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Smoking in Help-Seeking Veterans with PTSD Returning from Afghanistan and Iraq

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Abstract

Past research has shown that veterans and individuals with posttraumatic stress disorder (PTSD) have increased rates of smoking. However, the rates of smoking in younger help-seeking veterans returning from Afghanistan and Iraq, and possible correlates of smoking among this population are unknown. In this study, we evaluated the rate of lifetime and current smoking among a sample of 90 returning male veterans diagnosed with PTSD. Fifty-nine percent reported a lifetime history of smoking including 32% that were current smokers. Current smokers were significantly younger than nonsmokers. Current smokers (mean age = 31) reported a mean age of smoking onset as 15.86 with a pack year history of 8.89. These smokers reported on average five previous quit attempts. According to a stages-of-change model, one-half of the smokers were in the contemplation phase of stopping smoking (50%), 29% were in the precontemplation phase and 21% were in the preparation phase. The results are placed in the context of non-psychiatric and psychiatric smokers.

Keywords

Cigarette smoking; Posttraumatic stress disorder; Combat veterans; Comorbidity

1. Introduction

Cigarette smoking accounts for 440 000 deaths per year in the United States (Centers for Disease Control and Prevention, 2002). Healthcare use is increased in cigarette smokers due to increased morbidity from cardiovascular diseases, stroke, chronic bronchitis, emphysema, and cancer (Hayes, Dale, Hurt, & Croghan, 1999). People with psychiatric disorders smoke more than those in the general population. Despite representing 22% of the adult population in the United States, individuals with psychiatric conditions consume 44% of all cigarettes sold in the United States (Lasser et al., 2000). Between 50% and 80% of people suffering from a

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mental illness smoke, while less than 40% of those who have never had a mental illness smoke (Lasser et al., 2000). There is a high rate of cigarette smoking among individuals with posttraumatic stress disorder (PTSD, 40%–60%), and these individuals are also more likely to be heavy smokers (i.e., smoking 20 or more cigarettes per day; Beckham, 1999; Beckham et al., 1997; Feldner, Babson, & Zvolensky, 2007). In a large study of individuals enrolled in a health maintenance organization (HMO), PTSD was associated with a fourfold increase in the odds ratio of smoking (Breslau, Davis, & Schultz, 2003). There may be differences among individuals with PTSD from different trauma exposures. For example, Vietnam veterans represent a cohort at a particular time in history (e.g., the deleterious effects of smoking were not widely publicized, cigarettes were given out free with C rations) and thus may limit the previously reported findings to this cohort.

Veterans also have an increased rate of cigarette smoking compared to the general population (33% vs 23% respectively, Collie, Clancy, Yeatts, & Beckham, 2004). Military deployment has been related to smoking initiation and increases in cigarette consumption among those who smoke. For example, a report of tobacco use habits in United States Naval personnel serving in the first Gulf War showed that 7% of individuals started smoking for the first time, and 56% of pre-existing smokers increased their consumption of cigarettes while deployed (Forgas, Meyer, & Cohen, 1996). Similarly, in a study of British military personnel deployed to Iraq, smoking rates increased by 9% with deployment while 29% of pre-existing smokers increased their consumption of cigarettes while deployed (Boos & Croft, 2004). There is one recent report of the current smoking rate among veterans returning from Afghanistan (Operation Enduring Freedom; OEF) and Iraq (Operation Iraqi Freedom; OIF) based on data from the Survey of Healthcare Experiences and Patients (SHEP) that estimated a current smoking rate of 25%, and lifetime rate of 50% (Straits-Troster, Calhoun, Kudler, and Jones (2007).

Because smoking during military service is reported to be associated with lifelong increased cigarette consumption (Feigelman, 1994; Klevens, Giovino, Pedicord, Nelson, & Mowery, 1995), smoking cessation efforts in this population are of particular importance. Current Department of Veterans Affairs' policy mandates that smoking cessation treatment be made available without restriction at all VA sites. Miller and colleagues (1999) have reported that when asked, 60–70% of veterans who smoke expressed an interest in stopping smoking. Readiness to quit using the stages of change model (Prochaska & DiClemente, 1983) has been determined to be a modest but reliable predictor of smoking cessation (Abrams, Herzog, Emmons, & Linnan, 2000). The stages of change model classifies smokers into a five-stage "ladder." The stages are precontemplation (no plan to stop smoking), contemplation (intent to quit in the next 6 months), preparation (intent to quit in next month), action (current quit attempt with less than six months' abstinence), and maintenance (abstinence for more than six months). Advancement up the readiness "ladder" from precontemplation to contemplation has been associated with a 40% increase in likelihood of smoking cessation within two years. Advancement from precontemplation to preparation has been associated with an 80% increase in likelihood of smoking cessation within two years.

Only a few studies have examined readiness to quit in smokers with psychiatric disorders. In a study of readiness to quit in smokers with depressive disorders, Prochaska, Rossi, and colleagues (2004) reported that depressive smokers were a heterogeneous group with regards to their readiness to quit. More than half of their sample was in the contemplation stage (i.e., intending to quit in the next 6 months), about one-quarter was in the pre-contemplation stage (i.e., with no immediate intention to stop smoking), and one-quarter was in the preparation stage (i.e., considering quitting in the next month with at least one quit attempt in the past year). In addition, depressive symptom severity was unrelated to stages of change.

The stages of change model for readiness to stop smoking has been applied by Prochaska and colleagues in several different patient populations including smokers in general (Prochaska & DiClemente, 1983), smokers with major depressive disorder (Prochaska, Delucchi, & Hall, 2004), and smokers with co-morbid alcohol and substance abuse disorders (Prochaska, Rossi, et al., 2004). One study applying the model to Vietnam veterans with PTSD and their readiness to change alcohol use and anger (Rosen et al., 2001) found that veterans with PTSD varied in their readiness to change, and that readiness to change was unrelated to PTSD symptom severity. To date, there has been no evaluation of a stages of change model in veterans with PTSD returning from Iraq and Afghanistan, and since this group is typically younger and may be more likely to use VA services (Seal, Bertenthal, Miner, Sens, & Marmar, 2007) it may be useful to evaluate the stages of change model in this cohort.

The purpose of this descriptive study was to evaluate the rate of lifetime and current smoking among a sample of OEF/OIF male veterans diagnosed with PTSD and explore demographics and clinical variables that differentiate PTSD smokers from non-smokers. Further, the relationship between PTSD symptom severity and smoking was examined among those who smoke. In addition, we examined readiness to quit, PTSD symptom severity as related to smoking behaviors and readiness to quit, and comorbidity in smoking.

2. Method

2.1 Participants

Ninety consecutive male OEF/OIF veterans who presented to a VA Outpatient PTSD Clinic for evaluation and treatment of PTSD symptoms and were diagnosed with PTSD were included in the study sample. As part of their clinic evaluation, veterans completed self-report measures and a psychiatric interview as described below.

2.2 Procedures

The Clinician Administered PTSD Scale (CAPS; Blake et al., 1995) was used to evaluate PTSD. The CAPS is a clinical structured interview that evaluates symptom frequency and severity. PTSD symptoms were considered present based on the CAPS Frequency ≥ 1 /Intensity ≥ 2 rule (Blake et al., 1995), which has been shown to provide good diagnostic utility (Weathers, Keane, & Davidson, 2001). Raters received training on the CAPS and all evaluations were supervised by a licensed clinical psychologist. Inter-rater reliability among the raters was excellent ($\kappa=.93$). The major depressive disorder module of the Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1994) was used to assess for major depressive disorder. No other Axis I diagnoses were routinely assessed. Raters received standardized SCID training, and evaluations were supervised by a licensed clinical psychologist.

The Beck Depression Inventory is a well established, valid, and reliable 21-item self-report measure that assesses current depressive symptomatology (BDI; Beck, Steer, & Brown, 1996). The Davidson Trauma Scale (DTS; Davidson et al., 1997) is a 17-item self-report inventory designed to assess PTSD symptoms in individuals with a history of trauma. The measure, which was developed to correspond to DSM-IV PTSD diagnostic criteria, offers a rating of both symptom frequency and severity and results in a total PTSD severity score. In addition, a recent confirmatory factor analytic study (cite McDonald et al in Press) supported the validity of 4 subscales that largely correspond to DSM-IV PTSD diagnostic clusters including (cluster B re-experiencing symptoms; cluster C symptoms, avoidance symptoms; Cluster C numbing symptoms; and cluster D hyperarousal symptoms.). The scale has strong reliability and validity with CAPS ratings (Davidson et al., 1997).

As part of their diagnostic evaluation, participants provided information about level of education and current occupation, which is summarized as an overall measure of socioeconomic status in the Hollingshead Index score (Hollingshead & Redlich, 1958). Lower scores on the Hollingshead Index indicate higher socioeconomic status. Participants also completed the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Puente, & Grant, 1993). This ten item measure assesses three factors: alcohol consumption, alcohol dependence, and adverse consequences of alcohol use. The range of possible scores is 0 to 40, with higher scores indicating increased probability of an alcohol use disorder. Participants' exposure to combat was measured using the Combat Exposure Scale (CES; Keane et al., 1989). The CES is a 7-item Likert scale with strong internal stability and test-retest reliability.

Participants' trauma history was measured with the Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000). The TLEQ is a 24-item questionnaire designed to evaluate exposure to traumatic events. Participants were asked how many times they had experienced each of 22 types of potentially traumatic events, and for each event endorsed, they were asked if the event caused fear, helplessness, or horror. For the purposes of this study, participants were considered to have had a traumatic event if they endorsed that they had experienced the potentially traumatic event and that it caused a response of fear, helplessness, or horror. The 22 types of potentially traumatic events were summarized into seven main categories: 1) accident or disaster (motor vehicle accident, natural disaster, other serious accident); 2) attack (witnessing a beating or killing, abuse by a partner, being stalked, robbery, being beaten by a stranger); 3) personal trauma (life-threatening illness, miscarriage, abortion, death of close friend or loved one); 4) childhood violence (witnessing family violence, physical punishment); 5) childhood sexual abuse/assault; 6) adult sexual abuse/assault; and 7) military combat trauma.

Participants' current smoking was measured with the Fagerström Test for Nicotine Dependence (FTND; Heatherton, Kozlowski, Frecker, & Fagerström, 1991). The FTND is a widely used, six-item measure of nicotine dependence, with a range of scores from 0 to 10. The participants' readiness to stop smoking was assessed using a stages of change questionnaire (Prochaska & DiClemente, 1983). The stages of change questionnaire for cigarette smoking classifies the readiness of smokers to quit into a series of 5 stages. The precontemplation stage included veterans with no immediate intention to stop smoking, the contemplation stage included veterans intending to quit in the next 6 months, the preparation stage included veterans considering quitting in the next month with at least one quit attempt in the past year, the action stage included veterans who quit smoking for less than 6 months, and the maintenance stage included veterans who had been smoke free for at least 6 months.

2.2 Analyses

Bivariate associations between current smoking status and various demographic (e.g., age, race, marital status) and clinical variables (e.g., trauma history; PTSD severity, depression) were calculated using chi-square and analysis of variance (ANOVA) as appropriate. Multivariate logistic regression was used to examine the independent association of demographic and clinical variables with current smoking status. Variables that were found to be statistically significant ($p < .05$) in bivariate results were included in the logistic regression model. Similar analyses examined the relationship of demographic and clinical variables to readiness to quit smoking among current smokers.

3. Results

A summary of demographic information by smoking status, including age, minority status, marital status, and socioeconomic status can be found in Table 1. Table 1 also contains mean

PTSD symptom totals and B, C, and D subset scores as well as smoking characteristics for current smokers, such as pack years smoked, age began smoking, and FTND scores.

Thirty-two percent ($n=29$) were current smokers and 68% ($n=61$) were non-smokers. Of the 61 non-smokers, 24 (27% of the original sample) had a lifetime history of smoking, and 37 (41% of the original sample) had never smoked. Among current smokers, the average age of smoking onset was 15.86 ($SD = 2.91$) years, and average pack years smoked was 8.89 ($SD = 9.58$). Average FTND scores were relatively low at $M = 4.41$ ($SD = 2.17$), and 52 percent of current smokers reported FTND scores in the low to very low range (≤ 4 , (Heatherton et al., 1991). The number of times quit in the past was a mean of 5.13 ($SD = 6.87$). Fifty percent were heavy smokers who reported smoking ≥ 20 cigarettes per day. Current smokers were significantly younger than nonsmokers and had significantly less education.

Of the 90 participants, 88 subjects identified their primary, or index, trauma as a combat-related trauma, and 2 subjects (one current smoker, one non-smoker) identified their trauma as a non-combat, military-related trauma. There were no significant differences between smokers and non-smokers on the number of trauma categories endorsed on the TLEQ, $X^2(1, N = 90) = 0.18$, $p = .29$. Smokers reported a mean number of traumatic events of 2.52 ($SD = 1.30$), and non-smokers reported a mean number of traumatic events of 2.21 ($SD = 1.42$).

Results suggested that that severity of PTSD symptoms were related to current smoking status. Current smokers had significantly higher PTSD C-cluster symptoms on both the CAPS, $F(1, 89) = 6.35$, $p = .01$, and the DTS, $F(1, 89) = 5.44$, $p = .02$. In analysis of PTSD DTS C-cluster symptoms, current smokers had significantly higher numbing symptoms, but there were no detected differences in the C-cluster avoidance symptoms (see Table 1). Smokers also reported higher total BDI scores, $F(1, 88) = 5.14$, $p = .03$. In a multivariate logistic regression entering age, depression, and PTSD (CAPS) symptom clusters, only age was uniquely associated with current smoking status, OR = .923 (95% CI; .868-.981), $p = .01$. This may be a function of shared variance between depression and PTSD C-cluster symptoms ($r = .38$, $p = .0003$). In a separate logistic regression model controlling for age and CAPS C-cluster symptoms, both age, OR = .921 (95% CI; .866-.979), $p = .008$, and CAPS C-cluster symptoms, OR = 1.072 (95% CI; 1.002-1.147), $p = .04$, were associated with smoking. Similarly, in a separate model controlling for age and depression, age was associated with current smoking, OR = .921 (95% CI; .867-.978), $p = .008$, and there was a trend for depression being associated with current smoking, OR = 1.044 (95% CI; .998-1.092), $p = .058$.

One-half (50%) of the current smokers were in the contemplative phase of stopping smoking (intending to quit in the next 6 months but not the next 30 days), while 29% of current smokers were in the pre-contemplative phase (with no immediate intention to stop smoking in the next 6 months), and only 21% were in the preparation phase (considering quitting in the next month with a report of at least one quit attempt in the past year). Stage of change was unrelated to PTSD severity, OR = 1.012 (95% CI; .967-1.059), $p = .61$. Smoking severity as measured by the FTND was associated with being in an earlier stage of change, $F(2,25) = 3.56$, $p = .05$. Smokers with higher levelsof nicotine dependence were less likely to be in a stage of preparation for quitting smoking, OR = .517 (95% CI; .277-.965), $p = .04$. Among current smokers, a higher number of quit attempts was correlated with higher CAPS total scores ($r = .48$, $p = .02$), higher DTS total scores ($r = .45$, $p = .03$), and higher DTS C-cluster symptoms ($r = .44$, $p = .03$).

4. Discussion

Among male veterans with PTSD returning from Iraq or Afghanistan current smoking rates were 29%. The smoking rate in the US population is estimated to be 23% (Centers for Disease

Control and Prevention, 2007). Smoking rates of 33% in veterans have been reported (Collie et al., 2004) and reports of smoking rates in Vietnam veterans have ranged from 40% (Lasser et al., 2000) to 60% (Beckham et al., 1995; Hapke et al., 2005). This report is the first, to our knowledge, to report the rate of cigarette smoking in veterans with PTSD returning from Iraq or Afghanistan. Most reports of the high rate of cigarette smoking among veterans diagnosed with PTSD have been reported with Vietnam veterans (Feldner et al., 2007). The rate of heavy cigarette smoking (≥ 20 cigs/day) within smokers in the current study (50%) is similar to the rate reported in a previous study with Vietnam veterans with PTSD (48%; Beckham et al., 1997). One-half of the current smokers expressed intention to quit during the next six months (contemplation), while thirty-two percent of current smokers had no immediate plan to quit (pre-contemplation). This stage distribution is similar to that reported by Prochaska, Rossi, et al. (2004). In a sample of smokers with depressive symptoms, 55% were in the contemplation stage, and 21% were in pre-contemplation. In addition, the current study suggested that greater nicotine dependence is associated with less willingness to quit. As in smokers without psychiatric disorders, there is variance in these smokers' readiness to quit, suggesting that a stages of change approach may be of benefit in treating these smokers.

In a study of readiness to quit in smokers with depressive disorders, Prochaska, Rossi, and colleagues (2004) reported that depressive symptom severity was unrelated to stages of change. Similarly, in the present study, PTSD symptom severity was unrelated to stages of change for smoking cessation. Veterans in the current sample tended to be in a stage of contemplation and precontemplation, and higher levels of nicotine dependence were associated with being in an early stage of change. Smokers with higher levels of nicotine dependence were less likely to be preparing to quit. Given that smoking cessation clinical guidelines recommend tailoring treatment to patients' readiness to quit (Prochaska, Rossi, et al., 2004), smoking cessation for veterans may need to include interventions to increase motivation within these early stages of change. In addition, smoking cessation treatment integrated with PTSD treatment has been shown to be more efficacious in reducing smoking among smokers with PTSD compared to smoking cessation specialty clinic treatment (McFall et al., 2007).

In the present study, veterans who were younger and had higher CAPS C-cluster symptoms were more likely to smoke. Veterans' smoking may be an attempt to reduce or regulate PTSD symptoms (Dennis, Clancy & Beckham, 2007; Beckham et al., in press; Gelenberg, Leon, Evins, Parks, & Rigotti, 2007). In a laboratory study, Beckham and colleagues showed that PTSD symptoms were reduced after smoking in veterans who had been exposed to traumatic and general stress cues in a controlled setting (Beckham et al., 2007). Furthermore, *ad lib* studies have shown that PTSD smokers are more likely to smoke when experiencing a PTSD symptom, (Beckham et al., 2005; Beckham et al., in press), and report a significant reduction in negative affect following smoking (Beckham et al., in press). Results of the present study suggest that increased PTSD symptoms and PTSD C-cluster symptoms are associated with an increased number of quit attempts, suggesting that veterans with PTSD may make more unsuccessful quit attempts. Taken together, these results suggest that careful attention to PTSD symptoms in smoking cessation treatment for these individuals is warranted.

Results of this study point to the pressing need of finding effective strategies for smoking cessation for this group of veterans in order to prevent the significant smoking rates and associated morbidity that have been reported in Vietnam veterans with PTSD. Given the efforts of the Department of Veterans Affairs to mandate the availability of smoking cessation treatments at VA facilities, and the need to prevent the long lasting negative health effects of chronic smoking, understanding possible barriers to quitting smoking and the reasons and factors that contribute to the smoking of veterans with PTSD is essential.

The present study has several limitations. The results are based on a small sample. Generalizations made from this sample are tentative given the small sample size, and the absence of women in the sample. Additionally, the help-seeking veterans who participated in this study were living in the southeastern United States, where the prevalence of smoking is somewhat higher than in other areas of the country. Co-morbid psychiatric symptoms such as depression also need to be further investigated. Future studies could address these shortcomings.

Findings from the present study are consistent with results that suggest help seeking veterans returning from Iraq have multiple clinical problems (Seal, et al., 2007), including smoking. The co-occurrence of PTSD and cigarette smoking (along with possible alcohol use disorders) are likely to make smoking cessation particularly difficult for these veterans. It will be endemic upon those of us who serve this population to address cigarette smoking as one of multiple conditions in order to prevent further negative health consequences over their life trajectories.

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Table 1

Demographic Information by Group

Variable	Current Smokers <i>n</i> = 29			Non-Smokers <i>n</i> = 61			Test statistic
	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>	%	
Age	28.34	7.11		34.82	9.83		<i>t</i> (88) = 3.17, <i>p</i> = .002
Education	12.76	1.41		13.87	2.00		<i>t</i> (88) = 3.03, <i>p</i> = .003
Socioeconomic status ¹	55.24	9.63		52.12	11.81		<i>t</i> (87) = -1.33, <i>ns</i> χ^2 (5, <i>N</i> = 90) = 8.20, <i>ns</i>
Race							
% White			62			46	
% African-American			21			44	
% Hispanic			7			7	
% Other			10			3	
Marital Status							
% Married			52			62	χ^2 (2, <i>N</i> = 90) = 0.91, <i>ns</i>
% Divorced/separated			17			13	
Current MDD from interview			52			39	
CES	22.41	7.47		20.99	9.00		χ^2 (1, <i>N</i> = 90) = 1.22, <i>ns</i>
BDI	33.13	11.96		27.81	9.55		<i>F</i> (1, 89) = 0.54, <i>ns</i>
DTS total score	95.63	19.78		90.20	22.42		<i>F</i> (1, 88) = 5.14, <i>p</i> = .03
DTS B symptoms	24.59	7.39		27.81	9.55		<i>F</i> (1, 89) = 1.24, <i>ns</i>
DTS C symptoms	39.35	9.92		34.47	10.37		<i>F</i> (1, 89) = 0.01, <i>ns</i>
DTS C avoidance	10.07	4.18		9.78	4.05		<i>F</i> (1, 89) = 4.48, <i>p</i> = .04
DTS C numbing	28.65	6.88		24.68	7.85		<i>F</i> (1, 89) = 0.94, <i>ns</i>
DTS D symptoms	31.69	6.71		31.31	6.06		<i>F</i> (1, 89) = 5.44, <i>p</i> = .02
CAPS total score	90.69	15.55		82.87	19.88		<i>F</i> (1, 89) = 0.07, <i>ns</i>
CAPS B symptoms	23.83	7.04		21.56	8.74		<i>F</i> (1, 89) = 3.47, <i>ns</i>
CAPS C symptoms	37.17	6.71		32.66	8.47		<i>F</i> (1, 89) = 1.49, <i>ns</i>
CAPS D symptoms	29.69	5.47		28.66	5.82		<i>F</i> (1, 89) = 6.35, <i>p</i> = .01
Pack years smoked, ^{2,3}	8.89	9.58		6.45	11.23		<i>F</i> (1, 89) = 0.64, <i>ns</i>
Age started to smoke ³	15.86	2.95		17.05	5.56		<i>F</i> (1, 47) = 0.64, <i>ns</i>
AUDIT total score	8.93	8.03		7.02	7.59		<i>F</i> (1, 49) = 0.94, <i>ns</i>
% scored 8 or greater on AUDIT	5.12	6.88	41	4.55	6.62	33	<i>F</i> (1, 89) = 1.21, <i>ns</i>
# Quit attempts ³	4.41	2.17	50		NA		χ^2 (1, <i>N</i> = 90) = 0.63, <i>ns</i>
FTND					NA		<i>F</i> (1, 45) = 0.08, <i>ns</i>
% Heavy smokers (≥ 20 cigs/day)					NA		

Note: NA = not applicable; BDI = Beck Depression Inventory; DTS = Davidson Trauma Scale; CAPS = Clinician Administered PTSD Scale; FTND = Fagerström Test for Nicotine Dependence.

¹ Socioeconomic status was measured using the Hollingshead Index.

² Pack years smoked = (average cigarettes per day) × (number years smoked) / 20.

³ Smoking variable values for ex-smokers included in non-smokers category.