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PREDICTING CIGARETTE INITIATION AND RE-INITIATION AMONG ACTIVE DUTY UNITED STATES AIR FORCE RECRUITS

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Abstract

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Authorship statement:

All authors were part of the research conception and design, analysis, and interpretation of the results. Drs. Little and Talcott oversaw the collection of the data. Dr. Little drafted the article and her co-authors reviewed and edited the manuscript.

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Background—The first year of military service in the United States Air Force (USAF) is a high risk time for tobacco use. Previous studies have demonstrated the effectiveness of a tobacco ban during Basic Military Training. However, no studies have examined the effect of increasing the protracted ban for an additional four weeks. Understanding the patterns of initiation and re-initiation following the protracted ban will inform future intervention and policy efforts.

Methods—The current study examines patterns of cigarette smoking among a sample of 2,188 USAF personnel at baseline and after their first year of service.

Results—One year after BMT, we observed that 65.0% of USAF enlistees who never used cigarettes prior to BMT remained abstinent, 9.6% of individuals who formerly used remained abstinent from cigarettes, 9.3% who never used prior to BMT initiated cigarette smoking, and 16.1% who used prior to BMT reinitiated cigarette smoking. Despite the extended tobacco ban in BMT and Technical Training, 12.6% of individual who never smoked initiated cigarette smoking and 62.6% of individuals who formerly smoked reinitiated. Over half (54.2%) of Airmen who reported smoking cigarettes at follow-up, reported initiating or re-initiating during Technical Training.

Conclusions—Our findings indicate that while the increased ban prevents additional individuals who smoked cigarettes prior to joining the Air Force from re-initiating, it has no effect on initiation among individuals who report never using prior to military service. Additional research is needed to understand what may be leading to these high rates of initiation and re-initiation in Technical Training following the ban.

Keywords

Smoking; Military Personnel; Tobacco Use; Prevention

INTRODUCTION

Cigarette use is prevalent among US military personnel. Twenty-four percent of active duty military personnel report current cigarette smoking, compared to 18% among civilians.^{1,2} The Department of Defense (DoD) is the nation's largest employer with 1.4 million active duty personnel,³ and each year the DoD spends an average of \$1.6 billion treating tobacco-related morbidity among active-duty military personnel (e.g., medical care, hospitalizations, lost work days). More than 250,000 individuals leave the military annually,⁴ and many continue their tobacco dependence in civilian life.

Within the "lifespan" of an active-duty member, the first year after enlistment is particularly high-risk for cigarette use.⁵ Approximately 220,000 new recruits enter the military annually, with nearly 30,000 of them joining the US Air Force (USAF) alone.⁶ Recent studies found a higher cigarette-use prevalence among pre-enlistment USAF personnel when compared to the general population.^{1,7} For instance, the prevalence of hookah use was four times higher than civilians aged 18–24, and the prevalence of e-cigarettes was four times higher than the national average.^{1,7} In addition, among cigarette smokers, 31% were dual- (2 types of tobacco) and 44% were poly-tobacco (3 types of tobacco) users.

In order to reduce these high rates of tobacco use, on April 18, 1988, the USAF instituted a cigarette ban that prohibited smoking among all Basic Military troops, 24 hours a day, 7 days a week for the entire period of Basic Military Training (BMT).⁸ BMT refers to the initial training that all enlisted Airmen undergo when they join the USAF. The 8½ weeks of BMT are very structured, with limited privileges, and requires recruits to remain alcohol- and tobacco-free. Previous research indicates that the ban in BMT is associated with an 18% long-term smoking cessation rate among Airmen who reported smoking prior to joining the USAF.⁸ However, over two-thirds of individuals who smoked prior to BMT return to cigarette use following the protracted ban, and nearly all of them relapse during Technical Training, many within the first month after BMT.⁵ Technical Training refers to the second phase of training, and immediately follows successful completion of BMT. During Technical Training, recruits become Airmen (so-called regardless of gender or rank) and acquire skills for their designated USAF job (e.g., aircraft maintenance) for 2 weeks to 18 months, depending on the field.

Since this early work on the effectiveness of the ban in BMT was measured, the USAF extended the ban to cover the first four weeks of Technical Training, or the month after BMT when Airmen are at highest risk for re-initiation (AETC Instruction 36–2216, June 16, 2004). During this period, research indicates 63.0% of Airmen report they are “completely confident” they will remain tobacco-free.⁷ However, it was unclear whether the extended ban on tobacco produces greater cessation rates among Airmen, particularly in USAF Technical Training, which appears to be a high-risk period.

The current study built on this previous work by examining the rate of initiation and re-initiation of cigarettes following an extended tobacco ban in training among new Air Force recruits during their first year of service.

METHODS

Participants and Procedures

Study participants were USAF Technical Trainees from Joint Base San Antonio, TX, in training between March 2011 and July 2013. Airmen receive educational interventions during the transition from BMT to Technical Training. Airmen were consented for this study during our standard, group-based brief alcohol intervention (BAI)⁹ given to all Technical Trainees during the first week of Technical Training when they are still tobacco free. Both an academic and military Institutional Review Board approved the protocol.

Airmen were convened by squadron (i.e., a group of Airmen undergoing Technical Training together). After the BAI, we presented 8,943 Airmen with a study description. 76% of Airmen (N=6,880) consented to participate and completed the baseline questionnaire.

One year later, these Airmen were contacted for follow-up. 48.8% (N=3,355) were eligible for follow-up, 50.5% (N=3,475) were ineligible, and 0.7% (N=50) withdrew from the study. Airmen were ineligible for follow-up if they were not active duty (Guard [n=655] or Reserve [n=694]), stationed overseas (n=1,142), deployed (n=282), switched to a different military branch (n=4), separated from the USAF (n=680), deceased (n=16), or incarcerated (n=2).

One month prior to the projected follow-up date, a list of participants was sent to the Defense Manpower Data Center (DMDC). DMDC returned current contact information for participants, who were invited to complete the follow-up. The one-year assessment was completed by 2,395 (71.4%) eligible Airmen, with 97% of participants responding by phone (N=2,323) and 3% by email (N=72). Our final analytic sample only included the 2,188 Airmen who provided cigarette-use data at both baseline and follow-up.

Baseline questionnaire

Demographic variables included *age* (<21 or ≥21 years old), *BMI* (weight/height²), *gender* (female, male), *marital status* (not married, married), *ethnicity* (non-Hispanic, Hispanic), *race* (white, black, Asian, other, multiple), and *education* (high school graduate/GED/vocational training post-high school, at least some college).

Tobacco use prevalence was assessed by asking history of using cigarettes smokeless tobacco, or cigars prior to BMT (Airmen were tobacco-free when surveyed). Response options ranged from “I smoked cigarettes every day and I smoked/used (tobacco product) (amount) per day/per week”, “I didn’t use cigarettes every day, but I used at least once a week”, “I didn’t use cigarettes every week but I used at least once a month”, “I used cigarettes less than once a month”, “I didn’t use cigarettes”, “I used cigarettes but quit prior to BMT.”

Follow-up Questionnaire

Cigarette use prevalence was assessed by asking Airmen about their cigarette use over the year since joining the USAF. Responses mirrored the baseline responses. Airmen were also asked if they started smoking in the past 12 months and, if they did, when they began (Technical Training, On Leave, First Duty Assignment, Deployment, Other).

Statistical analysis

Descriptive statistics of demographic and tobacco variables were computed separately by cigarette-use status at one-year follow-up. We created four cigarette-use status categories (N=2,188): (1) *individuals who never used* (no cigarette use prior to BMT and no cigarette use in the previous 12 months at follow-up; N=1,422, 65.0%); (2) *individuals who reinitiated* (no cigarette use prior to BMT and at least some (i.e., less than monthly to daily) cigarette use in the previous 12 months at follow-up; N=204, 9.3%); (3) *individuals who formerly used and remained abstinent from cigarettes* (lifetime use prior to BMT and no cigarette use in the previous 12 months at follow-up; N= 210, 9.6%); and (4) *individuals who re-initiate* (lifetime use prior to BMT and at least some cigarette use in the previous 12 months at follow-up; N=352, 16.1%). Differences in proportions of demographic variables across user groups were calculated using ANOVA for continuous variables and χ^2 -test for categorical variables.

Associations were considered significant at the alpha level of 0.05. Data were analyzed using SAS version 9.4 (SAS Institute, Cary, NC).

RESULTS

Prior to BMT, 74.3% of Airmen reported never smoking cigarettes and 25.7% reported lifetime cigarette smoking. At the one-year follow-up, 25.4% of Airmen reported cigarette smoking over the previous 12 months. Among individuals who never smoked at baseline, 87.5% (N=1,422) remained abstinent at follow-up and 12.6% (N=204) initiated cigarette smoking. Among lifetime users, 37.4% (N=210) remained abstinent and 62.6% (N=352) re-initiated cigarette smoking.

Over half (54.2%) of Airmen who reported smoking at follow-up indicated they initiated or re-initiated during Technical Training, while 27.8% reported using cigarettes at their first duty assignment. No significant differences were observed in location of first use between individuals who initiate and individuals who re-initiate ($\chi^2=7.83$, $df=4$, $p=0.10$).

Comparisons between baseline characteristics across the four user categories are presented in Table 1. Individuals who initiate tended to be younger, male, non-white, and have less education compared to the other user categories (all $p<0.05$). Individuals who had never smoked reported less use of other tobacco products prior to joining the Air Force compared to other categories ($p<.0001$).

DISCUSSION

We observed one year after BMT, 65.0% of USAF enlistees remained never smokers, 9.6% remained abstinence from cigarettes, 9.3% initiated cigarette smoking, and 16.1% reinitiated cigarette smoking. Despite the extended tobacco ban in BMT and Technical Training, 12.6% of individuals who had never smoked initiated cigarette smoking and 62.6% of individuals who smoked prior to BMT reinitiated. While our initiation rate was lower than the previously reported 15%,¹⁰ the prevalence of cigarette use at the one-year follow-up (25.1%) was slightly higher than previous estimates (24%) among active-duty populations.²

Our findings confirm that a significant amount of tobacco initiation is still occurring following enlistment into the USAF. Despite the extended ban, we observed an increase in smoking-initiation among individuals who never smoked prior to joining the USAF compared to previous research examining the shorter 6-week ban (12.6% versus 8%).⁵ This is despite the fact that the ban now extends four weeks into Technical Training, during the high risk period for smoking re-initiation. However, we did observe slightly lower levels of re-initiation among individuals who smoked prior to joining the USAF (62.6% versus 69.8%),⁵ suggesting that the extended ban may be effective in reducing re-initiation among some individuals who used tobacco prior to joining the USAF. However, it appears that the ban is less effective in reducing smoking initiation among users who reported never smoking prior to military service.

Individuals who reported prior use of smokeless tobacco or cigars, as well as dual-tobacco users were more likely to be individuals who initiated, re-initiated or formerly used. Interestingly, individuals who formerly used cigarettes also reported higher rates of smokeless tobacco and cigar use prior to joining the military, compared to individuals who

re-initiated. Although it was beyond the scope of this study, it would be interesting to know whether individuals who chose not to re-initiate cigarettes, re-initiated smokeless tobacco and cigars. Individuals who reported dual use were more likely to re-initiate, suggesting that dual use is a significant risk factor for continued tobacco use.

We also found that more than half of this initiation and re-initiation occurred during Technical Training, soon after the tobacco ban was lifted, which is consistent with previous research.⁵ Given that high rate of use rates occur despite established anti-tobacco regulations on all military bases¹¹ and an intent among the majority of Airmen to remain tobacco-free,⁷ there is a need for a deeper understanding of the unique factors associated with Technical Training that may be associated with an uptake of cigarette smoking among Airmen who expressed a desire to remain tobacco free.

Although the current sample is representative of USAF Technical Trainees, given that all other service branches have similar BMT and Technical Training phases, our results could inform tobacco policy restrictions within the other service branches. Furthermore, because nearly a quarter of a million active duty service members leave the military each year,⁴ and many continue their tobacco dependence into their civilian lives, it is important to find ways to prevent tobacco use among service members. However, the implications of this study are limited by the focus on cigarette use. With the growing prevalence of other tobacco products^{7,12} and dual- and poly-tobacco use¹³ among this population, the scope of future studies should include the range of tobacco products used by Airmen in order to develop effective interventions. Reducing cigarette use without accounting for other tobacco products is not sufficient; prevention and cessation efforts must address contemporary use patterns.¹³

Given that Airmen have been tobacco-free throughout BMT and the beginning of Technical Training, tobacco interventions during this period might be more effective.¹⁴ However, developing effective interventions tailored to this underserved population during a high-risk period necessitates a greater understanding of the predictors associated with initiation and re-initiation among military recruits. Future studies should explore factors related to tobacco use during Technical Training in order to inform the development of effective interventions for the nearly 30,000 Airmen who enlist in the USAF each year.

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Table 1.

Baseline Characteristics by Cigarette User Groups at One Year Follow-up (N=2,188)^a

	Individuals who never used (N=1880)	Individuals who initiate (N=305)	Individuals who formerly used (N=275)	Individuals who re-initiate (N=492)	p-value
Demographic Factors					
Over 21	40.30%	27.94%	47.14%	37.22%	0.0005
Male	72.36%	81.37%	77.62%	79.55%	0.0026
BMI ^b	24.16(2.52)	24.08(2.46)	24.44(2.55)	24.02(2.15)	0.2511
Married	12.17%	6.90%	15.71%	12.22%	0.0506
Hispanic	13.84%	18.81%	14.83%	10.54%	0.0563
Race					<.0001
White	66.83%	65.84%	78.85%	77.27%	
Black	17.22%	12.87%	5.77%	5.68%	
Asian	3.67%	2.97%	1.92%	3.13%	
Other	5.43%	7.92%	7.21%	5.11%	
More than one race	6.85%	10.40%	6.25%	8.81%	
Some college	52.19%	38.73%	49.52%	43.18%	0.0003
Tobacco Use History					
Pre-BMT smokeless tobacco use	7.52%	11.27%	38.10%	36.08%	<.0001
Pre-BMT cigar use	13.79%	29.41%	52.86%	51.85%	<.0001
Dual use (2 products)	6.47%	12.75%	36.67%	40.63%	<.0001

^a All figures are percentages, unless otherwise noted.

^b Mean (standard deviation)

P-values calculated with ANOVA for continuous variables and χ^2 calculated for categorical variables.