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Knowledge Gaps around Smoking and Nicotine among U.S. Military Veterans Who Smoke and Implications for Practice

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Abstract

The present study describes the knowledge about smoking and nicotine among a sample of current Iraq-/Afghanistan-era veterans who smoke ($N = 117$). A majority of participants had knowledge regarding general risks of smoking and benefits of nicotine replacement therapy. However, many participants underestimated their personal cardiovascular and cancer risk as a smoker. Many participants also inaccurately believed that nicotine causes cancer and that nicotine medications work by making one physically sick if used while smoking. These beliefs could lead to reluctance to use nicotine replacement therapy. Discussion of findings offers potential solutions in the form of patient education as well as emphasis on training healthcare providers training on best practices for patient education (beyond simple advice to quit). More nuance and detail in patient education may facilitate increased knowledge about smoking and nicotine among U.S. military veterans with the ultimate goal of increasing cessation rates.

Keywords

nicotine; tobacco; cigarettes; smoking; education; substance use; veterans; health risks; OEF/OIF/OND veterans

Introduction

In the United States (U.S.), despite using increasingly stronger language over the years to warn consumers of the harmful effects of tobacco (Center for Disease Control and Prevention, 2016), tobacco use remains a leading preventable cause of death and morbidity (U.S. Department of Health and Human Services, 2014). One population that is at high risk for smoking and its associated health consequences are U.S. veterans, among whom smoking is highly prevalent (20-35%) (Barlas, Higgins, Pflieger, & Diecker, 2013; Brown, 2010). Among U.S. military veterans, those who served in recent armed conflicts in Iraq and Afghanistan have considerable risk for tobacco use. As many as 50% of veterans returning from service in Iraq and Afghanistan using Veterans Health Administration (VHA) healthcare have a lifetime history of smoking and 24% currently smoke (Acheson, Straits-Troster, Calhoun, Beckham, & Hamlett-Berry, 2011). This group exhibits greater risk of negative smoking-related health consequences compared to non-smoking veterans (Institute of Medicine, 2009).

There are two main federal policies that have bearing on the potential for reducing smoking among Iraq- and Afghanistan-era veterans. First, the VHA provides free nicotine replacement therapy (NRT; i.e., nicotine patches, gum, lozenges) to veterans who receive VHA care (Affairs, 2006). Secondly, the Food and Drug Administration (FDA) has the ability to reduce nicotine levels in cigarettes in order to reduce smoking at the population level (U.S. Government, 2009). By reducing the nicotine levels in cigarettes, the FDA believes that cigarettes would become less addictive and ultimately reduce smoking rates (Benowitz & Henningfield, 2013; U.S. Government, 2009). However, the efficacy of these policies may be affected by veteran beliefs about nicotine and nicotine-containing products. Smokers may misunderstand the role of nicotine in smoking and smoking-related health consequences. Indeed, empirical findings from civilian populations suggest that many civilian smokers incorrectly identify nicotine as a cause of negative smoking-related health consequences (Cummings, Hyland, Giovino, Hastrup, Bauer, & Bansal, 2004; Mooney, Leventhal, & Hatsukami, 2006; Wilson, Peace, Edwards, & Weerasekera, 2011). However, while smoking and nicotine knowledge have been studied in a number of populations, this area remains understudied among U.S. military veterans.

Little is known about knowledge of nicotine and nicotine-containing products among returning veterans; therefore, data regarding beliefs and misinformation regarding smoking and nicotine are critical for developing appropriate educational and labeling information for nicotine and tobacco products. The present study addresses this gap in the literature by assessing general knowledge regarding smoking health risks and nicotine, as well as characteristics associated with knowledge, among a sample of veterans who served in the U.S. military during the era of conflicts in Iraq and Afghanistan.

Methods

Participants

Participants were Iraq-/Afghanistan-era veterans who currently smoked (defined as smoking at least 7 cigarettes over the past 7 days prior to study recruitment). Veteran patients with

current tobacco use were identified from patient records at the Durham VA Health Care System. Inclusion criteria for the study included: at least 18 years of age, enrolled at Durham VA Health Care System for ongoing medical care, served during the era of U.S. military conflicts in Iraq and Afghanistan (OEF/OIF), current smoker willing to make a quit attempt in the next 30 days, and fluent in conversational English. Exclusion criteria were: no access to telephone, severely impaired hearing or speech (i.e., inability to take part in telephone surveys), active diagnosis of a psychotic disorder, extended serious illness, and current hospitalization. Participants in the current study ($N = 117$) represent respondents with non-missing smoking and nicotine knowledge data.

Procedures

Data for the current study were gleaned from baseline data from an ongoing intervention study ([ClinicalTrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT02513069) number: NCT02513069). All study procedures were approved by the Duke University Health System and Durham VA Health Care System Institutional Review Boards. For recruitment, potential participants were sent an introductory letter signed by the Principal Investigator. The letter described the study and informed potential participants that they would be called to complete a telephone survey unless they opted out of screening. Seven business days after the mailing, veterans who had not opted out were called by a research assistant to invite participation in the study. Veterans who screened in completed informed consent via telephone, and subsequently answered survey questions over the telephone.

Measures

Demographics.—The baseline questions assessed general demographic measures including age, race, ethnicity, gender, education, marital status, employment, and income.

Smoking and Nicotine Knowledge.—Participants were administered a Nicotine Knowledge survey adapted from a measure that was originally developed for use in a national sample (Cummings, Hyland, Giovino, Hastrup, Bauer, & Bansal, 2004). The measures included three knowledge indices: health risks of smoking, safety of nicotine, and nicotine medications (i.e., nicotine patches, gum, and lozenges). Each item was scored as either correct, incorrect, or unsure. In addition, a mean knowledge score was computed for each index (average number of correct items). Incorrect and unsure responses were combined similar to prior research for data analytic purposes (Cummings, Hyland, Giovino, Hastrup, Bauer, & Bansal, 2004).

Nicotine Dependence.—Nicotine dependence was assessed with the Fagerström Test of Nicotine Dependence (FTND) (Heatherton, Kozlowski, Frecker, & Fagerström, 1991), a reliable and valid, 6-item measure with scores ranging from 0–10. Following scoring guidelines (Heatherton, Kozlowski, Frecker, & Fagerström, 1991), nicotine dependence was divided into four categories based on the total score of the FTND: Low (1–2), low-to-moderate (3–4), moderate (5–7), and high (8 or higher) dependence.

Data Analytic Plan

Sample characteristics were generated. Frequencies of correct responses to each Nicotine Knowledge question were generated. Then, for each of the three Nicotine Knowledge subscales, *t*-tests were used to examine demographic group and smoking status/history differences (age, gender, race, education, income, relationship status, employment, years smoked, daily number of cigarettes, and nicotine dependence) in each of three mean Nicotine Knowledge index score (health risks of smoking, safety of nicotine, and nicotine medications). All statistical analyses were performed using SAS Version 9.4 (SAS, Inc. Cary, NC).

Results

Sample Characteristics

Participants were well representative of the population of U.S. veterans from Iraq-/Afghanistan-era service (Table 1). Participant ages ranged from 25 to 55. The sample included women veterans (13%), racial minority veterans (35%), and veterans under the age of 30 (21%). Veterans reported a wide range in terms of their number of years smoked, average cigarettes per day, and level of nicotine dependence.

Health Risks of Smoking

This sample of Iraq-/Afghanistan-era veterans who smoke generally understood the health risks of smoking (Table 2). Most participants correctly identified that smoking cigarettes has been proven to cause cancer (80%), smoking without inhaling is still just as dangerous (93%), more than 1 out of 10 smokers die because of smoking (71%), smoking only 5 cigarettes per day does not make one's risk of cancer the same as someone who never smokes (78%), and smoking cigarettes increases their risk of lung of cancer (74%). Despite this general knowledge about smoking risks, only 59% of participants believed that their own risk of cancer was higher than other people in their age group. Similarly, only 50% believed that their risk of having a heart attack was higher than other people in their age group.

Safety of Nicotine

As shown in Table 2, the majority of participants knew that the reduction of nicotine in cigarettes did not make cigarettes less dangerous (91%) and that low nicotine cigarettes are not less addictive than regular cigarettes (91%). However, over half of participants (56%) either incorrectly believed that nicotine causes cancer or did not know whether or not this was true.

Nicotine Medications

As shown in Table 2, most participants knew that nicotine medications, like the patch and gum, improve a smoker's chance of quitting successfully (82%). However, only two thirds of participants knew that nicotine medications do not completely eliminate the urge to smoke (67%). Over half of participants either incorrectly believed or were not sure whether nicotine medications work by making a person physically sick if they used them and

concurrently smoked. Only two thirds of participants knew that compared to cigarettes, nicotine patches and gum have lower risk for addiction. Additionally, only 61% of participants knew that nicotine patches are less likely than cigarettes to cause a heart attack.

Group Differences in Knowledge

In general, there were few differences in knowledge by demographic group (see Table 3). With respect to nicotine safety knowledge, participants who identified as White scored marginally higher than Non-White participants, 2.3 vs. 2.1, $t(115) = 1.81$, $p = .074$; and participants with an Associate's degree or higher scored marginally higher than those without a college degree, 2.4 vs. 2.2, $t(115) = -1.80$, $p = .075$. There were no other demographic differences in any index of smoking knowledge.

Discussion

The present study described a sample of U.S. Iraq- and Afghanistan-era veterans who smoke. Most of the sample accurately identified cigarette smoking as a risk for a variety of health conditions. However, most participants misattributed nicotine as being a potential cause of cancer and a substantial percentage of participants did not understand nicotine medications and how their use affects health and quit attempts. These findings are consistent with other studies of civilian smokers (Bansal-Travers, Cummings, Hyland, Brown, & Celestino, 2010; Cummings, Hyland, Giovino, Hastrup, Bauer, & Bansal, 2004; Shiffman, Ferguson, Rohay, & Gitchell, 2008). Additionally, previous research has found universal concerns about the safety of nicotine medications, particularly regarding addictive potential (Carpenter, Ford, Cartmell, & Alberg, 2011; Shiffman, Ferguson, Rohay, & Gitchell, 2008; Vogt, Hall, & Marteau, 2008). Similar to the current study, Carpenter and colleagues (2011) also found that some smokers believed that NRT worked by making you sick when smoking cigarettes.

The current study did not detect any demographic group differences in knowledge of health risks of smoking and nicotine medications, although race and education were marginally associated with knowledge of nicotine safety. This finding differs from previous research, which has detected age and race differences in smoking knowledge (Carpenter, Ford, Cartmell, & Alberg, 2011; Cummings, Hyland, Giovino, Hastrup, Bauer, & Bansal, 2004). Similar to previous research (Carpenter, Ford, Cartmell, & Alberg, 2011; Cummings, Hyland, Giovino, Hastrup, Bauer, & Bansal, 2004), the average age of participants was between mid-thirties to early forties with a smaller number of participants younger than 30-years old. However, the age range of participants was narrow (i.e., 25-55) suggesting that developmental similarities among mostly young veterans may explain why we did not detect an age difference in smoking and nicotine knowledge among Iraq- and Afghanistan-era veterans who smoke, unlike the general U.S. population of smokers. The difference in results could be caused by a cohort effect as the smoking prevalence in the U.S. has steadily decreased over the past few decades (Islami, Torre, & Jemal, 2015). Specifically, after the health effects of smoking became known in the 1950s and early 1960s, the high smoking prevalence shifted to older generations and individuals of younger generations became more

likely to quit and less likely to initiate smoking (Garrett, Dube, Winder, Caraballo, Centers for Disease, & Prevention, 2013).

Findings regarding inaccurate beliefs regarding nicotine and NRT are concerning, since these misconceptions have the potential to decrease interest in and use of efficacious NRT for smoking cessation (Mooney, Leventhal, & Hatsukami, 2006). Confusion regarding the role of nicotine in smoking-related health risks is not surprising in light of public health campaigns that broadly discourage the use of tobacco products without distinguishing between the negative effects of combustion of the chemicals and tar in cigarettes and nicotine itself. In order to correct misconceptions, it is necessary to train a variety of healthcare providers to proactively educate patients regarding nicotine and NRT. Appropriate healthcare workers include primary care providers, nurses, pharmacists, and specialty care providers (e.g., mental health, pulmonology, dental, and cardiology). Patients will likely benefit from more nuanced explanations of the risks of smoking, as well as the side effects of NRT. Explicit information regarding the relative safety of NRT compared to smoking is recommended. Future research in this area could test for efficacy of varying strategies of VHA patient education surrounding nicotine safety, and how this education may affect veterans' willingness to use NRT for a quit attempt.

There are limitations associated with this study. Given the descriptive nature of the study there were no experimental manipulations or interventions tested. While the nicotine knowledge measure assumed that participants knew they were comparing themselves to other people in their age group who did not smoke, it is possible that participants could have compared themselves to other people in their age group who also smoke. Findings from this study may not reflect the broader population (i.e., all adult smokers), but provide important insight into the U.S. veterans who served during the Iraq-/Afghanistan-conflict era. Sample size may have contributed to type II error in group difference testing of outcome variables. There are also some strengths of the current study, including the innovative use of a measure used to target nicotine knowledge, and inclusion of a veteran sample with representation of women and racial minority veterans.

In conclusion, Iraq- and Afghanistan-era veterans have broad knowledge of smoking health risks. However, there is still a need for better VHA patient education surrounding personal risks of being a smoker, why smoking imparts health risk, effects of nicotine, and how NRT works. This type of education may increase veterans' readiness to quit as well as their willingness to use this efficacious resource that is provided free of charge from VHA.

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Table 1:

Sample Characteristics

Variable	<i>n</i>	%
Gender		
Men	102	87%
Women	15	13%
Race		
White	76	65%
Black/African-American	27	23%
Other	14	12%
Age		
< 30	25	21%
30	92	79%
Income		
< \$30,000	38	32%
\$30,000	79	68%
Relationship status		
Married	52	44%
Divorced/Separated	40	34%
Single, never married	25	21%
Highest Education		
High school degree/GED	18	15%
Trade school/college courses (no degree)	57	49%
Associate's/bachelor's/graduate degree	42	36%
Work Status		
Working (Full- or Part-time)	72	62%
Unemployed	11	9%
Student	11	9%
Retired	7	6%
Disabled	16	14%
Number of years smoked		
0-9	20	17%
10-19	58	50%
20-29	26	23%
30+	11	10%
Average number of daily cigarettes		
5-9	16	16%
10-19	30	30%
20-29	48	48%
30-40	7	7%
Nicotine Dependence		
Low	33	28%

Variable	<i>n</i>	%
Low to moderate	44	38%
Moderate	36	31%
High	4	3%

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Table 2:

Smoking and Nicotine Knowledge Indices, N = 117

Knowledge Item (Correct Response)	Correct <i>n</i> (%)	Incorrect <i>n</i> (%)	Not Sure <i>n</i> (%)
Index 1: Health Risks of Smoking			
1. Do you think your risk of having a heart attack is higher, lower, or about the same as other (men/women) your age? (Higher)	58 (50%)	56 (48%)	3 (3%)
2. Do you think your risk of cancer is higher, lower, or about the same as other (men/women) your age? (Higher)	69 (59%)	48 (41%)	0 (0%)
3. Do you think your risk of lung cancer is higher, lower, or about the same as other (men/women) your age? (Higher)	86 (74%)	31 (27%)	0 (0%)
4. Cigarettes still have not been proven to cause cancer. (Disagree)	94 (80%)	17 (15%)	6 (5%)
5. If a person smokes only 5 cigarettes per day, their chances of getting cancer from smoking are about the same as someone who never smokes. (Disagree)	91 (78%)	25 (21%)	1 (1%)
6. Only about 1 out of 10 smokers die because of smoking. (Disagree)	83 (71%)	24 (21%)	10 (9%)
7. If you don't inhale, smoking is not really dangerous. (Disagree)	109 (93%)	8 (7%)	0 (0%)
Index 2: Safety of Nicotine			
1. Has the reduction of nicotine made cigarettes less dangerous to the smoker? (No)	107 (91%)	6 (5%)	4 (3%)
2. Nicotine is a cause of cancer. (No)	52 (44%)	51 (44%)	14 (12%)
3. The claim that a cigarette brand is low in nicotine means that it is less addictive. (Disagree)	106 (91%)	10 (9%)	1 (1%)
Index 3: Nicotine Medications			
1. Are nicotine patches more likely, about the same, or less likely to cause someone to become addicted as regular cigarettes? (Less likely)	73 (62%)	31 (27%)	13 (11%)
2. Is nicotine gum more likely, about the same, or less likely to cause someone to become addicted compared to regular cigarettes? (Less likely)	77 (66%)	27 (23%)	13 (11%)
3. Are nicotine patches more likely, about the same, or less likely to cause someone to have a heart attack as cigarettes? (Less likely)	71 (61%)	38 (32%)	8 (7%)
4. Nicotine medications work by completely eliminating the urge to smoke. (Disagree)	78 (67%)	36 (31%)	3 (3%)
5. Nicotine medications work by making you physically sick if you take them and smoke at the same time. (Disagree)	46 (39%)	66 (56%)	5 (4%)
6. It is easy to get addicted to nicotine gum. (Disagree)	69 (59%)	37 (32%)	11 (9%)
7. Nicotine medications like the patch and the gum improve a smoker's chances of quitting successfully. (Agree)	96 (82%)	17 (14%)	4 (3%)

Table 3:

Demographic Differences in Nicotine Knowledge Indices

	Smoking Risk Knowledge (Possible Range 0-7) <i>M (SD)</i>	Nicotine Safety Knowledge (Possible Range 0-3) <i>M (SD)</i>	Nicotine Medication Knowledge (Possible range 0-7) <i>M (SD)</i>
Gender			
Men	5.0 (1.6)	2.3 (0.6)	4.4 (1.7)
Women	5.7 (1.3)	2.1 (0.6)	4.1 (1.6)
Race			
White	5.0 (1.6)	2.3 (0.6) [†]	4.4 (1.6)
Non-White	5.1 (1.7)	2.1 (0.6) [†]	4.3 (1.8)
Age			
< 30	5.2 (1.4)	2.2 (0.6)	4.1 (1.4)
30	5.0 (1.7)	2.3 (0.6)	4.4 (1.7)
Income			
< \$30,000	5.0 (1.5)	2.3 (0.6)	4.5 (1.8)
\$30,000	5.1 (1.7)	2.2 (0.6)	4.3 (1.6)
Relationship status			
Married/Living as Married	5.2 (1.7)	2.2 (0.7)	4.5 (1.8)
Not Married	4.9 (1.6)	2.3 (0.6)	4.2 (1.6)
Highest Education			
No college/graduate degree	5.0 (1.4)	2.2 (0.7) [†]	4.2 (1.8)
College/graduate degree	5.0 (2.0)	2.4 (0.6) [†]	4.7 (1.4)
Work Status			
Working (Full-, Part-time, or Student)	5.1 (1.6)	2.3 (0.7)	4.1 (1.6)
Not Working (Retired or Disabled)	5.0 (1.6)	2.3 (0.6)	4.5 (1.7)
Years smoked			
< 10 years	5.1 (1.2)	2.1 (0.7)	3.9 (1.4)
10 years	5.0 (1.7)	2.3 (0.6)	4.5 (1.7)
Average daily cigarettes			
< 1 pack	5.1 (1.6)	2.3 (0.6)	4.2 (1.8)
1 pack	5.0 (1.6)	2.3 (0.6)	4.5 (1.6)
Nicotine dependence			
Low to moderate	5.0 (1.7)	2.3 (0.6)	4.3 (1.6)
Moderate to high	5.1 (1.5)	2.2 (0.6)	4.5 (1.7)

Note: Group differences were tested using *t*-tests.

[†]
p < .10