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Prevalence and predictors of hookah use in US Air Force military recruits

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ABSTRACT

Introduction: Hookah use has gained recent popularity among U.S. youth. The current study describes the characteristics and correlates associated with hookah use in late adolescent and young adult US Air Force (USAF) recruits.
Methods: Data were obtained from a cross-sectional questionnaire of USAF personnel in Technical Training School at Joint Base San Antonio (N = 10,997). Response rate was 78%. Logistic regression was used to analyze the associations between hookah use, demographic variables, other tobacco and nicotine containing product (TNCP) use, and the social environment.
Results: The prevalence of ever hookah use was 28%; at least monthly hookah use was 10%. Increased hookah use was positively associated with Hispanic ethnicity (OR [odds ratio] 1.52; 95% CI: 1.25, 1.85), cigarette smoking (OR 4.05; CI: 3.41, 4.82) and smokeless tobacco use (OR 1.35; 95% CI: 1.07, 1.71). Hookah use was negatively associated with age (OR 0.84; 95% 0.71 to 1.00), living as married (OR 0.54; 95% CI: 0.40–0.72), African American (OR 0.53; 95% CI: 0.40, 0.69) and ≥4-year degree (OR 0.54; 95% CI: 0.35, 0.82). Hookah use was highest among recruits who "many or almost all" of their friends smoked cigarettes (OR 2.43; 95% CI: 1.80, 3.30) and for those who reported willingness to try a tobacco product that claims to be safer than cigarettes (OR 3.16; 95% CI: 2.64, 3.77).
Conclusions: Hookah use among military recruits is similar to the civilian population. A willingness to try TNCPs claiming to be safer than cigarettes may influence hookah use. Public health campaigns disseminating accurate information about hookah health risks may be needed to reduce hookah use among youth.

1. Introduction

Hookah (also called shisha, sheesha, argileh, nargila, or waterpipe) smoking has been a common practice for centuries in Africa (Chaouachi, 2000), the Middle East and Asia (Chaouachi, 2006; Chaouachi, 2012; Maziak, Ward, Afifi Soweid, & Eissenberg, 2004) and has more recently emerged as a communal form of tobacco and nicotine containing product (TNCP) use in Western countries (McMillen, Maduka, & Winickoff, 2012). The World Health Organization (WHO) estimates that a hookah smoker may inhale 100 times the amount of smoke during one hookah session as is inhaled from one cigarette World Health Organization (2005). Toxin concentrations have been shown to be lower in hookah (Chaouachi, 2013) and the chemical composition of the smoke differs depending on the type of hookah used (Chaouachi, 2009). Although some controversy exists regarding the amount of toxins in hookah smoke (Chaouachi, 2011), hookah smoke has been shown to contain tar, nicotine, and carbon monoxide (Katurji, Daher, Sheheitli, Saleh, & Shihadeh, 2010).

College students and other young adults know little about the health effects of hookah use (Nuzzo et al., 2013; Heinz et al., 2013; Grekin & Ayna, 2012). Counterintuitively, knowledge of negative health effects of hookah smoking does little to deter its use (Nuzzo et al., 2013; Heinz et al., 2013). For example, the lack of legislation regulating the use of hookah in public venues Primack et al. (2012) and the lack of scientific debate and accountability (Chaouachi, 2012) implies that it is not as harmful as cigarette smoking, perhaps even bolstering hookah's acceptability (Grekin & Ayna, 2012).

The United States Air Force's (USAF) mission is to be tobacco-free (U. S. Department of the Air Force, 2012, March 26). And although the prevalence of cigarette smoking in the military has declined by approximately 50% in the last three decades, the use of noncigarette TNCPs has remained constant or increased in ten years (Department of Defense, 2009). In general, TNCP use has been reported by 20% of young adult Air Force recruits prior to entering Basic Military Training (BMT) (Vander Weg et al., 2008). The popularity of hookah use among high school and college students, non-student populations, and other young adults (i.e. 30% lifetime use and 10% past 30 day use; Primack et al., 2012) influences the hookah use among incoming cohorts of Air Force trainees. A paucity of research exists on the prevalence

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and correlates of noncigarette TNCP use in the Air Force, particularly with respect to hookah use.

Basic Military Training (BMT) at Lackland Air Force Base (AFB) in San Antonio, TX, is an 8.5 week introductory training program for USAF recruits. During BMT, recruits are under supervision at all times and are required to abstain from all TNCPs; anything short of 100% compliance results in being "washed back," effectively starting the Airman over at an earlier time in their 8.5 week training. Upon successful completion of BMT, Airmen are assigned to "Technical Training" and begin advanced training in the specific skills for their job in the Air Force (e.g., Security Forces, Medical, Pararescue, Intelligence), where they remain TNCP free for another 2 1/2 weeks. In a study of over 20,000 Air Force recruits who completed BMT from October 1999 to October 2000, the prevalence of self-reported waterpipe use was only 0.3% (n = 59) and unrelated to age, gender, ethnicity, or family income (Ward, Vander Weg, Relyea, Debon, & Klesges, 2006). When compared to pre-BMT non-tobacco users, pre-BMT waterpipe users had more education, were more likely to have experimented with cigarettes and other tobacco products, and were more likely to have been regular cigarette smokers. Waterpipe users also were more educated than participants who smoked only cigarettes (Ward et al., 2006). The characteristics of hookah use have not been examined in a more current cohort influenced by contemporary social norms (e.g. frequenting a trendy hookah lounge with friends on weekends or to celebrate an important life event), nor has hookah prevalence in a military population been studied in recent years to determine if changes have occurred over time.

We conducted a study of a recent cohort of Air Force recruits to determine the characteristics of hookah users entering the U.S. Air Force. We also assessed the demographic, social, and behavioral correlates of hookah smoking.

2. Methods

2.1. Study overview

This investigation was funded through the National Institutes of Health and the U.S. Food and Drug Administration (DA-036510, DA 036510-S1) and was a collaborative effort among the University of Tennessee Health Science Center (UTHSC), United States Air Force, and the Mayo Clinic. After completing BMT, Air Force Technical Training Airmen in San Antonio, TX, were offered the opportunity to answer a 37-item questionnaire about their history of and opinions about TNCP use prior to entering Basic Military Training.

2.2. Participants and procedure

History of TNCP use was collected during orientation week of U.S. Air Force Technical Training. Orientation week occurs immediately after graduation from BMT (BMT is 8.5 weeks long). All Active Duty personnel, guardsmen, and reservists who entered Air Force Technical Training at Joint Base San Antonio-Lackland AFB/Ft. Sam Houston from March 2011 to March 2013 were offered study participation. Response rate was 78%. Participants were informed that the study included a 37-item questionnaire assessing TNCP use history and exposure and opinions about TNCP use. Study details were described to all Airmen who were given the opportunity to ask questions. Participants signed an informed consent document describing the study aims and procedures as well as the potential risks and benefits of participation. All study procedures were reviewed and approved by the Wilford Hall Ambulatory Surgical Center (WHASC) Institutional Review Board (IRB).

2.3. Measures

The baseline questionnaire measured four general domains. First, basic demographics were assessed, including age, gender, ethnicity, education level, and marital status. Second, the use of TNCPs (e.g., "What is your history of hookah use prior to BMT?") was evaluated. For TNCP use questions (a hookah example is provided), participants chose from the following response choices: "I smoked hookah every day," "I didn't smoke hookah every day but at least once per week," "I didn't smoke hookah every week but at least once a month," "I smoked hookah less than once per month," "I didn't smoke hookah," or "I used to smoke hookah but quit prior to BMT." Third, pre-BMT exposure to TNCPs was assessed by asking about TNCP use of friends and family (e.g., "How many of your friends smoke cigarettes?"). Fourth, the Airmen were asked opinion questions regarding the harm of TNCPs (e.g. "Would you try a tobacco product that claims to be safer than cigarettes?"). In addition to these four general domains, one question addressed sports participation in high school ("Did you play sports in high school?").

2.4. Statistical analysis

Seventy-eight percent of all Airmen who offered participation were enrolled (N = 10,997). Hookah use was defined using four categories (never, former, less than monthly, at least monthly). Participants were classified as "never" if they indicated that they did not use hookah prior to BMT; "former" if they indicated that they used hookah in the past but quit prior to BMT; "less than monthly" if they reported using hookah less than once per month; and "at least monthly" if they reported using hookah at least once per month or more frequently. The frequency of hookah use was summarized overall and also stratified according to demographic and TNCP history characteristics. In addition to a descriptive summary, a multivariable analysis assessing characteristics associated with regular hookah use was planned a priori with the characteristics used for the descriptive summary and the multivariable analysis determined prior to performing any analyses. Three items chosen for the descriptive summary were not chosen to be included as explanatory variables in the multivariable model. Two items that assessed the recruit's intentions regarding TNCP use after BMT were not included as explanatory variables because they were not relevant prior to BMT, and a single item asking whether the recruit lived with someone who used both ST and cigarettes prior to BMT was excluded because it was redundant with other items.

The multivariable analysis assessing characteristics associated with hookah use was performed using logistic regression. Given the small number of former users and the fact that the frequency of hookah use prior to quitting was unknown, this group was excluded from the analysis. Less than monthly users were also excluded from analyses to remain consistent with extant analytical strategies in the literature (e.g., Asfar, Ward, Eissenberg, & Maziak, 2005; Smith-Malone, Maziak, & Eissenberg, 2008). The response variable for the logistic regression analysis included 2 categories: "Never users" and "Users" (i.e., at least monthly users). The model included all of the prespecified explanatory variables and the results of the full multivariable model are reported using odds ratios (ORs) and corresponding 95% confidence intervals (CI).

3. Results

3.1. Population demographics & characteristics of hookah users

The study cohort was comprised of 10,997 participants. Forty-six percent of the sample was younger than twenty years old (n = 5094). Twenty-eight percent of the trainees were women (n = 3042). The sample was racially diverse (i.e. 33% racial minority) and 15% of the participants reported Hispanic ethnicity. The largest proportion of recruits from racial minorities was African American (47% of minorities), followed by "Other single race" (30% of minorities) and "More than one race" (23% of minorities). Ten percent of the participants were living as married. Most participants had only a high school education (52%) or some education after high school (41%); few had at least a 4-year college degree (7%). The frequency of hookah use among our population of trainees is presented in Table 1 both