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Nicotine Dependence in US Military Veterans: Results from the National Health and Resilience in Veterans Study

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Abstract

Background: Veterans are a unique population that may be at increased risk of tobacco use disorder and nicotine dependence (ND). We analyzed data from the National Health and Resilience in Veterans Study (NHRVS), a large nationally representative sample of US veterans, in order to more fully understand the prevalence and correlates of lifetime ND in US Veterans.

Methods: Descriptive statistics were conducted to summarize health and functioning/quality of life characteristics among veterans with and without lifetime ND. Hierarchical binary logistic regression analyses were conducted to evaluate the relationship between ND and psychiatric and physical health variables.

Results: Compared with veterans without lifetime ND, veterans with lifetime ND were more likely to screen positive for several lifetime psychiatric disorders including current alcohol use disorder (odds ratio [OR] 2.79 [95% confidence interval [CI] 2.23, 3.49]), depression (OR 1.86 [1.38, 2.50]), and PTSD (OR 1.68 [1.14, 2.47]). From a medical standpoint, they were more likely to endorse having kidney disease (OR 4.18 [2.55, 6.86]), heart attack (OR 2.09 [1.51, 2.89]), and rheumatoid arthritis (1.90 [1.20, 3.00]) in addition to other conditions. They scored lower in overall physical functioning and higher in somatization symptoms.

Conclusions: Veterans with lifetime ND in the NHRVS survey were more likely to have psychiatric and medical conditions and lower physical functioning compared with Veterans without lifetime ND. Veterans with lifetime ND may therefore require a comprehensive and integrated approach to care that includes attention to co-morbid illness in addition to drug addiction.

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INTRODUCTION

Nicotine dependence (ND) and is commonly manifested in the form of cigarette smoking, which delivers nicotine rapidly and in high concentrations to the brain. Despite trends of decreasing cigarette smoking in the general population (Jamal et al. 2015), smoking continues to be a leading cause of morbidity and mortality (National Center for Chronic Disease et al. 2014). However, tobacco use has become more highly concentrated in specific populations, such as individuals with low socioeconomic and educational status, racial and ethnic minorities, and those with co-morbid psychiatric illnesses (National Center for Chronic Disease et al. 2014). Furthermore, care of individuals with tobacco-related illnesses imposes tremendous costs on the healthcare system (Warner et al. 1999; Barnett et al. 2015). Thus, it is critical to study tobacco use specifically in vulnerable populations.

Veterans are a unique population who may be at increased risk of tobacco use and ND. Veterans make up about 10% of the US population, and their key demographic features include older age, male predominance, and lower overall average socioeconomic status (Fuehrlein et al. 2016). Studies analyzing data from the National Surveys on Drug Use and Health found that both male and female Veterans had significantly higher rates of daily cigarette smoking in most age groups as compared with civilians (Wagner et al. 2007; Hoggatt et al. 2017). For example, female Veterans had higher rates of daily cigarette smoking than civilians in all age groups, while male Veterans had higher rates of daily cigarette smoking than civilians in all age groups except those aged 65 years or older (Hoggatt et al. 2017). Importantly, the rates of daily smoking in the survey were highest in those Veterans in the youngest age group studied (aged 18–25 years). It is important to characterize the prevalence and correlates of ND among Veterans to inform specific population-based prevention and treatment efforts that can help this vulnerable population.

Despite the substantial burden of tobacco related diseases and ongoing tobacco use among Veterans utilizing the Veterans' Affairs (VA) system, a recent study found that just 3.8% of these Veterans were utilizing tobacco treatment services offered by the VA (Kelly et al. 2016). Furthermore, fewer than 20% of veterans utilized VA healthcare services as their primary source of health-care (Wisco et al. 2014). Thus, studies of Veterans within the VA system alone may fail to accurately characterize the prevalence and correlates of ND in the general population of Veterans. The overall goal of our investigation was to develop a fuller understanding of ND and its associated conditions in Veterans to inform prevention and treatment strategies. To address this question, we analyzed data from a large, contemporary, nationally representative sample of US Veterans. We specifically sought to determine: (1) prevalence of lifetime ND; (2) sociodemographic and military correlates of ND and (3) psychiatric and physical health correlates of ND.

METHODS

Participants

The National Health and Resilience in Veterans Study (NHRVS) is a nationally representative study of 3,157 US Veterans aged 21 years and older. The sample was derived from KnowledgePanel, a survey research panel representing approximately 98% of US

adults (GfK knowledge Networks, Inc., Menlo Park, California). Probability-based sampling of household addresses from the US Postal Service's Delivery Sequence File was used, which allowed for the inclusion of households with no telephone access.

Assessments

Respondents were classified as having a lifetime history of ND if they met the following criteria: (1) reported a history of past or current smoking; (2) smoked more than 100 cigarettes in their lifetime; and (3) had a Fagerström Test for Nicotine Dependence (FTND) score ≥ 5 . (Heatherton et al. 1991) FTND scores of 5 or higher are consistent with a medium to high level of dependence, while scores of 4 or below indicate lower dependence (Network 2017). For past smokers, FTND was assessed retrospectively by asking patients to recall their smoking behaviors.

Psychiatric correlates included current PTSD and lifetime PTSD (assessed using the PTSD Checklist), depression (Patient Health Questionnaire-2), GAD (General Anxiety Disorder Screener), alcohol use disorder as well as lifetime major depressive disorder (Mini International Neuropsychiatric Interview (MINI)) (Hergueta et al. 1998), social phobia (MINI), alcohol use disorder (MINI), and drug use disorder (MINI). Suicidal ideation (SI) within the past two weeks was assessed using the suicidal ideation item on the Patient Health Questionnaire-9 (Kroenke et al. 2001), and suicide attempt(s) (SA) were queried.

Physical correlates were assessed using a Medical Conditions Checklist. Somatization was assessed using the Brief Symptom Inventory (Derogatis 2001). Cognitive functioning was assessed using the Medical Outcomes Study Cognitive Functioning Scale (Wu et al., 1991). Quality of life was assessed using the Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q) (Endicott et al. 1993).

Data Analysis

Descriptive statistics were first conducted to summarize sociodemographic, military, psychiatric, physical health, and functionality/quality of life characteristics of veterans with and without lifetime ND; independent samples t-tests and chi-square tests compared participants with and without ND on these variables. Hierarchical binary logistic regression analyses were then conducted to evaluate the relationship between ND and psychiatric and physical health variables as well as functioning and quality of life variables.

Sociodemographic and military characteristics that differed by ND status at $p < 0.01$ were entered in Step 1 (i.e., gender, education, income, and the VA as primary source of healthcare). For psychiatric outcomes, the presence/absence of ND was entered in Step 2. For physical health outcomes and functionality/quality of life outcomes, psychiatric outcomes that differed at $p < 0.01$ were entered in Step 2. The presence/absence of ND was entered in Step 3. For all analyses, α was set to 0.01 to reduce the likelihood of Type I error. Post-stratification weights, computed by GfK Knowledge Networks statisticians, were applied in all inferential analyses and were based on the demographic composition of U.S. military veterans from the most contemporaneous 2011 U.S. Census Bureau's Current Population Survey, so that results of the current investigation could be generalizable to the

entire population of U.S. military veterans; these demographic characteristics included age, sex, ethnicity, education, metropolitan area, and U.S. Census region.

RESULTS

A total of 582 US Veterans in the sample (weighted 19.4%) met criteria for lifetime ND; 2575 Veterans (weighted 80.6%) did not meet criteria for lifetime ND. Key demographics are summarized in Table 1. Compared with Veterans who did not have ND, Veterans with ND were more likely to be male (94.1% vs. 89.8%, $p = 0.001$), lower educational status (high school highest level 43.7% vs. 30.8%, $p < 0.001$), lower income (65.9% vs. 53.7% making <\$60,000), and to be in the Army (42.7% vs. 37.4%). Veterans with ND also were more likely to report using the VA as their primary source of healthcare.

Table 2 shows psychiatric variables by ND status. All psychiatric outcomes were significant at the bivariate level (except for current suicidal ideation). After adjusting for sociodemographic and military characteristics, multivariate analyses revealed that Veterans with ND were more likely to screen positive for all lifetime psychiatric disorders: PTSD, major depressive disorder, social phobia, alcohol and drug use disorders. Veterans with ND also were more likely to meet criteria for current posttraumatic stress disorder (PTSD), major depressive disorder, generalized anxiety disorder and alcohol use disorder, to have attempted suicide at some point in their life, to have endorsed childhood physical or sexual abuse, and to have experienced a greater number of lifetime traumas.

Tables 3 shows physical health variables by ND status. Bivariate analyses revealed that After adjusting for sociodemographic and military characteristics, as well as psychiatric variables, Veterans with ND were more likely to endorse having kidney disease (OR 4.18 [2.55, 6.86]), heart attack (OR 2.09 [1.51, 2.89]), rheumatoid arthritis (1.90 [1.20, 3.00]), heart disease (OR 1.73 [1.33, 2.25]), diabetes (OR 1.53 [1.20, 1.96]), asthma, chronic bronchitis or COPD (OR 1.49 [1.13, 1.97]), high cholesterol (OR 1.40 [1.15, 1.71]), arthritis (OR 1.36 [1.10, 1.68]), and high blood pressure (OR 1.34 [1.09, 1.63]). They also scored lower on measures of overall physical functioning and higher on a measure of somatization symptoms.

DISCUSSION

Our results suggest that multiple medical and psychiatric co-morbidities are associated with a lifetime history of ND in Veterans. These findings have critical implications for the overall care of Veterans with ND, as ND is likely to present as part of a complex set of conditions that include psychiatric and medical co-morbidities, a history of lifetime trauma, a reduction in overall physical functioning, and an increase in somatic complaints.

Relevant demographic characteristics that predicted ND included male gender, lower level of educational attainment, household income less than \$60,000 per year, enrollment in the Army branch of the military, and use of the VA system as the main source of healthcare. These findings are consistent with studies of other populations that found higher levels of ND in those with less education and lower income (National Center for Chronic Disease et al. 2014). It was also notable that veterans with ND were more likely to report using the VA as their main source of healthcare. This suggests that the VA system is treating a larger

proportion of Veterans with ND who are likely to have more medical and psychiatric co-morbidities compared with other Veterans who received non-VA healthcare.

The strongest psychiatric co-morbidities associated with ND were alcohol use disorder and drug use disorder. Other significant correlates included lifetime and current history of PTSD, depression, generalized anxiety, and higher number of lifetime traumas. These findings are consistent with prior studies that have demonstrated higher levels of ND in individuals with mental illness and heavy alcohol use (Grant et al. 2004). Cigarette smoking leads to rapid release of multiple neurotransmitters including dopamine, GABA, and glutamate (Benowitz 2010). Since these neurotransmitters have strong effects on mood, the survey findings likely suggest the possibility of self-medication for subjects' underlying mental health conditions. Other epidemiologic studies linking lifetime ND in individuals with depression support this conclusion (Hasin et al. 2005). These findings underscore the potential importance of screening veterans with ND for other underlying mood and anxiety disorders.

Lifetime ND was associated with elevated rates of several physical health conditions. The strongest associations were heart attack, kidney disease, and rheumatoid arthritis. Extensive epidemiologic evidence has linked smoking causally to cardiovascular disease and RA, but not directly to kidney diseases other than renal cancer (National Center for Chronic Disease et al. 2014). These conditions are linked etiologically by the systemic inflammatory response induced by chronic cigarette smoking and the delivery of thousands of toxic chemicals (National Center for Chronic Disease et al. 2014). We also observed lower levels of overall physical functioning and higher somatization scores among those with ND. This finding is consistent with recent evidence suggesting a positive association between pain intensity and smoking status (Volkman et al. 2015). Care for Veterans with ND is therefore likely to require multiple areas of expertise and might be performed more efficiently in an integrated care setting. Unfortunately, care for medical, psychiatric, and addictive conditions remains somewhat fragmented in our current healthcare system (An et al. 2004), including the VA.

Our study has some important limitations worth noting. First, the FTND score was determined retrospectively for all former smokers and could be subject to recall bias. Using a cut-off FTND score of 5 will also exclude some individuals who had milder forms of lifetime ND. Nevertheless, the advantage of this approach is that it limits the number of false positives and identifies the individuals with more moderate to high severity of lifetime ND. Second, the data analyzed were cross-sectional and retrospective, which prevents determination of causality and temporal relationships between ND and various mental and physical health correlates. Longitudinal studies are needed to more accurately determine the cause-and-effect relationship between ND and medical and psychiatric co-morbidities. Third, the NHRVS survey consisted predominantly of older white veterans. Although this population surveyed was representative of US Veterans as a whole, it necessarily limits the generalizability of the findings to other study populations, such as women and racial/ethnic minorities.

CONCLUSIONS

A significant percentage of US Veterans have a life-time history of ND, which frequently co-exists with multiple demographic, psychiatric, and medical conditions. The strongest correlates of lifetime ND were lifetime alcohol use disorder, lifetime drug use disorder, current alcohol use disorder, kidney disease, and heart disease. The implications of these findings are that many Veterans with ND may benefit from a comprehensive and integrated approach to care that includes attention to psychiatric and medical co-morbidities in addition to drug addiction that may or may not be in remission. Longitudinal studies of Veteran populations will be helpful in identifying cause-and-effect relationships between specific risk factors and ND. Furthermore, studies of integrated care systems for Veterans may be helpful in defining the optimal method for treating this unique patient population.

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REFERENCES

- An LC, Bernhardt TS, Bluhm J, Bland P, Center B, Ahluwalia JS, Foldes SS, Magnan S, Manley M. 2004 Treatment of tobacco use as a chronic medical condition: primary care physicians' self-reported practice patterns. *Preventive medicine*. 38(5):574–585. [PubMed: 15066360]
- Barnett PG, Hamlett-Berry K, Sung H-Y, Max W. 2015 Health Care Expenditures Attributable to Smoking in Military Veterans. *Nicotine Tob Res*. 17(5):586–591. [PubMed: 25239960]
- Benowitz NL. 2010 Nicotine addiction. *N Engl J Med*. 362(24):2295–2303. eng. [PubMed: 20554984]
- Derogatis LR. 2001 BSI 18, Brief Symptom Inventory 18: Administration, scoring and procedures manual NCS Pearson, Incorporated.
- mEndicott J, Nee J, Harrison W, Blumenthal R. 1993 Quality of life enjoyment and satisfaction questionnaire: A new measure. *US: Psychopharmacology Bulletin*. p. 321–326.
- Fuehrlein BS, Mota N, Arias AJ, Trevisan LA, Kachadourian LK, Krystal JH, Southwick SM, Pietrzak RH. 2016 The burden of alcohol use disorders in US military veterans: results from the National Health and Resilience in Veterans Study. *Addiction*. 111(10):1786–1794. [PubMed: 27061707]
- Grant BF, Hasin DS, Chou S, Stinson FS, Dawson DA. 2004 Nicotine dependence and psychiatric disorders in the united states: Results from the national epidemiologic survey on alcohol and related conditions. *Arch Gen Psychiatry*. 61(11):1107–1115. [PubMed: 15520358]
- Hasin DS, Goodwin RD, Stinson FS, Grant BF. 2005 Epidemiology of major depressive disorder: Results from the national epidemiologic survey on alcoholism and related conditions. *Arch Gen Psychiatry*. 62(10):1097–1106. [PubMed: 16203955]
- Heatherton TF, Kozlowski LT, Frecker RC, Fagerstrom KO. 1991 The Fagerstrom Test for Nicotine Dependence: a revision of the Fagerstrom Tolerance Questionnaire. *Br J Addict*. 86(9):1119–1127. eng. [PubMed: 1932883]
- Hergueta T, Baker R, Dunbar GC. 1998 The Mini-International Neuropsychiatric Interview (MINI): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J clin psychiatry*. 59(Suppl 20):2233.
- Hoggatt KJ, Lehavot K, Krennek M, Schweizer CA, Simpson T. 2017 Prevalence of substance misuse among US veterans in the general population. *The American Journal on Addictions*. 26(4):357–365. [PubMed: 28370701]

- Jamal A, Homa DM, O'Connor E, Babb SD, Caraballo RS, Singh T, Hu SS, King BA. 2015 Current cigarette smoking among adults - United States, 2005–2014. *MMWR Morbidity and mortality weekly report*. 64(44):1233–1240. eng. [PubMed: 26562061]
- Kelly MM, Sido H, Rosenheck R. 2016 Rates and correlates of tobacco cessation service use nationally in the Veterans Health Administration. *Psychological services*. 13(2):183. [PubMed: 27148953]
- Kroenke K, Spitzer RL, Williams JBW. 2001 The PHQ-9: Validity of a Brief Depression Severity Measure. *Journal of general internal medicine*. 16(9):606–613. [PubMed: 11556941]
- National Center for Chronic Disease P, Health Promotion Office on S, Health. 2014 Reports of the Surgeon General. The Health Consequences of Smoking-50 Years of Progress: A Report of the Surgeon General. Atlanta (GA): Centers for Disease Control and Prevention (US).
- Network NCT. 2017 NIDA CTN Common Data Elements, Fagerstrom Test for Nicotine Dependence.
- Volkman JE, DeRycke EC, Driscoll MA, Becker WC, Brandt CA, Mattocks KM, Haskell SG, Bathulapalli H, Goulet JL, Bastian LA. 2015 Smoking Status and Pain Intensity Among OEF/OIF/OND Veterans. *Pain Medicine*. 16(9):1690–1696. [PubMed: 25917639]
- Wagner TH, Harris KM, Federman B, Dai L, Luna Y, Humphreys K. 2007 Prevalence of substance use disorders among veterans and comparable nonveterans from the National Survey on Drug Use and Health. *Psychological Services*. 4(3):149.
- Warner K, Hodgson T, Carroll C. 1999 Medical costs of smoking in the United States: estimates, their validity, and their implications. *Tob Control*. 8(3):290–300. [PubMed: 10599574]
- Wisco BE, Marx BP, Wolf EJ, Miller MW, Southwick SM, Pietrzak RH. 2014 Posttraumatic stress disorder in the US veteran population: results from the National Health and Resilience in Veterans Study. *J Clin Psychiatry*. 75(12):1338–1346. [PubMed: 25551234]

Table 1. Sociodemographic and military characteristics of Veterans with and without nicotine dependence^a

	No Nicotine Dependence	Nicotine Dependence	Statistical Test
	n (weighted %) or mean (SD)	n (weighted %) or mean (SD)	
<i>Sociodemographic Characteristics</i>			
Age	62.02 (15.35)	62.06 (13.53)	$t=0.02, p=.98$
Gender			
Male	2294 (89.8%)	542 (94.1%)	$\chi^2=11.05, p=.001$
Female	281 (10.2%)	40 (5.9%)	
Ethnicity			
Non-Caucasian	437 (24.4%)	82 (21.2%)	$\chi^2=2.86, p=.09$
Caucasian	2138 (75.6%)	500 (78.8%)	
Education			
High School	352 (30.8%)	131 (43.7%)	$\chi^2=37.42, p<.001$
Some College or Higher Education	2223 (69.2%)	451 (56.3%)	
Marital Status			
Married/Living with Partner	2024 (75.4%)	458 (76.2%)	$\chi^2=0.15, p=.70$
Not Married/Living with Partner	551 (24.6%)	124 (23.8%)	
Household Income			$\chi^2=30.09, p<.001$
< \$60,000 per year	1185 (53.7)	325(65.9)	
\$60,000 per year	1390 (46.3%)	257 (34.1%)	
<i>Military Characteristics</i>			
Military Branch			$\chi^2=8.86, p=.03$
Army	1029 (37.4%)	241 (42.7%)	
Air Force	648 (23.0%)	155 (20.9)	
Marine Corps/National Guard/Coast Guard/Other	301 (15.6%)	57 (12.1%)	
Navy	591 (24.0%)	129 (24.3%)	
Drafted			$\chi^2=1.02, p=.31$
Yes	361 (12.6%)	67 (11.1%)	
No	2204 (87.4%)	513 (88.9%)	
Combat Exposure			$\chi^2=1.27, p=.26$
Yes	879 (34.1%)	226 (36.5%)	
No	1689 (65.9%)	353 (63.5%)	
VA Main Source of Healthcare			$\chi^2=29.04, p<.001$
Yes	399 (17.4%)	135 (26.9%)	
No	2172 (82.5%)	446 (73.1%)	

Table 2.

Psychiatric disorders of veterans with no nicotine dependence and veterans with nicotine dependence^a

	No ND (n=2575)	ND (n=582)	Bivariate Analysis	Multivariate Analysis	
	n (weighted %)	n (weighted %)	χ^2 , (p)	Wald χ^2 (p)	Adjusted OR (95% CI) ^b
<i>Psychiatric Disorders and Traumas</i>					
Lifetime PTSD	141 (6.8%)	71 (12.7%)	24.00 (.001)	21.49, .000	2.04 [1.51, 2.75]
Lifetime major depressive disorder	353 (14.3%)	164 (28.1%)	66.74 (.001)	66.03, .000	2.49 [2.00, 3.10]
Lifetime social phobia	174 (7.5)	98 (17.9)	63.04 (.001)	57.77, .000	2.78 [2.14, 3.63]
Lifetime alcohol use disorder	899 (36.0%)	385 (67.5%)	200.89 (.001)	174.40, .000	3.61 [2.99, 4.37]
Lifetime drug use disorder	246 (10.0%)	140 (27.4%)	128.17 (.001)	103.33, .000	3.22 [2.57, 4.03]
Lifetime suicide attempt ^c	100 (5.0%)	65 (14.5%)	68.79 (.001)	10.17, .001	1.78 [1.25, 2.53]
Current PTSD	67 (4.1%)	35 (7.9%)	14.49 (.001)	6.98, .00	1.68 [1.14, 2.47]
Current depression	139 (6.7%)	73 (12.6%)	23.53 (.001)	16.86, .000	1.86 [1.38, 2.50]
Current GAD	133 (6.9%)	69 (12.4%)	19.99, (.001)	14.82, .000	1.79 [1.33, 2.40]
Current alcohol use disorder	239 (10.9)	165 (27.0)	106.94 (.001)	81.28, .000	2.79 [2.23, 3.49]
Current suicidal ideation ^c	152 (7.9%)	79 (16.0%)	37.08 (.001)	2.75, .097	1.30 [.95, 1.78]
Childhood Physical or Sexual Abuse	477 (19.0%)	161 (26.5%)	16.69 (.001)	22.31, .000	1.67 [1.35, 2.07]
	Mean (SD)	Mean (SD)	t-test, p	B, p	β
Sum of Lifetime Traumas	3.08 (2.59)	4.28 (2.95)	7.94, .001	.94, .000	.13

^aStatistically significant associations between nicotine dependence and psychiatric outcomes are highlighted in bold

^bORs (95% CIs) are adjusted for gender, education, income, and Veterans Affairs as primary source of health care

^cORs (95% CIs) for suicidality are additionally adjusted for lifetime PTSD, lifetime major depressive disorder, lifetime alcohol use disorder and lifetime drug use disorder

Abbreviations: OR=odds ratio, PTSD=posttraumatic stress disorder, GAD=generalized anxiety disorder

Table 3.

Physical health outcomes of veterans with no nicotine dependence and veterans with nicotine dependence^a

	No ND (n=2575)		ND (n=582)	Bivariate Analysis		Multivariate Analysis	
	n (weighted %)	or mean (SD)	n (weighted %)	or mean (SD)	χ^2 (p)	Wald X^2 (p)	Adjusted OR ^b (95% CI)
Arthritis	762 (28.3%)		222 (34.7%)		9.86 (.002)	8.28 (.004)	1.36 [1.10, 1.68]
Asthma, Chronic Bronchitis, or COPD	235 (9.6%)		107 (16.8%)		25.91 (.001)	7.72 (.005)	1.49 [1.13, 1.97]
Cancer	406 (15.3%)		89 (14.5%)		0.23 (0.63)	.18 (.670)	.94 [1.71, 1.25]
Chronic pain	447 (18.5%)		149 (25.6%)		15.81 (.001)	1.85 (.173)	1.18 [1.93, 1.50]
Liver Disease	39 (1.7%)		15 (2.4%)		1.37 (.24)	.17 (.683)	.87 [1.45, 1.69]
Diabetes	446 (16.3%)		151 (21.5%)		9.55 (.002)	11.36 (.001)	1.53 [1.20, 1.96]
Heart Disease	327 (12.9%)		117 (18.8%)		14.10 (.001)	16.43 (.000)	1.73 [1.33, 2.25]
Heart Attack	186 (7.4%)		69 (12.7%)		18.91 (.001)	19.63 (.000)	2.09 [1.51, 2.89]
High cholesterol	1229 (44.7%)		336 (52.6%)		12.58 (.001)	11.09 (.001)	1.40 [1.15, 1.71]
High Blood Pressure	1279 (46.7%)		323 (55.0%)		13.75 (.001)	7.99 (.005)	1.34 [1.09, 1.63]
Kidney Disease	50 (1.7%)		34 (6.7%)		46.36 (.001)	31.98 (.000)	4.18 [2.55, 6.86]
Sleep Disorders	461 (19.0%)		139 (21.9%)		2.60 (.11)	2.46 (.117)	.81 [.62, 1.06]
Migraine	150 (5.5%)		48 (8.6%)		8.25 (.004)	5.45 (.020)	1.64 [1.08, 2.48]
Osteoporosis or Osteopenia	73 (2.4%)		27 (3.9%)		4.59 (.030)	3.65 (.056)	1.72 [1.99, 2.99]
Rheumatoid Arthritis	80 (3.1%)		30 (6.5%)		15.86 (.001)	7.53 (.006)	1.90 [1.20, 3.00]
Stroke	48 (1.6%)		19 (2.8%)		3.69 (.06)	.875 (.349)	1.38 [1.70, 2.71]
Traumatic Brain Injury	13 (0.6%)		3 (0.3%)		0.80 (.37)	1.57 (.211)	.32 [1.06, 1.89]
HIV/AIDS	8 (0.2%)		3 (0.2%)		0.03 (.86)	.113 (.737)	.71 [1.08, 5.23]
	Mean (SD)		Mean (SD)		t test (p)	B, p	β
Overall Physical Functioning	47.98 (8.25)		44.60 (9.42)		8.84 (.001)	-2.23 (.000)	-.10
Somatization	2.38 (3.76)		3.77 (4.47)		7.90 (.001)	.61 (.000)	.06

^a Statistically significant associations between nicotine dependence and physical health outcomes are highlighted in bold

^b ORs (95% CIs) are adjusted for gender, education, income, and Veterans Affairs as primary source of health care in addition to current PTSD, current depression, current GAD, current alcohol use disorder, lifetime PTSD, lifetime major depressive disorder, lifetime social phobia, lifetime alcohol use disorder, lifetime drug use disorder, lifetime suicide attempts, total number of lifetime traumas, and any childhood physical and/or sexual abuse Abbreviations: OR=odds ratio; PTSD=posttraumatic stress disorder; GAD=generalized anxiety disorder