights

- Hookah use was more prevalent than cigarette use (16% vs. 12%) among participants.
- Themes of experimentation/possibility were associated with hookah use.
- The profile for hookah use may differ from that of cigarettes among young adults.

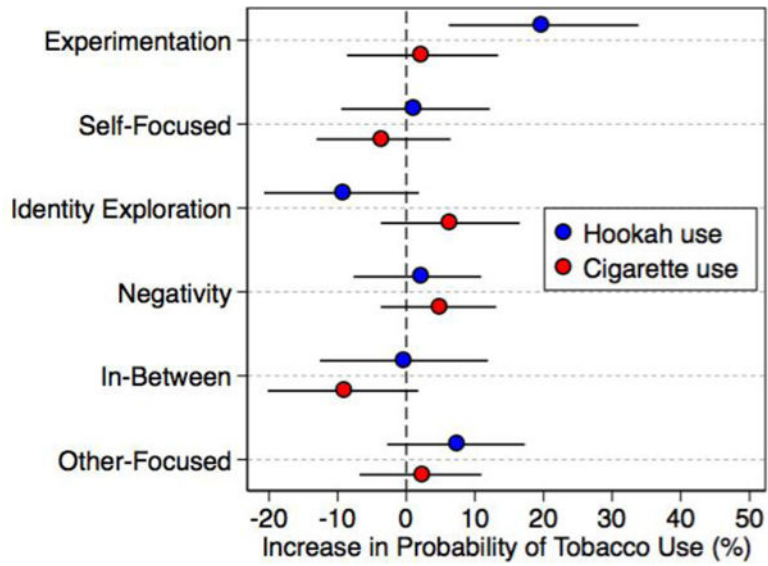


Figure 1. Shows the difference in predicted probabilities of past-month hookah and past-month cigarette use when the 10th and 90th percentile IDEA scores are included in computations with 95% confidence intervals. All estimates were arrived by use of 1000 random drawn sets of estimates from each respective coefficient covariance matrix with control variables held at their mean values.