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Veterans Living with HIV: A High-Risk Group for Cigarette Smoking

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Abstract

The Veterans Health Administration is the largest U.S. medical provider for persons living with HIV (PLHIV). Although HIV and veteran status are known risk factors for smoking, there are no population estimates of smoking prevalence among veteran PLHIV. Using data from a national random sample (National Survey on Drug Use and Health; 2005-2014), smoking prevalence was estimated by self-reported veteran and HIV status ($N = 376,620$). Results indicated 42% of veteran PLHIV smoked daily, compared to 18% of veterans without HIV and 30% of non-veteran PLHIV. Findings suggest that veteran PLHIV have high risk for smoking and consequent poor health.

Keywords

smoking; veteran; HIV; tobacco use; health status

Introduction

Despite an overall decline in new infections, human immunodeficiency virus (HIV) is still a major public health concern within the United States (U.S.), with over 1 million people nationwide currently living with HIV (1). Among the millions of persons living with HIV (PLHIV) in the U.S., rates of smoking are two to three times higher than in the general U.S.

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population (2). For those living with HIV, cigarette smoking decreases effectiveness of antiretroviral therapy and moreover increases risk of mortality and morbidity (2). With regards to the medical treatment of PLHIV, the Veterans Health Administration (VHA) is the single largest provider of HIV health services in the nation (3). While numerous studies have focused on the health of veterans living with HIV, there is no population-level evidence of smoking prevalence among veterans living with HIV as compared to the general population.

Separate epidemiologic studies have shown that in the general population, risk of current smoking is increased for veterans and for PLHIV. Regarding veteran status, nationally representative data indicate that veterans are more likely to smoke than civilians (4). In nationally representative data, the prevalence of current smoking is nearly twice as high among PLHIV compared to the general population (5). Although the risk of smoking has been separately shown for those who are veterans and those who have HIV, the risk for veterans living with HIV is unknown.

While population-level data are lacking, data from patients using VHA healthcare suggest that veterans living with HIV are more likely to smoke than veterans without HIV. The Veterans Aging Cohort Study (VACS) included a large convenience sample of 2,892 patients with HIV recruited from VHA infectious disease (ID) clinics and 2,717 age-, race-, gender-, and site-matched controls(6). In the VACS sample, the majority of veterans with HIV (64%) were current smokers. Moreover, in longitudinal VACS data veterans with HIV were not only more likely than HIV-seronegative veterans to smoke at baseline, but also their smoking status largely remained static over time (6).

Given that there is evidence that both PLHIV and veterans are at risk for smoking and there is considerable cost of smoking in terms of mortality and morbidity there is a need to estimate the population prevalence of smoking among veterans living with HIV in a national random sample. This information would be highly useful in determining the potential public health need for smoking cessation interventions in this population. The current study examined current smoking among veterans living with HIV in a large nationally representative sample.

Method

Data Source

The National Survey on Drug Use and Health (NSDUH) is a nationally representative annual, cross-sectional, self-report survey that measures drug use prevalence and correlates. It is sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA), and includes a national random sample of non-institutionalized U.S. residents. For further information on NSDUH methodology, see the published survey procedures (7). In the present study, NSDUH survey data from 2005 through 2014 were combined ($N=558,372$) in order to increase sample size of respondents with HIV. For these survey years, the mean annual weighted response rate was 73.9%. Among participants who provided data 2005-2014, those younger than age 18 ($n=176,245$) and those missing self-reported HIV status or veteran status ($n=5,507$) were excluded from the current sample, yielding a final sample size of 376,620.

Measures

To assess self-reported HIV status, participants were shown a list of health conditions, including HIV/AIDS, and asked to indicate which condition(s) a doctor or other medical professional has ever told them that they had. Participants were coded as self-reporting HIV status if they endorsed this item from the checklist of medical conditions. Veteran status was measured with the single item, "Have you ever been in the United States' armed forces?" Participants were coded as veterans if they answered yes to this question. Demographic variables used in the current study included participant age, gender, marital status, and educational attainment. Marital status was dummy coded into three variables with single status as a referent, as compared to married, widowed, and divorced status. During NSDUH data collection, age was categorized into 18, 19, 20, 21, 22-23, 24-25, 26-29, 30-34, 35-49, 50-64, 65 or older, and in statistical analysis it was treated as an ordinal variable. Educational attainment was measured on a continuous scale ranging from 1 = fifth grade education or less to 11 = college graduate. The year that the survey was completed was also retained as a covariate for all participants.

Current smoking status was measured in two ways: past-month smoking and current daily smoking. Past-month smoking was indicated by the response to the question: "How long has it been since you last smoked part or all of a cigarette?" Respondents who answered that they had smoked within the past 30 days were classified as past-month smokers. Daily smoking was assessed by participant response to the question: "During the past 30 days, that is since [DATE], on how many days did you smoke part or all of a cigarette?" If a participant could not state the number of days they smoked, they could provide a categorical response to the question: "What is your best estimate of the number of days you smoked part or all of a cigarette during the past 30 days?" (1-2 days, 3-5 days, 6-9 days, 10-19 days, 20-29 days, or all 30 days). Participants were classified as daily smokers if they indicated smoking on at least 90% of days within the past month (27 days for continuous response, 30 days for categorical response). Perceived health status was assessed with a single item, "Would you say your health in general is excellent, very good, good, fair, or poor?"

Statistical Analysis

Descriptive statistics used to characterize the sample prior to model testing were unweighted. Subsequently, model testing was performed using logistic and multiple linear regression analyses with Mplus v7 statistical software (8). Sample weightings (averaged across survey years) were applied to yield nationally representative findings, and additional stratification and clustering of the NSDUH data due to sampling techniques were accounted for in these analyses. Logistic regression was used to assess odds of any past-month smoking and current daily smoking as a function of veteran and HIV status. Initially, veteran status and HIV status were analyzed independently. In a second set of models, we also analyzed the following sub-groups: HIV-negative non-veterans, HIV-positive non-veterans, HIV-negative veterans, and HIV-positive veterans. Following model testing for smoking outcomes, multiple linear regression analysis was then used to assess self-reported health status as a function of veteran and HIV status and current daily smoking.

All prevalence rates were weighted to yield nationally representative findings without entering covariates into the model. Covariates for all logistic and linear regression models were selected a priori based upon prior empirical evidence of demographic factors related to smoking. A survey-year variable was created, and linear time effects were covaried in subsequent analyses. In addition to centered survey-year effects, age, sex, years of educational attainment, and marital status (i.e., single, married, widowed, divorced) were included as covariates to determine model effects.

Results

Of the 376,620 participants with data on veteran and HIV status, 174,635 (weighted prevalence 48.1%) were males; 139,455 (54.0%), married; 235,204 (30.4%), between 18 and 34 years old; 80,775 (27.5%), between 35 and 49 years old; 37,368 (24.8%), between 50 and 64 years old; and 23,273 (17.2%) 65 years old or older. Approximately 14.8% ($n = 61,101$) did not complete high school; 121,904 (30.4%) completed high school; 110,198 (26.0%) completed some post-high school education; and 83,417 (28.8%) graduated from a 4-year college. Veterans constituted 11.0% of the sample ($n = 23,303$) and 92.9% of veterans were male ($n = 20,437$). Approximately 0.2% of participants ($n = 548$), of whom 80.1% were males ($n = 407$) and 12.9% were veterans ($n = 61$). The prevalence of smoking during the past month was 27.1% ($n = 127,486$), and 16.5% ($n = 71,534$) reported smoking on at least 90% of the previous 30 days (missing $n = 476$).

Past-Month Smoking

When we calculated weighted prevalence of past-month smoking by HIV and veteran status (without controlling for covariates), we found that veterans living with HIV endorsed past-month smoking at the highest rate (53.1%), higher than HIV-positive non-veterans (45.7%), veterans without HIV (26.5%), and non-veterans without HIV (27.1%) (Figure 1). After controlling for factors known to affect population-level smoking patterns (sampling year, age, sex, education, and marital status), HIV-positive veterans were more likely to endorse past-month smoking than all other groups combined ($OR = 2.36$; 95% CI: 1.21, 4.58). Examining the individual contrasts after controlling for covariates, HIV-positive veterans were significantly more likely to endorse past-month smoking than HIV-negative veterans ($OR = 2.34$; 95% CI: 1.20, 4.56) and HIV-negative non-veterans ($OR = 2.37$; 95% CI: 1.22, 4.61), but not HIV-positive non-veterans ($OR = 1.40$; 95% CI: 0.69, 2.84).

According to the weighted logistic regression model of past-month smoking, smoking in the past month was associated with HIV status but not veteran status. After controlling for covariates, respondents with an HIV diagnosis were more likely than those without an HIV diagnosis to smoke in the past month ($OR = 1.77$; 95% CI: 1.39, 2.25). Veterans, however, were no more likely than non-veterans to report past-month smoking ($OR = 1.01$; 95% CI: 0.98, 1.05). Model estimates for covariates were as follows: past-month smoking decreased over sampling years ($OR = 0.97$; 95% CI: 0.97, 0.98); past-month smoking declined with age ($OR = 0.91$; 95% CI: 0.91, 0.91); women had lower odds of past-month smoking ($OR = 0.62$; 95% CI: 0.61, 0.64); higher education was associated with lower odds of smoking ($OR = 0.91$; 95% CI: 0.90, 0.91); and compared to single respondents, odds of past-month

smoking were lower for married respondents ($OR = 0.56$; 95% CI: 0.55, 0.57) and widowed respondents ($OR = 0.50$; 95% CI: 0.46, 0.54); divorced respondents had higher odds of past-month smoking than single respondents ($OR = 1.41$; 95% CI: 1.36, 1.47).

Daily Smoking

Similar to weighted prevalence results for past-month smoking, HIV-positive veterans endorsed the highest prevalence of daily smoking (42.0%), higher than HIV-positive non-veterans (30.4%), HIV-negative veterans (18.0%), and HIV-negative non-veterans (16.2%) (Figure 1). After controlling for covariates, the daily smoking rate among veterans with HIV was higher than all other groups combined ($OR = 3.14$; 95% CI: 1.54, 6.43). Examining the individual contrasts while controlling for covariates, HIV-positive veterans were significantly more likely to endorse daily smoking than HIV-negative veterans ($OR = 2.78$; 95% CI: 1.35, 5.72) and HIV-negative non-veterans ($OR = 3.27$; 95% CI: 1.60, 6.68), but not HIV-positive non-veterans ($OR = 1.73$; 95% CI: 0.79, 3.83).

According to the weighted logistic model of daily smoking that controlled for covariates, odds of daily smoking differed by HIV status and veteran status. Specifically, HIV-positive respondents were more likely than HIV-negative respondents to smoke daily ($OR = 1.99$; 95% CI: 1.53, 2.59). Also, veterans were more likely than non-veterans to smoke daily ($OR = 1.18$; 95% CI: 1.12, 1.24). Model estimates for covariates were similar to the previous model estimating risk for past-month smoking, including sampling year ($OR = 0.97$; 95% CI: 0.97, 0.98); age ($OR = 0.98$; 95% CI: 0.97, 0.98); gender (reference group: women; $OR = 0.82$; 95% CI: 0.80, 0.84); education ($OR = 0.88$; 95% CI: 0.88, 0.89); married status (reference group: single; $OR = 0.64$; 95% CI: 0.62, 0.66); widowed status (reference group: single; $OR = 0.57$; 95% CI: 0.52, 0.62); and divorced status (reference group: single; $OR = 1.65$; 95% CI: 1.58, 1.72).

Results using weighed multiple linear regression to examine self-reported health indicated that health was negatively associated with smoking, self-reported HIV diagnosis, and veteran status after controlling for covariates. Specifically, self-reported health was significantly lower for those who endorsed HIV diagnosis ($B = -0.48$; 95% CI: -0.57, -0.38), veteran status ($B = -0.13$; 95% CI: -0.15, -0.12), or daily smoking ($B = -0.27$; 95% CI: -0.29, -0.26). Regarding covariate model estimates, self-reported health was significantly negatively associated with: sampling year ($B = -0.01$; 95% CI: -0.01, -0.01); age ($B = -0.09$; 95% CI: -0.09, -0.09); female gender ($B = -0.03$; 95% CI: -0.04, -0.02); widowed status (reference: single; $B = -0.09$; 95% CI: -0.13, -0.06); and divorced status (reference: single; $B = -0.04$; 95% CI: -0.06, -0.12). Self-reported health was positively associated with: education ($B = 0.13$; 95% CI: 0.13, 0.13); and married status (reference: single; $B = 0.17$; 95% CI: 0.15, 0.19).

Discussion

This study used a nationally representative dataset and demonstrated that, compared to veterans without HIV, veterans living with HIV were more likely to currently smoke and to be daily smokers. Additionally, veteran status, HIV status, and daily smoking were all independently associated with significantly poorer self-rated health. The past-month

smoking rate observed in this national representative sample (42%) is lower than rates documented in veterans with HIV using VHA healthcare (6). Since smoking tends to persist in veterans living with HIV (6), the present findings suggest a strong need for smoking cessation interventions for veterans with HIV. However, a large proportion of veterans do not receive care at VHA. Given differences between national rates and rates from VHA user, it is possible that VHA users with HIV are more likely to smoke compared to non-VHA users living with HIV.

In spite of VHA policies and programs aimed at reducing smoking, there are numerous barriers to smoking cessation treatment and ultimately to smoking abstinence for veterans living with HIV. In order to address tobacco use among veterans, VHA created a National Smoking and Tobacco Use Cessation Program, which oversees public health efforts to reduce smoking among veterans nationwide (10). Within primary care, VHA has implemented automated periodic tobacco use screening, and VHA providers generally adhere to providing veterans with advice to quit smoking (10). VHA also offers free telehealth and mobile health interventions for veterans, including a national quit line (1-855-QUIT-VET) and a national mobile texting program (smokefree VET). Additionally, VHA facilities nationally provide nicotine replacement therapy free of charge and offer specialty smoking cessation clinics that use efficacious smoking cessation treatments. However, despite all of these resources, VHA prescription fills for nicotine replacement therapy are low, and VHA specialty smoking cessation clinics are widely underutilized (10).

Although VHA routinely screens for smoking in primary care, HIV providers are less likely to be aware of or address their patients' smoking behavior. Compared to other VHA primary care providers, HIV providers (who often identify as infectious disease specialists) are less likely to accurately state their patients' current smoking status and are also less confident in their ability to affect smoking outcomes (11). Specifically, data from the VACS study indicate that HIV providers failed to accurately identify 35% of current smokers (11). Consequently, it is likely that these smokers with HIV are less likely to receive advice to quit, efficacious smoking cessation medications, and/or referral to smoking cessation counseling or a specialty clinic.

Given that smokers with HIV may be less likely to quit than their counterparts without HIV infection, intensive treatments tailored to those with HIV are indicated. PLHIVface a number of unique barriers to smoking cessation treatment and smoking abstinence: high rates of comorbid psychiatric disorders and substance use, low adherence rates to cessation treatments, and a lack of integration of smoking cessation interventions into HIV clinical care (2). Not only are there few overall adequately powered trials for smokers with HIV (2), even fewer of these interventions have been implemented specifically for veterans living with HIV. In light of the high national rate of smoking in HIV-diagnosed veterans documented in this study, it is appropriate for providers in VHA to consider delivering efficacious psychological and pharmacological treatments for smoking cessation that are easily accessible for VHA users with HIV.

There are limitations of the current study, including that HIV status was assessed by self-report, which may underestimate HIV (due to stigma and lack of awareness of serostatus).

However, NSDUH utilizes ACASI, which increases accurate responding for sensitive information thereby decreasing effects of social desirability bias (12). Since active duty service members were not included in the national NSDUH sample, results cannot be generalized to this population. Additionally, even though data across years were combined, some contrasts were underpowered (e.g., comparing veterans with HIV to non-veterans with HIV on smoking status indicators). In order to achieve adequate power for contrasts by veteran and HIV status, it would be helpful in future studies to oversample veterans.

Conclusions

This study provides preliminary evidence that veterans living with HIV may be a particularly high-risk group for tobacco smoking, with concerns related to poor self-rated health. It is estimated that half of veterans living with HIV are daily smokers. Results indicated the utility of further detailed investigation regarding differences in tobacco use by veteran status for those living with HIV, including smoking expectancies, mood and affective associations with smoking/quitting, motivation for quitting and smoking cessation expectations. Given that VHA is the largest centralized provider in the U.S. of HIV services, further efforts should be made to prioritize efficacious smoking cessation treatments among veteran populations receiving treatment for HIV.

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References

1. Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data – United States and 6 dependent areas – 2012. HIVS surveillance Supplemental Report. 2014 Nov.19(3) Available at: <http://www.cdc.gov/hiv/library/reports/surveillance/>.
2. Kariuki W, Manuel JI, Kariuki N, Tuchman E, O'Neal J, Lalanne GA. HIV and smoking: Associated risks and prevention strategies. *HIV/AIDS*. 2016; 8:17–36. [PubMed: 26766919]
3. Backus LI, Boothroyd DB, Phillips BR, et al. National quality forum performance measures for HIV/AIDS care: The Department of Veterans Affairs' experience. *Arch Intern Med*. 2010; 170(14): 1239–1246. [PubMed: 20660844]
4. Hoerster KD, Lehavot K, Simpson T, McFall M, Reiber G, Nelson KM. Health and health behavior differences: U.S. Military, veteran, and civilian men. *Am J Prev Med*. 2012; 43(5):483–489. [PubMed: 23079170]
5. Mdodo R, Frazier EL, Dube SR, et al. Cigarette smoking prevalence among adults with HIV compared with the general adult population in the United States. *Ann Intern Med*. 2015; 162(5): 335–44. [PubMed: 25732274]
6. Braithwaite RS, Fang YX, Tate J, et al. Do alcohol misuse, smoking, and depression vary concordantly or sequentially? A longitudinal study of HIV-infected and matched uninfected veterans in care. *AIDS Behav*. 2016; 20(3):566–572. [PubMed: 26187007]

7. Center for Behavioral Health Statistics and Quality. 2014 National Survey on Drug Use and Health: Methodological summary and definitions. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2015.
8. Muthén, LK., Muthén, BO. Mplus User's Guide. Seventh. Los Angeles, CA: Muthén & Muthén;; p. 1998-2015.
9. Population Health Group, Veterans Health Administration, Department of Veterans Affairs. HIV infected veterans in VHA care by state, 2013. Report Rpt87. 2014 Mar. Available at: <http://www.hiv.va.gov/provider/policy/hiv-in-care-by-state-2013.asp>
10. Veterans Health Administration. Public Health: Tobacco Cessation for Health Professionals. Department of Veterans Affairs, Office of Public Health, Tobacco and Health: Policy and Programs; 2016 Nov. Available at: <http://www.publichealth.va.gov/smoking/professionals/index.asp>
11. Crothers K, Goulet JL, Rodriguez-Barradas MC, et al. Decreased awareness of current smoking among health care providers of HIV-positive compared to HIV-negative veterans. J Gen Intern Med. 2007; 22(6):749–754. [PubMed: 17503106]
12. Macalino GE, Celentano DD, Latkin C, Strathdee SA, Vlahov D. Risk behaviors by audio computer-assisted self-interviews among HIV-seropositive and HIV-seronegative injection drug users. AIDS Educ Prev. 2002; 14(5):367–378. [PubMed: 12413183]

Figure 1. Weighted prevalence of current past-month and daily smoking by HIV status among veterans and non-veterans