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Alcohol use and treatment utilization in a national sample of veterans and nonveterans

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ABSTRACT

Background: Research comparing prevalence of alcohol use problems and alcohol treatment utilization between veterans and nonveterans is lacking. Whether predictors of alcohol use problems and alcohol treatment utilization differ in veterans vs. nonveterans is also unclear.

Methods: Using survey data from national samples of post-9/11 veterans and nonveterans ($N = 17,298$; 13,451 veterans, 3847 nonveterans), we investigated associations between veteran status and 1) alcohol consumption, 2) need for intensive alcohol treatment, and 3) past-year and lifetime alcohol treatment utilization. We also investigated associations between predictors and these three outcomes in separate models for veterans and nonveterans. Predictors included age, gender, racial/ethnic identity, sexual orientation, marital status, education, health coverage, financial difficulty, social support, adverse childhood experiences (ACEs), and adult sexual trauma.

Results: Population weighted regression models demonstrated that veterans reported modestly higher alcohol consumption than nonveterans, but were not significantly more likely to need intensive alcohol treatment. Veterans and nonveterans did not differ in past-year alcohol treatment utilization, but veterans were 2.8 times more likely to utilize lifetime treatment than nonveterans. We found several differences between veterans and nonveterans in associations between predictors and outcomes. For veterans, being male, having higher financial difficulty, and lower social support were associated with need for intensive treatment, but for nonveterans, only ACEs were associated with need for intensive treatment.

Conclusions: Veterans may benefit from interventions with social and financial support to reduce alcohol problems. These findings can help to identify veterans and nonveterans who are more likely to need treatment.

1. Introduction

Alcohol use disorder (AUD) is highly prevalent in both veterans and nonveterans (Fuehrlein et al., 2016; Hasin et al., 2007) and is associated with functional impairment (Mannes et al., 2021), psychosocial and health problems (Gutkind et al., 2021), psychiatric comorbidities (Castillo-Carniglia et al., 2019), and disease burden (in terms of disability and years of life lost; Global Burden of Disease 2016 Alcohol and Drug

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Use Collaborators, 2018). Although some may assume that veterans demonstrate higher alcohol use problems than nonveterans, little evidence exists to support this assumption. The few studies making direct comparisons between veterans and nonveterans on alcohol problems have found that veterans and nonveterans do not differ in prevalence of heavy episodic drinking (Grossbard et al., 2013) or past-year AUD (in two all ages adult samples [Boden & Hoggatt, 2018; Wagner et al., 2007] and in a sample of adults aged 21–34 [Golub et al., 2013]). In contrast, one study found higher lifetime AUD among veterans than nonveterans (36 % in Veterans vs. 28 % in nonveterans; Boden & Hoggatt, 2018).

Risk factors for alcohol use problems may also differ for veterans and nonveterans. Findings are mixed regarding how gender and age may be associated with alcohol problems differentially for veterans vs. nonveterans. For instance, one study found that veterans reported higher past-year AUD and heavy episodic drinking than nonveterans *only in men aged 18–25* (Hoggatt et al., 2017). In contrast, another study found that *nonveterans* demonstrate higher heavy episodic drinking than veterans *only in men* (Bachrach et al., 2018). Yet another study found that veterans reported higher lifetime AUD than nonveterans *only in women* (Evans et al., 2018). In studies investigating only veteran samples or only nonveteran samples, lower education (Bonevski et al., 2014; Gilman et al., 2008; Grant et al., 2012; O'Toole et al., 2020), lower social support (Bravo et al., 2016; Brick et al., 2018; Groh et al., 2007; McCabe et al., 2019), unpartnered marital status (Dash et al., 2020; Fuehrlein et al., 2016; Kendler et al., 2016; Kretsch & Harden, 2014), sexual minority status (Cochran et al., 2013; Crane et al., 2020; Lehavot et al., 2014), adverse childhood experiences (ACEs; Aronson et al., 2020; Hughes et al., 2017; Lee & Chen, 2017), and adult sexual assault (Caamano-Isorna et al., 2021; Forkus et al., 2020; Lindgren et al., 2012; Newins et al., 2021) were found to be associated with alcohol use problems. Among veterans, research has also found combat exposure to be associated with alcohol use problems (Miller et al., 2017; Na et al., 2021). Despite many studies investigating predictors of alcohol use problems among only veteran or only nonveteran samples, no studies to our knowledge have directly compared the strength of associations between these predictors and alcohol use problems in veteran vs. nonveterans.

Little research exists comparing veterans' and nonveterans' alcohol treatment utilization. One study found that veterans (vs. nonveterans) were more likely to be screened for alcohol use problems, and were more likely to receive advice about alcohol's harmful effects (Bachrach et al., 2018), which may lead to greater treatment utilization. Veterans (vs. nonveterans) were found to be more likely to receive substance use disorder (SUD) treatment in one study (Boden & Hoggatt, 2018), whereas another study found no such differences between veterans and nonveterans (Golub et al., 2013). This discrepancy may be due to sample/timing differences, as Golub et al. (2013) used data collected from 2004 to 2010 from a sample of adults aged 21–34, whereas Boden and Hoggatt (2018) used data collected from 2012 to 2013 from a sample of adults of all ages. In a sample of men of all ages receiving mental health treatment, the study found no differences in AUD treatment utilization between veterans and nonveterans (Manhapra et al., 2021). Given these sparse and conflicting findings, more research is needed to better understand alcohol treatment differences between veterans and nonveterans in national samples, especially among post-9/11 veterans (i.e., those who served in Operation Enduring Freedom, Operation Iraqi Freedom, and/or Operation New Dawn).

Several studies using veteran or nonveteran samples have investigated predictors of alcohol treatment utilization (with many more studies focused on nonveterans than veterans). Older age and lower income have been found to be associated with alcohol treatment utilization among veterans (Halvorson et al., 2014) and nonveterans (Cohen et al., 2007; Mowbray, 2014). Among veterans, combat exposure is also associated with alcohol treatment utilization (Miller et al., 2017). Among nonveterans, male gender (Cohen et al., 2007; Mellinger et al., 2019), White race (Niv et al., 2009), higher social support (Mowbray, 2014), divorced marital status, health coverage (Kim et al., 2010), childhood maltreatment (Goldstein et al., 2013), recent sexual assault (Rothman et al., 2008), and intimate partner violence (Schonbrun et al., 2013) were all associated with alcohol treatment utilization; however, among veterans, research has not investigated these predictors. Whether education and sexual orientation may be associated with alcohol treatment utilization differentially for veterans vs. nonveterans is unclear. In veterans, one study found that education was not associated with alcohol treatment utilization (Golub et al., 2013), whereas in nonveterans, there are mixed findings (Cohen et al., 2007; Golub et al., 2013; Grant, 1996). Sexual orientation has not been investigated as a predictor of alcohol use treatment utilization in Veterans. Among nonveterans, sexual minorities generally report greater unmet need for substance use treatment (Allen & Mowbray, 2016; Haney, 2020); however, findings from one study of nonveterans indicate that unmet need for alcohol use treatment may only be greater among gay men (and not among bisexual men, lesbian women, or bisexual women; Lehavot et al., 2017). Alcohol treatment utilization outcomes are measured differently across these studies, which may account for some conflicting findings in the literature; for instance, in Halvorson et al. (2014), treatment utilization is a three category outcome ("no treatment," "non-specialty SUD-care" and "specialty SUD-care") based on medical chart notes, whereas in Cohen et al. (2007), treatment utilization was assessed with a single-item self-report question defining treatment more broadly: "Have you ever gone anywhere or seen anyone for a reason that was related in any way to your drinking: a physician, counselor, Alcoholics Anonymous, or any other community agency or professional?" In addition to these inconsistencies, one prominent gap in this prior literature is that no studies have directly compared these predictors of alcohol treatment use for veterans and nonveterans. Thus, whether these predictors of alcohol treatment may differ for veterans and nonveterans remains unclear.

The current study aimed to fill these research gaps in direct comparisons of veterans and nonveterans on alcohol problems and treatment utilization. The study analyzed survey data from a nationally representative samples of post-9/11 veterans and nonveterans to (1) examine differences in alcohol use and alcohol treatment utilization between Veterans and nonveterans and (2) investigate whether associations between sociodemographic (and other relevant) factors and alcohol outcomes (alcohol problems and treatment utilization, specifically) differ between veterans and nonveterans.

2. Materials and methods

2.1. Participants and survey design

The Veterans Affairs (VA) Comparative Health Assessment Interview (CHAI) Research Study is a national, population-based survey study that examined the health and well-being of post-9/11 veterans (in Active Duty, or activated Guard/Reserve, at any point from 9/11/2001 through May 2015) and nonveterans. The response rate for the survey was 40.0 % among veterans and 56.5 % among nonveterans. This response rate is similar to response rates of other surveys (e.g., Bastian et al., 2014; Eber et al., 2013). Participants included a total of 19,820 veterans and nonveterans (n = 15,166 Veterans, n = 4654 nonveterans). A population-based sample of veteran participants were randomly selected from the U.S. Veterans Eligibility Trends and Statistics sampling frame (not limited to veterans seeking care at VA). GfK Group's KnowledgePanel applied a complex sampling frame to recruit nonveteran participants (Ipsos, 2022). The study collected data from 4/18/2018 to 8/10/2018 through an online survey or computer-assisted telephone interview. All participants provided informed consent and received $50 for survey completion. Previous published studies include additional detail on sampling and recruitment methods (Blosnich et al., 2021; Hoffmire et al., 2021). The VA Central Institutional Review Board approved the CHAI study protocols.

For the current study, we included 17,298 respondents (87 % of the

total sample; n = 13,451 veterans, n = 3847 nonveterans) who had complete data on key variables.

2.2. Measures

2.2.1. Predictor variables

2.2.1.1. Sociodemographic variables. Participants self-reported their age, gender identity, race/ethnicity, sexual orientation, marital status, education, current healthcare coverage, and current financial difficulty. The study restricted gender identity to participants who self-identified as a man or woman, with transgender participants categorized based on their self-identified gender. We assessed financial difficulty in one item: "Which of the following best describes your financial condition over the past 4 months?" Options included 1) "Very comfortable and secure," 2) "Able to make ends meet without much difficulty," 3) "Occasionally have some difficulty making ends meet," 4) "Tough to make ends meet but keeping your head above water," and 5) "In over your head." Current health care coverage categories included VA, Tricare, other government coverage (e.g., Medicare), employer coverage, other private coverage, or no coverage.

2.2.1.2. Social support. We used the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1998) to assess perceived social support from friends, family, and significant others. The MSPSS includes 12 items, such as "I can count on my friends when things go wrong," with response options from "very strongly disagree (1)" to "very strongly agree (7)." Items are summed with resulting scale scores ranging from 12 to 84. The MSPSS has demonstrated good psychometric properties (Zimet et al., 1990).

2.2.1.3. Adverse childhood experiences (ACEs). The measure of ACEs comprised items from the Life Stressors Checklist–Revised (LSC-R; Wolfe & Kimerling, 1997) and the Life Events Checklist (LEC) for DSM–5—Extended (Weathers et al., 2013). The LSC-R and LEC-5 have demonstrated good psychometric properties (Blevins et al., 2015; Gray et al., 2004). For each response endorsing a specific type of adverse event, the assessment asked participants if the event happened "before age 18," "age 18 or older," or both. We assessed 24 individual potentially traumatic events that occurred before the age of 18 (yes = 1 or no = 0). As in prior research, we transformed these 24 variables into a 5-category ordinal variable representing the cumulative frequency of ACEs (0, 1–2, 3–4, 5–6, >6 ACEs; Maguen et al., 2022).

2.2.1.4. Adult sexual assault. We used two items from The Life Stressor Checklist-Revised (LSC-R; Wolfe & Kimerling, 1997) to assess adult sexual assault: 1) "Did you ever have sex (oral, anal, genital) when you didn't want to because someone forced you in some way or threatened to hurt you if you didn't?") and 2) "Were you ever touched or made to touch someone else in a sexual way because he/she forced you in some way or threatened to harm you if you didn't?" Participants who responded yes to at least one item, and specified that this occurred when they were 18 or older, were categorized as experiencing adult sexual assault.

2.2.1.5. Combat exposure. The study asked participants to self-report whether they had experienced combat or exposure to a warzone on one item from the LEC.

2.2.2. Outcome variables

2.2.2.1. Alcohol Use Disorders Identification Test – Consumption (AUDIT-C). The AUDIT-C includes three questions assessing alcohol consumption. The first question asks, "How often did you have a drink containing alcohol in the past year?" The second question asks, "How many drinks containing alcohol did you have on a typical day when you were drinking in the past year?" The third question asks, "How often did you have six or more drinks on one occasion in the past year?" Items are rated on a 0–4 scale and summed to a total score of 0–12. Research has shown the AUDIT-C to be valid in veteran and nonveteran samples (Aalto et al., 2009; Bradley et al., 2003; Bush et al., 1998; Crawford et al., 2013). In the current study, we used the total score as an outcome variable; we also used cutoff scores recommended by Aalto et al. (2009, 2006) for the general population (>4 for women and >5 for men) to restrict the sample when investigating need for treatment as an outcome variable. The study administered the ASSIST (assessing need for treatment; described below) only to participants who met these cutoff scores.

2.2.2.2. Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST). We used the alcohol involvement subscale (comprising six items) from the ASSIST to assess need for intensive alcohol treatment (Ali et al., 2002; Humeniuk et al., 2008; Humeniuk et al., 2010). The alcohol involvement subscale measures alcohol use problems (e.g., "During the past three months, how often has your use of alcohol led to health, social, legal, or financial problems?"). Item responses are summed to a total alcohol involvement score of 0–39. Alcohol involvement scores fall into three categories: 1) no treatment recommended (score 0–10), 2) brief treatment recommended (score 11–26), and 3) intensive treatment recommended (score 27 or more). A brief intervention is defined as a one-time discussion about problem alcohol use with a provider; intensive treatment is any targeted treatment for problem alcohol use beyond a one-time intervention.

In the current study, one of the six ASSIST items assessing alcohol involvement presented a temporal parameter in the question and response options that differed from the original screening test. The correct original wording for the question and response options follows: "Has a friend or relative or anyone else ever expressed concern about your use of alcohol?" with response options "no, never (scored 0)," "yes, but not in the past three months (scored 3)," or "yes, in the past three months (scored 6)." The current study added a time specifier to the question: "*In the past three months*, has a friend or relative or anyone else ever expressed concern about your use of alcohol?" with response options "never," "once or twice," "monthly," "weekly," or "daily or almost daily." Our version of this question allowed us to correctly identify which participants reported that others expressed concern about their alcohol use *in the past three months* (options "once or twice," "monthly," "weekly," or "almost daily"); the study gave these participants a score of 6 for this item. Participants who reported "never" were given a score of 0 for this item. Because of how this item was asked, participants in this study who may have reported "yes, but not in the past three months" if presented with the original question and response options (with corresponding score of 3) would have answered "never" (and given a score of 0) in the current study. As a consequence, in the current study, we underestimated alcohol involvement scores by 3 points for some participants; however, this partial underestimation is the same across veterans and nonveterans and should not contribute to differential findings for these groups.

2.2.2.3. Past-year and lifetime alcohol treatment. The study asked participants: "Have you received treatment for your use of alcohol in the past year?" and "Have you ever received treatment for your use of alcohol?" with response options yes and no for both questions.

2.3. Statistical analysis

2.3.1. Data analytic plan

For models with AUDIT-C as the outcome variable, the current study used the full sample of participants (N = 17,298). For this linear regression model, we first checked that the AUDIT-C met criteria for normal distribution (with skew between −2 and 2 and kurtosis between

−7 and 7; Hair et al., 2009; for current investigation: skew = 1.14 [*SE* = 0.02], kurtosis = 1.18 [*SE* = 0.04]). For models with need for intensive alcohol treatment (from the ASSIST) as the outcome variable, we used a subgroup of participants who scored above the AUDIT-C cutoff (n = 12,887). For models with past-year or lifetime alcohol treatment as the outcome variable, the study used a subgroup of participants who were identified as needing either brief or intensive treatment based on the ASSIST (n = 2674).

We corrected for family wise error (i.e., erroneously rejecting the null hypothesis) by assessing statistical significance at $p < .001$ for all planned analyses. The study team performed analyses using SPSS Version 28.

For the first research question examining veteran vs. nonveteran differences in alcohol use and alcohol treatment, the study conducted four regression models—one linear regression (with the AUDIT-C as outcome variable) and three binary logistic regressions (with need for intensive treatment, past-year alcohol treatment, and lifetime alcohol treatment as outcome variables). These four models compared veteran and nonveteran alcohol use and alcohol treatment, controlling for demographic and social factors. The study used population and standardization weighting in these four models that weighted nonveterans to the population demographic distribution of veterans. Using Taylor series approximation (linearization) variance estimation, weighting accounted for the complex sampling design, noncoverage, and nonresponse (as described in a previous study using these data; Blosnich et al., 2021). Our estimation of the coefficient on veteran status (veteran vs. nonveteran) is doubly robust because the study controlled for demographic differences both through weighting and by entering these variables as covariates in these four models (Funk et al., 2011). However, because of this, the covariates in these four models (all variables except veteran vs. nonveteran status) are not interpretable but rather used solely for adjustment purposes. Our covariates in these four models included age, gender, sexual orientation, marital status, racial/ethnic identity, education, healthcare coverage (yes/no for any coverage), financial difficulty, social support, ACEs, and adult sexual trauma. The study z-scored financial difficulty and social support for ease of interpretation.

For our second research question, we examined separately associations between our predictor and outcome variables in veterans and nonveterans. We employed a different weighting procedure to allow for appropriate interpretation of model estimates for veterans and nonveterans. For veterans, weights included a base sampling weight, a nonresponse adjustment, and a calibration to gender, pre−/post-9/11 activation, and deployment factors (branch, component, or geographic region; Blosnich et al., 2021). For nonveterans, weights included the probability of selection into the KnowledgePanel and into the CHAI sample, matched to US Census benchmarks. Using this weighting strategy, the study examined separately four regression models (with AUDIT-C, need for intensive intervention, past-year treatment, and lifetime treatment as outcome variables) for veterans and for nonveterans. Predictor variables included age group, gender, racial/ethnic identity, sexual orientation, marital status, education, main source of healthcare coverage, financial difficulty, social support, ACEs, and adult sexual trauma. For the veteran models only, VA and Tricare health coverage and combat exposure were also included.

2.3.2. Missing data

We excluded 13 % of participants from the original study due to missing data on any of the key variables, which was the result of skipped questions on various predictor variables and the AUDIT-C.

3. Results

3.1. Participant characteristics

The majority of veterans and nonveterans in our sample were

Table 1
Full sample characteristics and measures by veteran status, with population weights.

Variable	Variable subcategory	Veteran weighted mean (*SD*) or % n = 13,451	Nonveteran weighted mean (*SD*) or % n = 3847
Age (in years)		38.42 (10.41)*	44.13 (15.89)*
Age groups			
	18–24	3.7 %*	9.7 %*
	25–34	38.9 %*	24.1 %*
	35–44	31.6 %*	19.3 %*
	45–54	16.3 %	17.9 %
	55–64	7.9 %*	16.4 %*
	65+	1.6 %*	12.6 %*
Men		82.7 %*	47.6 %*
Racial/ethnic identity			
	White (non-Hispanic)	66.4 %*	62.6 %*
	Black (non-Hispanic)	12.7 %	12.0 %
	Hispanic	11.4 %*	16.3 %*
	Multiracial (non-Hispanic)	5.7 %*	1.8 %*
	Other (non-Hispanic)	3.8 %*	7.3 %*
Sexual orientation			
	Heterosexual	95.5 %*	92.1 %*
	Gay/lesbian	1.8 %*	3.8 %*
	Bisexual	1.9 %*	2.9 %*
	Other	0.8 %	1.2 %
Marital status			
	Never married	19.9 %*	31.3 %*
	Married/ in a domestic relationship	63.4 %*	55.3 %*
	Divorced/ separated/ widowed	16.7 %*	13.4 %*
Education			
	No college	12.4 %*	38.9 %*
	Some college	29.1 %*	18.8 %*
	Associates	17.3 %*	11.0 %*
	Bachelors	24.4 %*	18.1 %*
	Masters or PhD	16.8 %*	13.2 %*
Health coverage			
	VA	32.1 %	NA
	Tricare	29.7 %	NA
	Employer coverage	46.8 %*	59.8 %*
	Other government coverage	9.1 %*	32.4 %*
	No coverage	5.6 %*	7.8 %*
	Other private coverage	1.5 %*	3.4 %*
Financial difficulty (scale 1–5)		2.40 (1.15)*	2.25 (1.09)*
Social support (scale 12–84)		64.51 (15.78)*	62.73 (15.44)*
ACEs			
	0	23.9 %*	26.9 %*
	1–2	33.2 %*	36.1 %*
	3–4	18.5 %	19.1 %
	5–6	11.1 %*	9.0 %*
	7+	13.3 %*	8.9 %*
Adult sexual trauma history		13.1 %	14.6 %
Combat exposure		45.9 %	NA
AUDIT-C (scale 0–12)		3.26 (2.61)*	2.56 (2.33)*
Need for intensive treatment (from ASSIST)		4.6 %*	2.5 %*
Past-year alcohol treatment		1.5 %	1.3 %
Lifetime alcohol treatment		7.3 %*	2.6 %*

ACE = Adverse Childhood Experiences, AUDIT-C = Alcohol Use Disorders Identification Test – Consumption, ASSIST = Alcohol, Smoking, and Substance Involvement Screening Test. Need for intensive treatment prevalence may be underestimated due to survey administration error; see measures section for detail.

* Significant group differences at $p < .05$.

married, White, heterosexual, and had some form of health care coverage. Among veterans needing intensive treatment, 16 % (vs. 9 % in nonveterans) received past year alcohol treatment and 36 % (vs. 14 % in nonveterans) received lifetime alcohol treatment. Among veterans needing brief treatment, 3 % (also 3 % in nonveterans) received past year alcohol treatment and 13 % (vs. 7 % in nonveterans) received lifetime alcohol treatment. See Table 1 for population weighted characteristics for Veterans and nonveterans.

3.2. Combined veterans and nonveterans models

Veterans demonstrated higher alcohol consumption ($B = 0.30$, CI =

Table 2
AUDIT-C veteran and nonveteran models, with population weights, N = 17,298.

Predictor variables	Variable subcategory	Veteran model $n = 13,451$		Nonveteran model $n = 3847$	
		B	*95 % CI*	*B*	*95 % CI*
Age (ref group: 25–34)					
	18–24	−0.12	−0.40-0.16	0.04	−0.45-0.54
	35–44	−0.15	−0.29- -0.01	0.12	−0.15-0.39
	45–54	**−0.45****	**−0.62- -0.29**	−0.11	−0.46-0.24
	55–64	**−0.64****	**−0.82- -0.46**	−0.07	−0.46-0.32
	65+	−0.12	−0.48-0.23	−0.16	−0.64-0.32
Gender: men (ref group: women)		**0.96****	**0.84–1.07**	**0.82****	**0.61–1.04**
Racial/ethnic identity (ref group: White [non-Hispanic])					
	Black (non-Hispanic)	**−0.39****	**−0.56- -0.23**	−0.09	−0.51-0.33
	Hispanic	−0.02	−0.20-0.17	−0.10	−0.47-0.27
	Multiracial (non-Hispanic)	−0.18	−0.41-0.06	−0.21	−0.68 − 0.27
	Other (non-Hispanic)	-0.27	−0.57-0.03	**−0.73****	**−1.05- -0.40**
Sexual orientation (ref group: heterosexual)					
	Gay/lesbian	0.41	0.04–0.78	−0.35	−0.73-0.03
	Bisexual	0.19	−0.17- 0.56	0.37	−0.53-1.26
	Other	−0.42	−1.14-0.29	0.96	−0.40-2.32
Marital status (ref group: never married)					
	Married/ in a domestic relationship	−0.24*	−0.40- -0.08	−0.05	−0.36-0.26
	Divorced/ separated/widowed	0.11	−0.09-0.31	−0.08	−0.49-0.34
Education (ref group: no college)					
	Some college	−0.11	−0.33-0.10	−0.07	−0.39-0.26
	Associates	−0.31*	−0.54- -0.09	−0.10	−0.45-0.26
	Bachelors	−0.17	−0.39-0.04	0.20	−0.11-0.50
	Masters or PhD	−0.18	−0.40-0.05	−0.06	−0.38-0.26
Health coverage (ref group: no coverage)					
	VA	−0.13	−0.26-0.01	NA	NA
	Tricare	**−0.44****	**−0.60 - -0.29**	NA	NA
	Employer coverage	−0.11	−0.26-0.04	−0.10	−0.49-0.28
	Other government coverage	**−0.47****	**−0.70 - -0.24**	−0.65*	−1.07- -0.22
	Other private coverage	−0.03	−0.54-0.49	−0.61	−1.17- -0.05
Financial difficulty (z-scored)		0.04	−0.03-0.10	−0.03	−0.15-0.09
Social support (z-scored)		**−0.18****	**−0.25- − 0.12**	0.00	-0.12-0.11
ACEs (ref group: no ACEs)					
	1–2	0.08	−0.06-0.22	0.25	0.01–0.50
	3–4	0.23*	0.07–0.39	0.45*	0.14–0.77
	5–6	0.20	0.001–0.40	0.09	−0.31-0.50
	7+	0.11	−0.09-0.31	0.13	−0.29-0.56
Adult sexual trauma history		0.08	−0.09-0.24	0.46	0.11–0.82
Combat exposure		**0.43****	**0.32–0.55**	NA	NA

AUDIT-C = Alcohol Use Disorders Identification Test – Consumption, ACE = Adverse Childhood Experiences. Veteran model estimated with linear regression model with population weights including a base sampling weight, a nonresponse adjustment, and a calibration to sex, pre/post-9/11 activation, and deployment factors (branch, component, and geographic stratum). Nonveteran model estimated with linear regression model with population weights including the probability of selection into the KnowledgePanel and into the CHAI sample, matched to U.S. Census benchmarks (18+ non-incarcerated) on age, sex, race/ethnicity, census region, education, and household income.

* $p < .01$.
** $p < .001$.

Table 3
ASSIST need for intensive treatment veteran and nonveteran models, with population weights, n = 12,887.

Predictor variables	Variable subcategory	Veteran model n = 10,135		Nonveteran model n = 2752	
		OR	*95 % CI*	*OR*	*95 % CI*
Age (ref group: 25–34)					
	18–24	0.25	0.06–1.14	0.78	0.24–2.53
	35–44	1.11	0.83–1.50	0.88	0.46–1.71
	45–54	0.62	0.40–0.94	2.20	0.88–5.52
	55–64	0.87	0.48–1.58	0.23	0.06–0.90
	65+	0.27	0.06–1.21	0.45	0.06–3.49
Gender: men (ref group: women)		**2.40****	**1.75–3.28**	2.30	1.13–4.68
Racial/ethnic identity (ref group: White [non-Hispanic])					
	Black (non-Hispanic)	1.41	0.96–2.07	1.55	0.60–3.97
	Hispanic	1.17	0.80–1.70	1.58	0.70–3.53
	Multiracial (non-Hispanic)	0.83	0.47–1.46	[a]	[a]
	Other (non-Hispanic)	1.52	0.80–2.89	1.77	0.46–6.82
Sexual orientation (ref group: heterosexual)					
	Gay/lesbian	0.82	0.39–1.75	1.16	0.32–4.26
	Bisexual	0.67	0.28–1.63	0.80	0.21–3.03
	Other	1.57	0.50–4.96	0.84	0.07–9.57
Marital status (ref group: never married)					
	Married/ in a domestic relationship	1.31	0.91–1.89	0.85	0.38–1.88
	Divorced/ separated/ widowed	1.26	0.85–1.87	0.13*	0.03–0.47
Education (ref group: no college)					
	Some college	0.89	0.61–1.30	0.81	0.28–2.32
	Associates	0.50*	0.31–0.82	0.58	0.21–1.59
	Bachelors	0.93	0.61–1.40	0.63	0.29–1.36
	Masters or PhD	0.94	0.56–1.55	0.64	0.23–1.79
Health coverage (ref group: no coverage)					
	VA	0.97	0.72–1.29	NA	NA
	Tricare	0.64	0.42–0.98	NA	NA
	Employer coverage	0.75	0.54–1.03	0.76	0.30–1.90
	Other government coverage	1.31	0.83–2.07	0.91	0.35–2.39
	Other private coverage	0.74	0.21–2.62	[a]	[a]
Financial difficulty (z-scored)		**1.32****	**1.16–1.51**	1.25	0.91–1.71
Social support (z-scored)		**0.62****	**0.55–0.69**	0.88	0.66–1.16
ACEs (ref group: no ACEs)					
	1–2	1.15	0.78–1.69	3.19	1.33–7.69
	3–4	1.24	0.82–1.89	**5.42****	**2.19–13.46**
	5–6	1.44	0.92–2.27	5.57*	1.83–16.92
	7+	1.37	0.88–2.13	6.33*	1.94–20.65
Adult sexual trauma history		1.34	0.93–1.93	1.56	0.61–4.01
Combat exposure		1.41	1.08–1.85	NA	NA

ACE = Adverse Childhood Experiences. Veteran model estimated with binary logistic regression model with population weights including a base sampling weight, a nonresponse adjustment, and a calibration to sex, pre/post-9/11 activation, and deployment factors (branch, component, and geographic stratum). Nonveteran model estimated with binary logistic regression model with population weights including the probability of selection into the KnowledgePanel and into the CHAI sample, matched to U.S. Census benchmarks (18+ non-incarcerated) on age, sex, race/ethnicity, census region, education, and household income.

* $p < .01$.

** $p < .001$.

[a] Numbers too low to analyze in model.

0.18–0.42) and higher lifetime alcohol treatment utilization (*OR* = 2.80, 95 % CI = 1.67–4.70) than nonveterans. Based on our more conservative significance cutoff of $p < .001$, veterans did not demonstrate higher need for intensive treatment (*OR* = 1.63, 95 % CI = 1.18–2.23, $p = .003$). Veterans and nonveterans did not differ significantly on past-year alcohol treatment ($p = .23$).

3.3. Separate veteran and nonveteran models

3.3.1. Alcohol consumption (AUDIT-C)

In veterans, the following predictor variables were associated with higher alcohol consumption: a) identifying as a man (vs. woman), $B = 0.96$, CI = 0.84–1.07, b) identifying as White (vs. Black), $B = 0.39$, CI = 0.23–0.56, c) being aged 25–34 (vs. 45–54 and vs. 55–64), $B = 0.45$/0.64, CI = 0.29–0.62/0.46–0.82, d) lower social support, $B = -0.18$, CI = −0.25 to −0.12, and e) combat exposure, $B = 0.43$, CI = 0.32–0.55. Having other government health coverage (i.e., not TriCare or VA health coverage, but another form of government health coverage, such as Medicare), $B = -0.47$, CI = −0.70 to −0.24, or Tricare, $B = -0.44$, CI = −0.60 to –0.29, was associated with lower alcohol consumption (Table 2).

In nonveterans, the following predictor variables were also associated with higher alcohol consumption: a) identifying as a man (vs. woman), $B = 0.82$, CI = 0.61–1.04, and b) identifying as White (vs. "other" on the racial/ethnic categories) $B = 0.73$, CI = 0.40–1.05 (Table 2).

3.3.2. Need for intensive treatment (ASSIST)

In Veterans, the following predictor variables were associated with being identified as needing intensive treatment for alcohol use: 1) identifying as a man (vs. woman), *OR* = 2.40, CI = 1.75–3.28; 2) greater financial difficulty, *OR* = 1.32, CI = 1.16–1.51; and 3) lower social support, *OR* = 0.62, CI = 0.55–0.69 (Table 3). In nonveterans, only greater ACEs, *OR* = 6.33, CI = 1.94–20.65, were associated with being identified as needing intensive treatment for alcohol use (Table 3).

3.3.3. Past-year alcohol treatment

For both veterans and nonveterans, no predictor variables were significantly associated with past-year alcohol treatment (Table 4).

3.3.4. Lifetime alcohol treatment

In veterans, only lower education was associated with lifetime

Table 4
Past-year alcohol treatment veteran and nonveteran models, with population weights, n = 2674.

Predictor variables	Variable subcategory	Veteran model $n = 2100$		Nonveteran model $n = 574$	
		OR	*95 % CI*	*OR*	*95 % CI*
Age (ref group: 25–34)					
	18–24	0.36	0.04–3.20	[a]	[a]
	35–44	1.21	0.72–2.05	0.27	0.07–1.01
	45–54	0.96	0.39–2.35	1.32	0.41–4.28
	55–64	1.69	0.52–5.53	[a]	[a]
	65+	0.45	0.05–3.75	[a]	[a]
Gender: men (ref group: women)		1.53	0.82–2.88	0.68	0.19–2.39
Racial/ethnic identity (ref group: White [non-Hispanic])					
	Black (non-Hispanic)	1.04	0.49–2.22	2.61	0.69–9.96
	Hispanic	1.33	0.65–2.72	2.46	0.52–11.61
	Multiracial (non-Hispanic)	1.18	0.53–2.66	[a]	[a]
	Other (non-Hispanic)	3.66*	1.54–8.71	7.96	1.61–39.35
Sexual orientation (ref group: heterosexual)					
	Gay/lesbian	1.07	0.31–3.62	0.84	0.08–8.60
	Bisexual	0.91	0.19–4.43	[a]	[a]
	Other	1.39	0.22–8.78	[a]	[a]
Marital status (ref group: never married)					
	Married/ in a domestic relationship	0.48	0.26–0.90	4.98	1.02–24.33
	Divorced/ separated/ widowed	1.30	0.68–2.51	1.47	0.17–13.00
Education (ref group: no college)					
	Some college	0.65	0.32–1.31	0.36	0.08–1.70
	Associates	0.57	0.24–1.34	2.00	0.52–7.62
	Bachelors	0.82	0.39–1.72	0.23	0.02–2.37
	Masters or PhD	0.91	0.39–2.15	1.31	0.20–8.35
Health coverage (ref group: no coverage)					
	VA	1.94*	1.24–3.06	NA	NA
	Tricare	1.31	0.63–2.74	NA	NA
	Employer coverage	0.84	0.50–1.43	2.85	0.63–12.98
	Other government coverage	2.69*	1.34–5.40	3.60	0.56–23.30
	Other private coverage	0.16	0.02–1.37	[a]	[a]
Financial difficulty (z-scored)		1.27	0.98–1.64	1.20	0.65–2.23
Social support (z-scored)		1.11	0.88–1.39	0.63	0.36–1.09
ACEs (ref group: no ACEs)					
	1–2	0.67	0.30–1.49	[a]	[a]
	3–4	1.60	0.76–3.34	[a]	[a]
	5–6	1.66	0.72–3.80	[a]	[a]
	7+	1.60	0.75–3.43	[a]	[a]
Adult sexual trauma history		1.14	0.65–2.00	1.49	0.45–4.96
Combat exposure		1.03	0.64–1.66	NA	NA

ACE = Adverse Childhood Experiences. Veteran model estimated with binary logistic regression model with population weights including a base sampling weight, a nonresponse adjustment, and a calibration to sex, pre/post-9/11 activation, and deployment factors (branch, component, and geographic stratum). Nonveteran model estimated with binary logistic regression model with population weights including the probability of selection into the KnowledgePanel and into the CHAI sample, matched to U.S. Census benchmarks (18+ non-incarcerated) on age, sex, race/ethnicity, census region, education, and household income.

* $p < .01$.

[a] Numbers too low to analyze in model.

alcohol treatment (not having gone to college vs. having a bachelors, *OR* = 2.45, CI = 1.53–3.94; not having gone to college vs. having a masters or PhD, *OR* = 2.37, CI = 1.42–3.94; Table 5). In nonveterans, no predictor variables were significantly associated with lifetime alcohol treatment (Table 5).

4. Discussion

The current study is the first to use nationally representative samples of veterans and nonveterans to not only compare prevalence of alcohol use and alcohol treatment, but also to compare predictors of alcohol use and alcohol treatment. We found that veterans reported higher alcohol consumption and higher lifetime alcohol treatment utilization than nonveterans. However, differences in alcohol consumption between veterans and nonveterans were modest (with a mean of 3.26 among veterans vs. a mean [age−/sex−/race-ethic-adjusted] of 2.92 among nonveterans on a 0–12 scale). Differences in lifetime alcohol treatment were more prominent, with veterans being 2.8 times more likely to receive treatment compared with nonveterans. This represents a particularly novel finding, as previous studies investigating differences in treatment utilization among veterans and nonveterans have focused on SUD treatment broadly and only assessed past-year treatment utilization, with conflicting findings (Boden & Hoggatt, 2018; Golub et al., 2013).

One possible reason that veterans receive alcohol treatment more than nonveterans is that the VA provides more alcohol screenings and alcohol treatment than traditional health care facilities. However, we did not find that current VA health care coverage was associated with alcohol treatment utilization. Another reason may be that because veterans report higher alcohol consumption, they have a greater need for alcohol treatment utilization. Additionally, the transition out of active military service can be difficult, and this may lead to higher prevalence of alcohol use and AUD, which may then lead individuals to seek treatment (e.g., Hoopsick et al., 2017; Wright et al., 2012). The fact that veteran participants in the current study had separated an average of nine years ago (and had nearly a decade to seek treatment) may partially explain why this study found differences in lifetime treatment between veterans and nonveterans but no differences in past-year treatment.

Gender was a prominent predictor in several contexts. For veterans, men reported higher alcohol consumption and were 2.4 times more likely to be identified as needing intensive alcohol treatment than women (based on self-reported alcohol-related problems). For nonveterans, men also reported higher alcohol consumption than women, but they were not more likely to be identified as needing intensive alcohol treatment than women. This finding suggests that veteran men demonstrate especially high need for alcohol treatment services. This finding aligns with one previous research finding that veterans reported

Table 5
Lifetime alcohol treatment veteran and nonveteran models, with population weights, n = 2674.

Predictor variables	Variable subcategory	Veteran model $n = 2100$		Nonveteran model $n = 574$	
		OR	*95 % CI*	*OR*	*95 % CI*
Age (ref group: 25–34)					
	18–24	0.47	0.14–1.61	0.39	0.02–6.86
	35–44	1.17	0.85–1.60	2.78	1.07–7.25
	45–54	1.18	0.74–1.87	1.60	0.53–4.86
	55–64	0.83	0.43–1.61	3.25	0.68–15.44
	65+	0.33	0.08–1.37	12.59*	2.45–64.81
Gender: men (ref group: women)		1.86*	1.24–2.81	3.26	1.25–8.52
Racial/ethnic identity (ref group: White [non-Hispanic])					
	Black (non-Hispanic)	1.33	0.87–2.04	1.12	0.28–4.41
	Hispanic	1.38	0.93–2.05	0.41	0.12–1.36
	Multiracial (non-Hispanic)	0.98	0.58–1.66	2.32	0.21–25.04
	Other (non-Hispanic)	1.08	0.51–2.28	2.41	0.38–15.38
Sexual orientation (ref group: heterosexual)					
	Gay/lesbian	1.85	0.85–4.04	0.31	0.05–2.06
	Bisexual	2.03	1.02–4.08	0.09	0.00–2.31
	Other	1.14	0.25–5.23	5.70	0.49–66.11
Marital status (ref group: never married)					
	Married/ in a domestic relationship	0.64	0.45–0.92	0.78	0.32–1.92
	Divorced/ separated/ widowed	1.07	0.72–1.61	0.70	0.15–3.25
Education (ref group: no college)					
	Some college	0.66	0.43–0.99	0.55	0.20–1.50
	Associates	0.48*	0.29–0.77	0.25	0.05–1.30
	Bachelors	**0.41****	**0.25–0.66**	0.20	0.06–0.69
	Masters or PhD	**0.42****	**0.25–0.70**	0.19	0.05–0.77
Health coverage (ref group: no coverage)					
	VA	1.45	1.06–1.99	NA	NA
	Tricare	1.07	0.70–1.64	NA	NA
	Employer coverage	0.75	0.53–1.05	0.68	0.24–1.99
	Other government coverage	1.14	0.72–1.83	0.81	0.26–2.49
	Other private coverage	[a]	[a]	[a]	[a]
Financial difficulty (z-scored)		0.98	0.84–1.13	1.01	0.66–1.53
Social support (z-scored)		0.93	0.81–1.07	1.76	1.13–2.75
ACEs (ref group: no ACEs)					
	1–2	1.38	0.89–2.15	3.01	0.52–17.40
	3–4	1.82	1.14–2.88	2.72	0.41–18.13
	5–6	2.00*	1.23–3.26	5.42	0.78–37.59
	7+	1.75	1.06–2.89	8.27	1.20–57.11
Adult sexual trauma history		1.31	0.88–1.95	3.14	1.01–9.73
Combat exposure		0.87	0.65–1.17	NA	NA

ACE = Adverse Childhood Experiences. Veteran model estimated with binary logistic regression model with population weights including a base sampling weight, a nonresponse adjustment, and a calibration to sex, pre/post-9/11 activation, and deployment factors (branch, component, and geographic stratum). Nonveteran model estimated with binary logistic regression model with population weights including the probability of selection into the KnowledgePanel and into the CHAI sample, matched to U.S. Census benchmarks (18+ non-incarcerated) on age, sex, race/ethnicity, census region, education, and household income.

* $p < .01$.

** $p < .001$.

[a] Numbers too low to analyze in model.

higher past-year AUD and heavy episodic drinking than nonveterans only in men aged 18–25 (Hoggatt et al., 2017). However, our finding conflicts with one finding that nonveteran men reported higher heavy episodic drinking than veterans (Bachrach et al., 2018) and another finding that veterans reported higher lifetime AUD than nonveterans only in women (Evans et al., 2018). Differences in findings may be attributable to differences in samples (e.g., younger age) or measurement of alcohol outcomes.

Many prominent differences existed between our veteran and nonveteran models. For veterans, higher financial difficulty and lower social support were associated with need for intensive treatment. In contrast, for nonveterans, only ACEs predicted need for intensive treatment. In previous studies, financial difficulty, social support, and ACEs have all been found to be related to alcohol problems among both veterans and nonveterans (Aronson et al., 2020; Bravo et al., 2016; Brick et al., 2018; Cohen et al., 2007; Groh et al., 2007; Halvorson et al., 2014; Hughes et al., 2017; Lee & Chen, 2017; McCabe et al., 2019), but these studies did not account for the shared variance of all three factors. Mental health interventions for veterans that incorporate modules on social support, such as VetChange, significantly reduced alcohol consumption (e.g., Livingston et al., 2020). Financial assistance programs may also be a helpful adjunct for many veterans with alcohol use problems, given that they have been shown to improve health outcomes (e.g., Nelson et al., 2021). Conversely, for nonveterans, focus on ACEs may be particularly helpful. For example, a trauma-informed motivational intervention for adults with a history of ACEs led to reductions in alcohol use (Goldstein et al., 2019).

Several factors were related to overall alcohol *consumption* but not being identified as needing treatment. For veterans, these factors included identifying as White (vs. Black), being aged 25–34 (vs. 45–54 and vs. 55–64), and combat exposure. For nonveterans, identifying as White (vs. "other") was associated with alcohol consumption but not needing treatment. Thus, across veterans and nonveterans, White individuals may consume higher amounts of alcohol, but do not report greater negative consequences. This finding may be due to White privilege, with White individuals' greater access to various resources potentially buffering against the negative effects of higher alcohol use. Conversely, experiences of discrimination for non-White individuals may especially heighten the negative consequences of alcohol use. For instance, several studies have found that associations between race and alcohol problems are accounted for by experiences of racial discrimination, as well as other environmental factors (McKone et al., 2019;

Zapolski et al., 2014; Zemore et al., 2016). For veterans, the 25–34 age group reported higher alcohol consumption (vs. 45–54 and vs. 55–64), but they did not report higher need for treatment than any other group. One previous study found that veterans aged 18–25 demonstrated greater risky alcohol consumption (Hoggatt et al., 2017). Younger adult veterans may demonstrate higher alcohol consumption due to a variety of factors, including using alcohol to cope with the transition to adulthood, proximity to separation from active duty, and the age of veterans at the start of the Iraq War. More research is needed to better understand these age/cohort effects in veterans, and which factors may protect this group from greater alcohol problems. Alternatively, higher alcohol consumption in younger veterans may not cause immediate problems (or they may not be aware of problems), but may lead to greater problems in the future.

The current study has several limitations. First, we used a cross-sectional design, which did not allow us to investigate temporal relationships among variables. Future research comparing veterans and nonveterans should also include longitudinal designs, as some of our predictor variables, such as financial difficulty and adult sexual assault, likely demonstrate bidirectional relationships with our alcohol outcomes (alcohol problems and alcohol treatment utilization). Second, due to an error on the ASSIST, we partially underestimated alcohol-related problems; thus, future studies should seek to validate these results using the ASSIST measure with no errors. Third, we used a cutoff for the AUDIT-C in our models of those at higher risk for alcohol problems that has been recommended in prior literature (Aalto et al., 2006; Aalto et al., 2009); however, research has also recommended lower cutoffs (e.g., Bradley et al., 2003; Bush et al., 1998); thus, future research may use lower cutoffs to reduce the likelihood of missing participants who do not endorse very heavy drinking but still may experience alcohol problems and may benefit from treatment. Fourth, we had lower power to detect effects in the treatment analyses subsample due to the smaller subsample used (those who needed intensive treatment). Future research should recruit a larger number of participants with lifetime and/or current AUD to increase power in investigating treatment utilization. Fifth, we used self-report measures, which are less objective than clinical interviews, especially in reporting alcohol problems, as these problems may be minimized by some. Sixth, we did not assess current and lifetime AUD; comparing these actual diagnoses across veterans and nonveterans would be helpful in future research. Finally, we used panel recruitment for nonveterans. The study selected veterans from the US Veterans Eligibility Trends and Statistics (USVETS) and sent them a letter for recruitment, whereas we selected nonveterans from members of KnowledgePanel and sent them an email for recruitment. Unmeasured differences may exist between the veteran and nonveteran sample due to nonveterans' KnowledgePanel membership (e.g., more free time, higher organizational capacity). Future research should use the same recruitment approach for veterans and nonveterans.

5. Conclusion

This study represents the first investigation to compare prevalence and predictors of alcohol use and treatment utilization among veterans and nonveterans in a national sample. Strengths of our study include accounting for the shared variance of a variety of relevant predictors and using population weights to increase generalizability of our findings. We found that veterans reported higher alcohol use consumption and higher lifetime alcohol treatment utilization than nonveterans. We also found several differences between veteran and nonveteran models in associations between predictors and our alcohol outcomes (alcohol problems and alcohol treatment utilization). These findings underscore the importance of understanding how veteran and nonveteran treatment needs may differ, which can help to shape policy and clinical interventions that will improve treatment for both veterans and nonveterans. Our findings suggest that veterans may benefit from interventions targeting financial problems and social support, whereas nonveterans may benefit from a focus on ACEs.

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Declaration of competing interest

None.

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