



Correlates of incarceration history among military veterans

Katherine Kelton^a, Elizabeth E. Van Voorhees^{a,b,c,**}, Eric B. Elbogen^{b,c,d,**}, VA Mid-Atlantic MIRECC Workgroup^c, and Kirsten H. Dillon^{a,b,c}

^aResearch & Development, Durham VA Health Care System, Durham, North Carolina, USA; ^bDepartment of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, North Carolina, USA; ^cVA Mid-Atlantic Mental Illness Research, Education, and Clinical Center, Durham, North Carolina, USA; ^dNational Center on Homelessness among Veterans, Washington, District of Columbia, USA

ABSTRACT

Veterans with histories of incarceration are at greater risk for poor physical and mental health outcomes, yet prior research in this population has focused on specific subsets of veterans or a narrow range of predictors. We utilized the Bronfenbrenner Socioecological Model as the framework to evaluate correlates of incarceration history in a large sample of Iraq and Afghanistan-era veterans at four levels: demographic, historical, clinical, and contextual. Participants were 2,904 veterans (76.9% male; 49.5% White and 46.5% Black; mean age 38.08, *SD* = 10.33), 700 of whom reported a history of incarceration. Four logistic regression models predicting history of incarceration were tested, adding demographic, historical, clinical, and contextual variables hierarchically. In the final model, younger age (*OR* = 0.99, 95% *CI* = 0.98–1.00), male gender (*OR* of being female = 0.28, 95% *CI* = 0.21–0.38), belonging to a historically marginalized group (*OR* of being White = 0.69, 95% *CI* = 0.56–0.84), family history of incarceration (*OR* = 1.47, 95% *CI* = 1.10–1.94), adult interpersonal trauma (*OR* = 1.39, 95% *CI* = 1.28–1.51), problematic alcohol use (*OR* = 1.03, 95% *CI* = 1.02–1.05), drug abuse (*OR* = 1.15, 95% *CI* = 1.11–1.19), and unemployment (*OR* for being employed = 0.76, 95% *CI* = 0.62–0.92) were significantly associated with a history of incarceration. Implications of these findings for developing interventions and supporting systems to effectively target this high-risk population of veterans are discussed.

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What is the public significance of this article?—We examined the associations between demographic, historical, clinical, and contextual factors and incarceration history in Iraq and Afghanistan-era veterans. We found that veterans who had been incarcerated were more likely to be younger, male, and nonwhite. Additionally, they were more likely to have a family history of incarceration, to have been the victim of interpersonal trauma as an adult, to abuse alcohol and drugs, and to be unemployed. These findings can help us develop interventions and support veterans with a history of incarceration.

Correlates of incarceration among military veterans

Military veterans comprise approximately 8% of the incarcerated population in the United States (Bronson et al., 2015). Veterans with a history of incarceration in jail or prison have consistently higher rates of mental health concerns (Backhaus et al., 2016; Blodgett et al., 2015) and are at

greater risk for a variety of negative outcomes, including unstable housing and employment (Mallik-Kane & Visser, 2008), homelessness (Tsai and Rosenheck, 2015; Tsai et al., 2014), suicide (Edwards et al., 2022), and overdose-related death (Wortzel et al., 2012). Identification of risk factors associated with criminal legal system involvement (CLS) among veterans requires systemic examination across meso- (e.g., family), exo- (e.g., labor market), and macro-levels (e.g., policies and laws for parolees; Bronfenbrenner, 1992; Hagerdorn, 2013). Understanding how risk factors across levels place veterans at risk for incarceration would allow researchers to identify veterans at highest risk for CLS involvement, inform potential targets for screening (Blonigen et al., 2016), and assist the Veterans Health Administration (VHA) in identifying the most important areas for intervention (Finlay et al., 2019).

Study model

To address this gap, we utilized Bronfenbrenner's Socioecological Model (Bronfenbrenner, 1992), to

CONTACT Kirsten H. Dillon ✉ kirsten.dillon@va.gov 📧 Research & Development, Durham VA Health Care System, 508 Fulton Street, Durham, NC 27705.

**The Mid-Atlantic MIRECC Workgroup contributors for this paper include: Jean C. Beckham, PhD, Patrick S. Calhoun, PhD, Eric Dedert, PhD, Eric B. Elbogen, PhD, John A. Fairbank, PhD, Robin A. Hurlley, MD, Jason D. Kilts, PhD, Nathan A. Kimbrel, PhD, Angela Kirby, MS, Scott D. McDonald, PhD, Sarah L. Martindale, PhD, Christine E. Marx, MD, MS, Scott D. Moore, MD, PhD, Rajendra A. Morey, MD, MS, Jennifer C. Naylor, PhD, Jared Rowland, PhD, Robert D. Shura, PsyD, Cindy Swinkels, PhD, Larry A. Tupler, PhD, Elizabeth E. Van Voorhees, PhD, Ruth Yoash-Gantz, PsyD.

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examine the complex interplay of factors that influence incarceration. The Socioecological Model proposed that outcomes are influenced by five nested and interactive levels of an individual's social environment to influence behavior (i.e., microsystem, mesosystem, exosystem, macrosystem, chronosystem; Bronfenbrenner, 1992) and has since been adapted to examine reentry (e.g., Bunting et al., 2018; Russell et al., 2022) and veteran perception and satisfaction of Veteran Treatment Court (Clifford et al., 2014). Historically, theoretical frameworks to organize analyses and interpretations are limited to specific aspects of the CLS (e.g., veteran adaptation to incarceration in Stacer & Solinas-Saunders, 2015; recidivism in Blonigen et al., 2017) or are discipline-specific (Finlay et al., 2019). Application of the Socioecological Model allows for concurrent analysis of static and dynamic factors that are typically examined in isolation. Static factors may be thought of in demographic (e.g., race, gender) and historical domains (e.g., combat exposure) and are typically immutable for direct intervention. In contrast, dynamic factors include clinical (e.g., PTSD) and contextual domains (e.g., housing) which are amenable to change and can be targeted by individual and broader-level interventions. Most studies on veteran CLS involvement do not examine risk factors across all four of these domains (Finlay et al., 2019), resulting in a piecemeal understanding of a complex process. Finally, prior studies focused on understanding veteran risk for incarceration have been limited by the use of specific veteran samples (e.g., participating in Veterans Treatment Court programs or currently incarcerated veterans; Brooke & Peck, 2019; Trojano et al., 2017). This is the first study to utilize a multidisciplinary, multi-level framework for incarceration risk factors for veterans using VA care.

Current understanding of static and dynamic risk for incarceration

Demographic factors

Similar to the civilian population, research has demonstrated increased risk of CLS involvement in veterans associated with demographic characteristics such as belonging to a historically marginalized group (e.g., Black or LatinX/Hispanic identifying individuals) and being younger and male (Elbogen et al., 2012; Greenberg & Roseheck, 2012; Tsai et al., 2013, 2022). Notably, age cohort has been shown to moderate the relationship between risk/protective factors (e.g., social support) and prior suicide attempt and homelessness but not arrest history (Edwards et al., 2022). While educational attainment is often viewed as a protective factor against incarceration in the general population

(Harlow, 2003), this has only been examined in the context of re-arrest, re-conviction, re-incarceration, or revocation among veterans, and with mixed results (Edwards et al., 2022; Logan et al., 2021; Tsai & Rosenheck, 2013b).

Historical factors

With respect to historical factors, the civilian literature suggests that parental history of incarceration heightens odds of incarceration or CLS involvement (Gifford et al., 2019), but the impact of parental incarceration on CLS outcomes has yet to be explored in the veteran population. The civilian literature suggests childhood victimization and trauma exposure likely play a role in the "pathway" to incarceration (DeHart, 2008; Lynch et al., 2014). Among the veteran population, however, childhood trauma exposure has shown mixed results. For example, some researchers have shown that increased risk of CLS involvement in veterans is associated with witnessing violence growing up (Elbogen et al., 2012), while others have found that childhood abuse (i.e., physical, sexual, or emotional abuse) is not significantly associated CLS involvement (Tsai & Rosenheck, 2013a). History of combat exposure has also shown mixed links to CLS involvement (Finlay et al., 2019), with some studies showing combat exposure is negatively related (Bennett et al., 2018), positively (Brooke & Peck, 2019), or unrelated to this outcome (Elbogen et al., 2012). Differences in the impact of these factors as risks on CLS-involvement may be related the differences among the subsamples of veterans included in the studies. Examination of general risks for incarceration in a broader sample of veterans is needed to understand the generalizability of factors from more narrowly focused studies.

Clinical factors

In terms of clinical factors, most studies have examined mental health characteristics and found that increased risk of CLS involvement in veterans is associated with diagnoses of substance use disorder (Elbogen et al., 2012; Finlay et al., 2018, 2019), posttraumatic stress disorder (PTSD; Bennett et al., 2018; Stimmel et al., 2019), or other mental health diagnoses including psychotic and bipolar disorders (Finlay et al., 2018; Timko et al., 2020). Systematic reviews suggest that comorbidity may act as a moderating or mediating variable for consideration, citing that relationship between PTSD and violence has been shown to be more robust among veterans with a comorbid substance use disorder (Blonigen et al., 2016). Additional variables are important to include, as they may impact the relationship between diagnoses and CLS involvement. For

example, Elbogen et al. (2012) found that PTSD was associated with a higher risk of arrest only in the presence of high levels of anger/irritability. Indeed, a recent meta-analysis of the association between PTSD and veteran CLS-involvement concludes that additional research is necessary to understand which factors may drive the association (Taylor et al., 2020).

Contextual factors

Finally, with respect to contextual factors, risk of CLS involvement in veterans is associated with living instability, unemployment, and homelessness (Cusack & Montgomery, 2017; Tsai & Rosenheck, 2013c; Tsai et al., 2014). Employment has been negatively associated with new arrests or incarceration after veteran participation in a Veteran Justice Outreach (VJO) program, suggesting that employment may play a crucial role in reducing the likelihood of criminal legal involvement (Tsai, 2017). The role of work involvement as a whole and its association with CLS involvement, however, remains inconclusive (Blonigen et al., 2016). Relatedly, individuals experiencing homelessness are more likely to become involved in the CLS (Greenberg & Rosenheck, 2008). Homelessness and incarceration act as both risk factors and outcomes for one another (Cusack & Montgomery, 2017; Greenberg & Rosenheck, 2008). It is estimated that one to three-fourths of veterans who have been incarcerated have also experienced homelessness both prior to and after incarceration (Blue-Howells et al., 2018).

Social support, both tangible and emotional, has been identified as a key variable in reducing re-incarceration and recidivism in the general population (Mowen et al., 2019; Pettus-Davis, 2021). While social support may act as a protective factor against aggressive and violent behavior among veterans (e.g., Van Voorhees et al., 2018), the link between social support and incarceration has rarely been examined in the veteran population. Recent research suggests that greater levels of received social support are negatively associated with arrest history and may act as a protective factor against incarceration (Edwards et al., 2022).

Grounded in the Socioecological framework, the current study sought to examine static and dynamic risk factors for veteran history of CLS involvement. Conceptually and statistically including static and dynamic risk factors together provides a wider context for understanding history of CLS involvement (Piper & Berle, 2019). Additionally, this study includes risk factors well documented in civilian literature that are currently missing or unresearched in the veteran population – parental incarceration and social support.

Methods

Participants and procedures

The present study utilized data from the VA Mid-Atlantic Mental Illness Research, Education and Clinical Center (MIRECC) Post-Deployment Mental Health (PDMH) multi-site study (for more information, see Brancu et al., 2017). Inclusion criteria were broad: Veterans who were enrolled in VA care and who served in the U.S. armed forces after September 11, 2001, regardless of diagnosis or discharge status. Veterans were initially recruited to the registry through mailings, advertisements, and clinician referrals. Informed consent procedures were approved by institutional review boards at multiple sites. Participants completed structured clinical interviews and questionnaires addressing psychiatric symptoms, health, and possible post-deployment adjustment issues. They were compensated \$175 for completion of study assessments (prorated for partial completion), provided a travel stipend based on distance traveled (between \$8–\$75 for 25–200+ miles), and were supplied with clinician referrals if appropriate. A total of 3,867 veterans enrolled between 2005 and 2018 were included in these analyses. In the current study, we analyzed data from 2,904 participants who had completed all the study measures of interest. This was a multi-site study conducted over 13 years, resulting in some variation in the administered measures across sites and over time. The Medical Outcomes Study Social Support Survey (MOS; Sherbourne & Stewart, 1991) was not used at several of the study sites for the entirety of the data collection period, so data were missing for this assessment for 771 participants. With a sample size of 2,904, a significance level of $\alpha = .01$, an outcome prevalence rate of 24%, and assumed R^2 of .20, we had an estimated 80% power to detect odds ratios of 1.17 or 0.86.

Measures

Demographic factors

Demographic information was ascertained via self-report. Demographic variables included age, sex (male = 0; female = 1), race (White = 1; nonwhite = 0), ethnicity (non-Hispanic = 1; Hispanic = 0), and years of education.

Historical factors

Family history of incarceration. Participants were asked questions about family history of incarceration as part of a larger self-report survey about family history. Participants were given a list of family relationships on their mother and father's sides (e.g., mother,

grandmother-mother's side, uncle-mother's side) and asked to indicate whether there was a history of a list of diagnoses and situations (e.g., substance use, suicide, mental illnesses), including whether their family members had ever "served time in prison." This variable was coded as present if participants reported that either a parent or a sibling had served time in prison.

Trauma history. Combat exposure was measured using the Combat Exposure Scale (Keane et al., 1989), a 7-item self-report scale measuring wartime trauma exposure. The CES was first validated in a sample of Vietnam veterans, demonstrating good internal consistency, test-retest reliability, and content validity. Further, veterans with a diagnosis of PTSD scored significantly higher on the CES (Keane et al., 1989). The CES has been used in other research with Iraq/Afghanistan-era veterans and demonstrated good internal consistency ($\alpha = 0.85$; Glenn et al., 2020). In the current sample, internal consistency was good ($\alpha = 0.88$).

The Traumatic Life Events Questionnaire (Kubany et al., 2000) was used to assess exposure to a range of traumatic events (e.g., accidents, natural disasters, assaults). For each event endorsed, follow-up questions ask about frequency of the event(s) and whether or not the individual experienced fear, helplessness, or horror at the time of the event(s). The scale has demonstrated positive predictive power (i.e., overlap with known traumatic events that participants have experienced) and most items have demonstrated temporal stability (Kubany et al., 2000). The TLEQ has been used widely in veteran studies (e.g., Van Voorhees et al., 2012). Consistent with previous studies, trauma exposures were summed into categories reflecting exposure to trauma types relevant to the research questions (Graziano et al., 2021; Van Voorhees et al., 2012). For the present analysis, two variables were created to reflect physical or sexual abuse in childhood and interpersonal trauma in adulthood (physical or sexual assault). These two variables were calculated by summing the number of event types that were endorsed and accompanied by fear, helplessness, or horror. Higher values correspond to a higher count of trauma exposure.

Clinical factors

Anger. Anger was assessed with the 6-item hostility subscale of the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1994). Although it is labeled as a hostility scale, the construct assessed more closely resembles anger, as it measures thoughts, feelings, and actions characteristic of anger (Dillon et al., 2020). Items were averaged to create a mean score, with higher scores indicating more problematic levels of anger. The SCL-

90-R, including the hostility subscale, has previously demonstrated internal reliability, test-retest reliability, and construct validity (Derogatis, 1994). Additional research has found that the hostility scale reflects unique symptoms rather than general psychological distress, with high reliability (Smits et al., 2015). In the current sample, internal consistency was excellent ($\alpha = 0.90$).

Substance use. Drug misuse was assessed using the Drug Abuse Screening Test (DAST; Skinner, 1982). The DAST is a self-report measure of problems related to drug misuse in the past year. Each of the 28 "yes"/"no" questions are summed to produce a total score, with higher scores reflecting more problematic drug use. Despite being an older measure, meta-analyses suggest that the DAST demonstrates satisfactory internal reliability and concurrent validity (Yudko et al., 2007). In the current sample, internal consistency was good ($\alpha = 0.87$).

Alcohol use was assessed using the Alcohol Use Disorders Identification Test (AUDIT; Bradley et al., 1998), a 10-item Likert scale self-report questionnaire that assesses three key domains including alcohol intake, potential dependence on alcohol, and experiences of alcohol-related harm. The items are summed to produce a total score with higher scores indicating more problematic drinking. The AUDIT has demonstrated reliability and validity, including sensitivity, specificity, and predictive validity (Babor et al., 2001). In the current sample, internal consistency was good ($\alpha = 0.85$).

PTSD symptoms. PTSD symptoms were measured using the Davidson Trauma Scale (DTS; Davidson et al., 1997), wherein respondents rate the past-week frequency and severity of the DSM-IV PTSD symptoms related to a specific trauma, and widely used in studies of PTSD among veterans (e.g., see Phillips et al., 2018). Possible scores range from 0 to 136, with a score of 48 set as the diagnostic cutoff for PTSD; this cutoff is associated with a sensitivity of 0.82, a specificity of 0.94, and a diagnostic efficiency of 0.87 in designating the presence of PTSD in Iraq and Afghanistan veterans (McDonald et al., 2009). In the current sample, internal consistency was excellent ($\alpha = 0.98$).

Contextual factors

Living situation. Participants were asked about their current living situation (i.e., "Where do you live currently?"). Participants who reported living in a house/apartment/mobile home/condominium that they owned or rented, temporarily living with family or friends, or

were in an assisted living facility or nursing home were coded as having a stable housing situation. Participants who reported they were living in a group home, transitional housing, residential substance abuse treatment program, shelter, or domestic violence shelter were coded as not having a stable housing situation.

Social support. Social support was assessed using the Medical Outcomes Study Social Support Survey (MOS; Sherbourne & Stewart, 1991), a self-report measure of the perceived availability of functional social support. Respondents rated their perception of how often each kind of support was available to them if they needed it on a scale of 1 (*none of the time*) to 5 (*all of the time*). The overall support index was used in the present study, with possible scores ranging 0 to 100. Across samples of participants with various medical diseases as well as non-clinical samples, the MOS has demonstrated good validity and reliability (Giangrasso & Casale, 2014; Sherbourne & Stewart, 1991). In the current sample, internal consistency was excellent ($\alpha = 0.98$).

Employment. Participants who reported either full-time or part-time employment were coded as being employed.

Incarceration

Similar to other studies of veteran incarceration (e.g., Tsai et al., 2022), participants were asked, “have you ever been in jail or prison in your life?” Those who endorsed this item were coded as having a history of incarceration. Although self-report of incarceration history has its limitations, prior research suggests fair reliability and validity (Morris & Slocum, 2010; Sutton et al., 2011).

Statistical analysis

SAS version 9.4 was used for all analyses. Descriptive statistics were calculated to characterize demographic, historical, clinical, and contextual characteristics of participants. Chi-square and *t*-tests were conducted to compare the characteristics of individuals with a history of incarceration to those without. Tests of collinearity indicated that multicollinearity was not a concern (Tolerance = .38–.97, VIF = 1.03–2.62). To determine the proportion of variance in incarceration history that is accounted for by dynamic factors, above that associated with relevant static covariates, we conducted a four-step hierarchical regression, with a single, dichotomous item of endorsed CLS involvement regressed onto demographic, historical, clinical, and contextual factors. The order of dynamic factors entered in the model was based on the nested circles comprising the

Socioecological framework, which places an individual at the center, surrounded by systems. Clinical factors were entered first, as they are more proximal to the veteran and modifiable by direct intervention or programming. Contextual factors were entered last, as they occur in the broader environment that affects veterans beyond the influence of individual providers or the VA. Demographic factors were entered at *Step 1* of the model: age, gender, race, ethnicity, and education. Historical factors entered in *Step 2* included: family history of incarceration, combat exposure, childhood abuse, and adult physical or sexual assault. Clinical factors entered in *Step 3* of the regression were hostility/anger, alcohol use, substance use, and PTSD severity. Finally, the following contextual factors were added into *Step 4* of the model: living situation, social support, and employment. Likelihood ratio tests were conducted to determine whether subsequent steps were significantly different from the previous step. Due to the number of predictors and analyses, a more conservative significance level of $\alpha = .01$ was used.

Results

Descriptive statistics are presented in Table 1. When comparing characteristics of participants with and without a history of incarceration, every demographic, historical, clinical, and contextual variable examined was significantly different between the two groups, except for ethnicity. Regarding race, 21.9% of participants who identified as White reported a history of incarceration versus 26.2% of participants who identified as Black and 27.0% who identified as either American Indian, Asian, or Pacific Islander. Rates of incarceration were similar between Hispanic and non-Hispanic participants (24.1% vs. 24.2%). Male participants were more than twice as likely to report a history of incarceration relative to female participants (27.5% vs. 12.8%). Veterans with a family history of incarceration were more likely to report incarceration history compared to those without a family history of incarceration (33.6% vs. 23.0%). Participants in stable housing situations were less likely to report a history of incarceration, compared to those without stable housing (23.7% vs. 40.91%). Employed participants also were less likely to report a history of incarceration than those who were not employed (19.6% vs. 30.2%).

Results from the hierarchical multivariate logistic regression are presented in Table 2. In *Step 1*, demographic variables explained 6% of the variance in history of incarceration. Further, all variables were significantly associated with the history of incarceration, except for ethnicity and years of education. With historical

Table 1. Demographic, historical, clinical, and contextual characteristics by incarceration status.

Characteristic	Full Sample (n = 2,904)		No History of Incarceration (n = 2,204)		History of Incarceration (n = 700)		p
	N	%	N	%	N	%	
Race							0.022
White	1434	49.5	1120	50.8	314	44.9	
Black	1346	46.5	993	45.1	353	50.4	
Other	115	4.0	84	3.8	31	4.4	
Ethnicity							0.976
Hispanic	186	6.4	141	6.4	45	6.43	
Non-Hispanic	2718	93.6	2063	93.6	655	93.6	
Sex							<0.001
Male	2234	76.9	1620	73.5	614	87.7	
Female	670	23.1	584	26.5	86	12.3	
Family History of Incarceration	313	10.8	208	9.4	105	15.0	<0.001
Stable Housing Situation	2838	97.7	2165	98.2	673	(96.1	<0.001
Employed	1672	57.6	1344	(61.0%)	328	(46.9	<0.001
Characteristic	M	SD	M	SD	M	SD	
Age	38.08	10.33	38.68	10.57	36.18	9.28	<0.001
Years of Education	13.58	3.85	13.71	3.93	13.15	3.57	<0.001
CES Total	11.29	10.53	10.61	10.24	13.44	11.14	<0.001
Childhood Abuse Count	0.63	1.02	0.60	1.01	0.74	1.06	<0.001
Adult Interpersonal Trauma Count	0.81	1.25	0.69	1.14	1.20	1.50	<0.001
SCL-Hostility	0.85	0.95	0.75	0.89	1.18	1.07	<0.001
AUDIT Total	4.90	5.83	4.21	5.06	7.10	7.37	<0.001
DAST Total	1.11	2.75	0.68	1.87	2.48	4.24	<0.001
DTS Total	40.64	39.05	36.77	37.86	52.79	40.27	<0.001
MOS Total	72.66	26.37	74.55	25.66	66.69	27.66	<0.001

CES = Combat Exposure Scale; SCL = Symptom Checklist-90-Revised; AUDIT = Alcohol Use Disorders Identification Test; DAST = Drug Abuse Screening Test; MOS = Medical Outcomes Study Social Support Survey; DTS = Davidson Trauma Scale.

Table 2. Hierarchical logistic regression examining demographic, historical, clinical, and contextual association with history of incarceration.

Variable	Step 1: Demographics		Step 2: + Historical		Step 3: + Clinical		Step 4: + Contextual	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Age	0.98***	0.97–0.98	0.98***	0.97–0.99	0.99**	0.98–1.00	0.99**	0.98–1.00
Female Sex	0.36***	0.28–0.46	0.24***	0.18–0.32	0.29***	0.21–0.38	0.28***	0.21–0.38
Race (White)	0.68***	0.57–0.81	0.71***	0.59–0.86	0.67***	0.55–0.82	0.69***	0.56–0.84
Ethnicity (non-Hispanic)	1.01	0.70–1.44	1.12	0.77–1.62	1.17	0.79–1.73	1.17	0.79–1.73
Years of Education	0.99	0.97–1.01	0.99	0.96–1.01	1.00	0.97–1.02	1.00	0.97–1.03
Family History of Incarceration			1.54**	1.17–2.03	1.48**	1.11–1.97	1.47**	1.10–1.94
CES Total			1.02***	1.01–1.03	1.01	1.00–1.02	1.01	1.00–1.02
Adult Interpers. Trauma Count			1.49***	1.38–1.61	1.40***	1.29–1.51	1.39***	1.28–1.51
Childhood Abuse Count			1.09	0.99–1.20	1.03	0.93–1.14	1.03	0.93–1.14
SCL-Hostility					1.18	1.03–1.35	1.16	1.01–1.32
AUDIT Total					1.03***	1.02–1.05	1.03***	1.02–1.05
DAST Total					1.16***	1.12–1.20	1.15***	1.11–1.19
DTS Total					1.00	1.00–1.00	1.00	1.00–1.00
Stable Housing							1.39	0.75–2.56
MOS Total							1.00	0.99–1.00
Employed							0.76**	0.62–0.92
	Step 1: Nagelkerke R ²		Step 2: Nagelkerke R ²		Step 3: Nagelkerke R ²		Step 4: Nagelkerke R ²	
	0.06		0.14		0.21		0.21	
	AUC		AUC		AUC		AUC	
	0.63		0.70		0.75		0.75	
			R ² Δ		R ² Δ		R ² Δ	
			0.08		0.07		0.01	
			p		p		p	
			< .001		< .001		< .01	

CES = Combat Exposure Scale; SCL = Symptom Checklist-90-Revised; AUDIT = Alcohol Use Disorders Identification Test; DAST = Drug Abuse Screening Test; MOS = Medical Outcomes Study Social Support Survey; DTS = Davidson Trauma Scale. **p < .01; ***p < .001

variables added in *Step 2*, the model accounted for 14% of the variance in history of incarceration. A likelihood ratio test indicated a significant difference between Step 1 and 2, $p < .001$. The significant associations from Step 1 remained significant and, except for count of types of

childhood abuse experiences, each of the historical variables added to the model were also significantly related to a reported history of incarceration. With clinical variables added in *Step 3*, 21% of the variance in incarceration history was accounted for. A likelihood ratio

test indicated a significant difference between Step 2 and 3, $p < .001$. Combat exposure (CES) was no longer significantly associated with incarceration history at this step. Furthermore, regarding the clinical variables added to the model, alcohol use (AUDIT), and drug misuse (DAST) were significantly associated with incarceration history, whereas PTSD severity (DTS) and anger (SCL-Hostility) were not. In *Step 4*, contextual variables added yielded a final model that accounted for 21% of the variance in incarceration history. A likelihood ratio test indicated a significant difference between Step 3 and 4, $p < .01$. All significant associations from the previous step remained significant. Regarding contextual variables, employment status was significantly associated with incarceration history when accounting for all the other variables in the model; however, stable housing and social support (MOS) were not.

Discussion

HT This study used Bronfenbrenner's Socioecological model to integrate and provide a framework for understanding the interplay of complex and potentially intersecting demographic, historical, clinical, and contextual factors associated with incarceration history among U.S. veterans who have served in the military since 9/11/2011. In the final step of a hierarchical model evaluating demographic (Step 1), historical (Step 2), clinical (Step 3), and contextual (Step 4) factors, we found that age; sex; race; family history of incarceration; number of different types of adult interpersonal trauma experienced; degree of alcohol misuse; degree of drug misuse; and employment status remained significant in the model. Together, these factors predicted 21% of the variance in history of incarceration in this sample of military veterans.

First, concerning demographic correlates, race, sex, and age remained as significant predictors of history of incarceration in the final step of our model; however, ethnicity and years of education were not associated with history of incarceration at any step of our model. While veterans in jails and prisons appear to have greater educational attainment than non-veterans (Greenberg & Rosenheck, 2012; Noonan & Mumola, 2007), educational attainment may not be as protective against incarceration among veterans as among civilians.

Race also remained significant in the final model, suggesting that inequalities in policing, laws, sentencing guidelines, and other manifestations of systemic racism operate to increase history of incarceration in veterans in much the same way that they do in civilians

(Alexander, 2010). This finding suggests that services and policies aiming to address racial disparities in incarceration in civilian populations are also applicable to veterans (Tsai et al., 2022). For example, at the local and education/training level, Veteran Justice Programs (VJP) have made efforts to partner with law enforcement agencies in training Crisis Intervention Teams and local jurisdiction officers (Weaver et al., 2021). It will be important to integrate an awareness of the impact of racism on veteran CL involvement into these training programs, and research examining how this can be effectively integrated into existing programs will be an important part of effectively doing so. Research examining how racial disparities manifest at various levels of the system, including within VJP programs and Veteran Treatment Courts, will also be an important step toward addressing them (Rosenthal & Finlay, 2022).

Concerning historical correlates, only family history of incarceration and experiences of adult interpersonal trauma remained significantly associated with history of incarceration in the final step of the model. While it is surprising in light of prior findings that childhood trauma was not significant in the final model (i.e., Elbogen et al., 2012), it may be that substantial co-occurrence of childhood and adult victimization (Widom et al., 2008) prevented childhood abuse from reaching significance when both variables were considered simultaneously. Though tests of multicollinearity did not indicate significant collinearity between these two variables, we defined adult and childhood trauma in terms of how many different types of trauma were experienced, rather than in terms of whether or not trauma was present or absent. Thus, while the count of different types of childhood and adult interpersonal trauma experienced may not overlap substantially in this sample, this does not necessarily imply that the experience of childhood trauma is not associated with exposure to adult interpersonal trauma or with incarceration. More research is necessary to elucidate the interplay between different types of trauma and incarceration and to inform tailored prevention and intervention strategies.

Similar to other research (e.g., Wildeman & Andersen, 2017), Veterans with a history of familial incarceration were found to be at an increased risk for incarceration history themselves. Second to male gender, history of family incarceration presented the greatest association with incarceration, with 47% greater odds of history of incarceration. Our findings are contrary to the common narrative that military involvement acts as a protective factor against involvement in the CLS by providing stability, even against a backdrop of familial instability (Brooke & Gau, 2018).

Just as clinicians gather psychosocial information about familial history of physical and mental health conditions and substance use, including questions about familial incarceration may provide a more comprehensive assessment of veterans and their context. The impact of intergenerational incarceration may point to contributing and maintaining factors for risks of the veteran's own CLS-involvement (e.g., diminished access to resources, early externalizing behaviors, food insecurity, homelessness; e.g., Turney, 2015; Wildeman, 2014). This study adds a new variable for consideration in the association between risk for incarceration among veterans. Additional studies are needed to examine the function of familial incarceration as a potential pathway to arrest and incarceration among veterans, particularly because familial incarceration is characterized by some measures as an adverse childhood experience (i.e., ACE) rather than a standalone variable.

Conceptualization of the above demographic and historical factors within the framework of the Socioecological Model allows for a more holistic consideration of the intersection of such variables as race, trauma exposure, and family history of incarceration with broader systems. For example, understanding the impact of racism and race-based trauma experienced by Black and Indigenous People of Color (BIPOC) both in the military (Coughlin, 2021) and in the CLS may inform relevant treatment options for CLS-veterans of color, including the VA-developed Race-Based Trauma Stress and Empowerment group (e.g., Carlson et al., 2018). Striking a balance between acknowledging systematic issues versus clinical symptoms as the necessary unit for change is particularly important for interventions with CLS-involved veterans and marginalized groups. Future investigations should consider qualitative methodologies to further elucidate the nature of the relationship between trauma, historical factors such as a family history of incarceration, and incarceration among veterans.

Concerning clinical correlates, we found that alcohol use and substance misuse remained significantly associated with history of incarceration in the final model. This is consistent with prior research associating substance use with increased risk of CLS involvement (Elbogen et al., 2012; Finlay et al., 2018, 2019). A recent systematic review found that substance use treatment is associated with a reduction in legal problem severity and violence (Timko et al., 2020), and some VJP initiatives address this issue by diverting veterans from incarceration and connecting them to treatment (e.g., Veteran Treatment Court). However, barriers within the VA system often prevent efficient collaboration among

VA providers to provide substance abuse services to veterans involved in the CLS. Increasing provider awareness of VJP (e.g., that VJP consists of several different smaller programs), strengthening the relationship between the local VJP and substance use clinic (e.g., adding VJP and substance use staff to relevant notes, attending each other's treatment meetings when possible), designating a preselected number of weekly substance use intake slots for CLS-involved veterans, and designing a VJP-specific substance use group intervention would be important steps toward coordination of services for these high-risk veterans. We are currently working with local VJP staff at one of our hospitals to pilot a program implementing these steps.

Finally, one advantage of using the Socioecological Model to conceptualize history of incarceration in veterans is the flexibility it provides for operationalizing risk factors. For example, substance use has historically been operationalized by criminology frameworks at the individual level. However, it can also be conceptualized as a contextual or systemic factor when not fully explained by clinical characteristics (Prins, 2019). In some cases, these systemic factors may be more appropriate targets for intervention, such as the criminalization of drug use (Prins, 2019; Scott, 2021), or incarceration as a sanction for substance use relapse. This may shift the focus of providers, programs, and organizations to focus on systemic conditions that put people at risk for CLS-involvement.

Among contextual variables, unemployment status was significantly associated with history of incarceration in the final model, neither homelessness or social support were associated. While it is unclear from this cross-sectional design whether unemployment preceded incarceration or followed it, there is evidence that the limitations placed on persons with histories of incarceration restrict social mobility, contributing to the creation of a permanent underclass (Dumont et al., 2012). While programs like VTC concentrate their efforts on connecting veterans with mental health and substance use services, fewer efforts have been directed toward assistance with employment (Tsai et al., 2018). Results suggest these efforts may need to be expanded once individuals come in contact with VJP, and that case managers associated with mental health or substance use clinics connect veterans with compensated work programs or supported employment (U.S. Department of Veterans Affairs, 2016). Finally, while homelessness, unemployment, and incarceration being known reciprocal risk factors (Tsai et al., 2014), over 97% of our sample endorsed having a secure housing situation. This may explain why homelessness was not significantly associated with incarceration in our model. Similarly, the

social support index showed average veterans reported a score of 72.66 out of a possible score of 100, indicating an adequate level of perceived social support among the sample. Other recent studies have found correlations between social support and arrest history using a subscale of the same measure of social support used in the current study, although the strength of association was small (see Edwards et al., 2022). The civilian literature suggests that up to 92% of formerly incarcerated persons rely on their families to provide emotional or instrumental support (Pettus-Davis et al., 2017). Future studies are needed to address the function of different types of social support and perceived quality of social support received in relationship to risk for CLS involvement.

This study is not without limitations. Participants are self-selected to participate and may not be representative of all Iraq/Afghanistan-era veterans. Further, restriction of the sample to VA-connected veterans may have resulted in fewer Veterans with Other than Honorable (OTH) discharges in the sample than in the broader cohort. This may be particularly relevant because veterans with OTH discharge represent up to one-quarter of veterans in the CLS (Bronson et al., 2015) and are also more likely to struggle with risk factors like homelessness and substance misuse.

The use of a single, dichotomous outcome variable to capture incarceration in both jail and prison limits our understanding of the nature of incarceration, decreasing nuance in the detection of risk factors. However, while jail and prison are vastly different experiences (e.g., availability of services, transiency of populations, level of confinement), there is overlap in risk factors and most forms of criminal legal contact (e.g., arrest) have deleterious consequences for mental health (Sugie & Turney, 2017). Nonetheless, future research should compare outcomes between veterans with different types and length of incarceration.

Since the data are cross-sectional, this study cannot determine when the incarceration occurred, which may be an important factor in how it relates to the other variables in the model. Longitudinal studies are needed to elucidate the paths of risk factors for incarceration versus the consequences of incarceration. Data were also not collected on participants' income, so we were unable to include this variable in the model, and the battery of self-report measures did not include any attention check items. Finally, given that so many of the predictors of incarceration found in previous research and replicated here often co-exist and exacerbate each other, it cannot be assumed that the absence of a variable from the final means that it is not an important area for intervention. Rather, it could be

argued that significant findings at each step of the model are worthy of attention in reducing incarceration rates and recidivism in veterans.

The coordination required to reach CLS-involved veterans is extensive and complex, and research identifying risk factors for the history of incarceration is needed to understand and address barriers for accessing and engaging with VA care (Finlay et al., 2017). The variables that were added in the final two steps of the model (clinical and contextual factors) are of particular interest because they are modifiable. Although it is unclear to what extent they preceded or followed the incarceration, our findings suggest that veterans with a history of incarceration may present with anger difficulties, problematic substance use, and a lack of employment. Interventions for these problems should be a priority in treatment planning and may also be addressed across different levels of the system. The VA has recently begun to try to focus on reducing health disparities within the VA system (Peterson et al., 2014), and directing resources toward addressing the unique needs of incarcerated veterans may be an important area for targeted intervention in this effort. Expanding the VJO Programs within the VA system could be one strategy toward this goal. A formal assessment of the demand and available resources would enhance the effectiveness of determining the incremental validity of new or redirected resources (Rosenthal & Finlay, 2022). Additionally, static factors that remained significant in the final model, such as race, suggest that strategies for broader, systemic changes also need to be incorporated into existing and new efforts. While intersectionality of predictive factors in incarceration was beyond the scope of this paper, evaluation of how risk factors may interact with each other (e.g., substance use, unemployment) and increase vulnerability to incarceration are important areas for future research and may inform the development of more targeted and effective strategies to mitigate risk for incarceration.

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Data availability statement

Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

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