Disparities in Cigarette Use and Heavy Episodic Drinking Among Older Veterans and Nonveterans

J McDaniel, D Albright, M Torabi

Abstract

Background: Little assessment data on cigarette use (CU) and heavy episodic drinking (HED) among older military veterans is available for local health education program planning.

Purpose: The purpose of this study was to estimate the prevalence of CU and HED among older veterans and nonveterans at the local level, as well as to determine if local area urbanicity was associated with CU and HED prevalence.

Material and methods: Small area estimation methodology was used with 2017 Behavioral Risk Factor Surveillance System (BRFSS) data to estimate the prevalence of CU and HED among veterans and nonveterans older than 64 in 136 metropolitan and micropolitan statistical areas (MMSAs).

Results: Across 136 MMSAs, older veterans had higher CU rates compared to nonveterans (Mveteran = 9.56%, 95% CI = 9.15–9.97; Mnonveteran = 9.24%, 95% CI = 8.84–9.63; Cohen's *d = 0.13) and higher HED rates (Mveteran = 4.68%, 95% CI = 4.52–4.84; Mnonveteran = 4.08%, 95% CI = 3.94–4.22; Cohen's d = 0.67), although variation was observed across MMSA types.*

Conclusion: Health educators should consider geographic disparities when developing and implementing health education programs for older veterans.

Keywords: cigarette smoking; heavy drinking; veterans; health education

Conflict of Interest: The authors have no conflicts of interest to disclose.

Introduction

Nicotine and alcohol constitute the two most heavily used substances among United States military veterans.[1] The rate of heavy episodic drinking (HED) among older (aged ≥ 65 years) veterans (i.e., individuals who have served on active duty in the United States Armed Forces) is higher than among older nonveterans (approximately 5% vs 3%, respectively).[2] Similarly, the rate of cigarette use (CU) among older veterans (approximately 21%) is higher than among older nonveterans (approximately 17%).[3] CU and HED are associated with early mortality.[4, 5] Knowledge of differences in these outcomes among veterans across local areas—below the national level—is limited.

We hypothesised that health-harming behaviours are more prevalent among veterans than nonveterans at the local level. The aims of this paper are threefold: (1) to model the prevalence of CU and HED among older veterans and nonveterans at the local level; (2) to validate modelled rates for CU and HED; and (3) to determine whether CU and HED rates differ between metropolitan and micropolitan areas (MMSAs). A better understanding of where CU and HED are most prevalent could assist in the development of geographically targeted interventions leading to use reduction of cigarettes and alcohol and subsequent lifespan increases for veterans.

Methods

Data collection

We obtained data from the 2017 Selected Metropolitan/Micropolitan Area Risk Trends (SMART) Behavioral Risk Factor Surveillance System (BRFSS) dataset (i.e., the most current dataset at the time of writing), which provides health information for participants in MMSAs with samples ≥500.[4] A metropolitan statistical area is an area of 50 000+ inhabitants, while a micropolitan statistical area is an area of 10 000–49 999 inhabitants. Metropolitan

divisions include ≥2 500 000 inhabitants. Appendix A provides a list of areas included in the dataset. The dataset contained 230 875 observations upon download. After removal of missing data on the measures described below, the final sample included 202 739 individuals. We also obtained population data from the US Census Bureau for each of the MMSAs included in the SMART BRFSS dataset.[5] Details regarding how these two datasets were combined are given below.

Measures

Dependent variables of the present study are CU and HED. Current CU was determined by a BRFSS calculated variable (0 = no CU, 1 = current CU). HED was determined with the following question: 'Considering all types of alcoholic beverages, how many times during the past 30 days did you have 5 or more drinks for men or 4 or more drinks for women on an occasion?' Respondents who reported at least one HED episode were categorised as a current heavy episodic drinker.

The following covariates were selected for our analysis: age (0 = 18–64; 1 = 65+), sex (0 = male, 1 = female), race (1 = white, 2 = black, 3 = other) and military status (0 = no military experience, 1 = military experience). We obtained unique MMSA codes so as to discern the geographic location of each respondent. Each respondent's MMSA was further defined thusly: (1) metropolitan division; (2) metropolitan statistical area; and (3) micropolitan statistical area.

Data analysis

This study was considered exempt from review by an institutional review board because the data were deidentified and publicly available. In order to accomplish Aim 1, we employed small area estimation (SAE) methodology[6]—that is, probabilities from BRFSS predictive models were post-stratified onto Census demographic population counts to derive area-specific prevalence estimates. Our unit-level models were estimated with survey-weighted, generalised linear mixed regression equations, each of which contained MMSA random effects. Fixed effect covariates in these models were selected to match Census pre-tabulated population count categories. To the extent that we were interested in the health behaviours of older veterans, we included an interaction term for age and military status—allowing us to discern the unique probability of senior citizen CU and HED. Empirical best predictor (EBP) probabilities of CU and HED for older veterans and nonveterans were applied to Census population counts in each MMSA in order to develop modelled rates.

To accomplish Aim 2, we estimated Pearson correlation coefficients of relationships between modelled estimates and direct survey estimates. Direct survey rates, that is, prevalence rates based on observed survey data, were developed for MMSAs with at least 50 individuals who exhibited the following characteristics: aged 65+ years and military experience. Our screening of MMSAs revealed that 19 of 136 MMSAs did not meet the inclusion criteria. These MMSAs were dropped from the validation analysis.

To accomplish Aim 3, we calculated the average modelled CU and HED rates among older veterans and nonveterans, separately. We categorised these estimates by MMSA type. We developed 95% confidence intervals for each of these point estimates.

Results

The weighted rate of CU for the entire sample was 14.90%. The weighted rate of HED for the entire sample was 6.16%. Results pertaining to our first aim are shown in Table 1. In the CU and HED models, older individuals were less likely to respond in the affirmative to the dependent variable. While females were less likely than males to report CU, no sex differences were observed for HED. Veterans were more likely to smoke and engage in heavy drinking than nonveterans. While no racial differences were observed in the CU model, blacks and other race individuals were more likely than white individuals to report HED.

Probabilities of CU and HED were computed from the models presented in Table 1. All modelled prevalence rates for each MMSA are given in Appendix A. Modelled older veteran CU rates ranged from 2.3%–16.6% and HED rates ranged from 1.6%–7.3%. For older nonveterans, modelled CU rates ranged from 2.2%–16.1% and HED rates ranged from 1.4%–6.5%. Across 136 MMSAs, in the aggregate, older veterans had higher CU rates compared to nonveterans (Mveteran = 9.56%, 95% CI = 9.15–9.97; Mnonveteran = 9.24%, 95% CI = 8.84–9.63; Cohen's *d* = *and higher HED rates (Mveteran = 4.68%, 95% CI = 4.52–4.84; Mnonveteran = 4.08%, 95% CI = 3.94–4.22; Cohen's d = 0.67).*

Modelled rates of CU and HED in 117 MMSAs were similar to direct estimates (Aim 2), indicating that the modelled rates were reliable. Regarding CU, correlations between modelled and direct estimates were as follows: total older adult prevalence (r = 0.73, 95% CI = 0.63–0.80), veteran prevalence (r = 0.44,

Table 1 Results of weighted generalised linear mixed models of current cigarette use (CU) and heavy episodic drinking (HED), SMART BRFSS 2017, N = 202 739

	Current cigarette use				Heavy drinking			
Variable	b	AOR	95% CI Lower	95% CI Upper	b	AOR	95% CI Lower	95% CI Upper
Fixed intercept	-1.42	0.24	0.23	0.26	-2.55	0.08	0.07	0.08
Age	-0.75	0.47	0.46	0.50	-0.56	0.57	0.54	0.61
Sex	-0.21	0.81	0.79	0.83	-0.01	0.99	0.95	1.03
Military status	0.17	1.18	1.13	1.24	0.19	1.20	1.12	1.30
Race								
White	Ref				Ref			
Black	0.03	1.03	0.99	1.08	-0.58	0.56	0.52	0.60
Other	-0.04	0.97	0.92	1.01	-0.40	0.67	0.62	0.72
Age x Military status	-0.27	0.76	0.70	0.84	-0.07	0.94	0.82	1.07
Random effects								
MMSA Intercept variance	0.10				0.07			
MMSA Intercept SD	0.32				0.26			

Note. Ref = Reference category. AOR = Adjusted odds ratio.

Table 2 Mean prevalence rates for current cigarette use (CU) and heavy episodic drinking (HED) among older veterans and nonveterans by metropolitan and micropolitan statistical area (MMSA), SMART BRFSS 2017, N = 202 739

	Current cigarette use prevalence				Heavy drinking prevalence			
MMSA	M	95% CI Lower	95% CI Upper	Cohen's d*	M	95% CI Lower	95% CI Upper	Cohen's d*
Metro division (n = 17)								
All older adults	7.41	6.44	8.37		4.08	3.77	4.39	
Veterans	7.62	6.63	8.62		4.58	4.22	4.94	
Nonveterans	7.36	6.40	8.32	0.13	3.98	3.68	4.27	0.87
Metro area (n = 113)								
All older adults	9.54	9.11	9.97		4.23	4.06	4.39	
Veterans	9.80	9.36	10.25		4.70	4.52	4.88	
Nonveterans	9.47	9.04	9.90	0.14	4.10	3.94	4.26	0.64
Micro area (n = 6)								
All older adults	10.23	9.16	11.31		4.18	3.47	4.89	
Veterans	10.52	9.42	11.63		4.60	3.82	5.37	
Nonveterans	10.16	9.09	11.22	0.27	4.07	3.38	4.76	0.58

* Cohen's d comparing veteran and nonveteran cigarette use or heavy drinking within each MMSA type

95% CI = 0.28–0.57) and nonveteran prevalence (r = 0.65, 95% CI = 0.54–0.75). Regarding HED, correlations between modelled and direct estimates were as follows: total older adult prevalence (r = 0.65, 95% CI = 0.53–0.75), veteran prevalence (r = 0.29, 95% CI = 0.11–0.45) and nonveteran prevalence (r = 0.60, 95% CI = 0.47–0.71).

Table 2 shows the results pertaining to our third aim. CU prevalence among older veterans was slightly higher than among older nonveterans in metropolitan divisions, metropolitan areas and micropolitan areas. Furthermore, for older veterans and older nonveterans, CU rates were slightly higher in micropolitan areas than in metropolitan areas and metropolitan divisions. HED rates among older veterans and older nonveterans were highest in metropolitan areas, followed by micropolitan areas and metropolitan divisions.

Discussion

We showed that slight disparities in CU and HED exist between older veterans and nonveterans. Specifically, we showed that older veterans had a higher prevalence of CU and HED than older nonveterans in 136 MMSAs. Following validation of our modelled prevalence rates with direct survey estimates, we showed that metropolitan divisions had the lowest rates of older veteran substance use.

Literature comparing CU and HED among older veterans and nonveterans is sparse. One national study showed that female veterans older than 50 years had a higher prevalence of CU than female nonveterans.[3] Regarding HED, another national study[7] found that veterans older than 55 had higher HED rates (4% vs 2%) than nonveterans; however, neither of these studies accounted for geography.

The proportion of veterans who are older than 65 will increase from 49% to 52% by 2024.[8] Given this demographic shift, and in light of the study results, targeted health education programs centred on smoking cessation and alcohol abstinence are needed. One intervention for substance abuse, which has been implemented in the Veterans Health Administration, is 'screening, brief intervention and referral to treatment (SBIRT)'. SBIRT is recommended by the US Preventive Services Task Force for CU and HED.[9,10]

Our study is limited to 136 MMSAs. Future studies would benefit from national coverage. Also, the question used to determine military service in the BRFSS did not distinguish between active duty and veterans. However, we assumed that any respondent who answered in the affirmative to the military service question and was older than 65 was a veteran.

In conclusion, we showed that rates of CU and HED were slightly higher among older veterans than among nonveterans in 2017 and that these disparities were accentuated in less urbanised areas. Interventions that screen older veterans for substance use and provide follow-up brief motivational interviews aimed at reducing adherence to adverse behaviours are needed.

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