

# Substance Use Rates of Veterans with Depression Leaving Incarceration: A Matched Sample Comparison with General Veterans

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**ABSTRACT:** Formerly incarcerated military veterans—comprising approximately 8% of the prison population—experience significant barriers to reentry including homelessness, mental illness, and mortality. One of the most consequential barriers is relapsing into substance use. Most justice-involved veterans (JIV) possess histories of substance abuse before imprisonment, and this rate continues upon release. Mental illness—depression in particular—is often comorbid with substance abuse. With high rates of depression and substance use in a JIV population, it is important to determine to what extent release from prison contributes to predicting substance use and negative clinical outcomes. This study compares rates of substance use and negative outcomes between two matched samples of JIV and general veterans, both with depression and a substance use disorder. It is hypothesized that JIV will have a higher rate of substance use and that use will be associated with higher negative outcomes in the JIV condition. Rates of use of veterans released from prison and general veterans were collected during six-year follow-up periods. Use was defined as the use of an illicit substance or alcohol, if an alcohol use disorder was present, and determined by urine drug tests or self-report recorded in medical notes. Results indicate that JIV used substances at a higher rate compared to those not recently incarcerated, and that such use is predictive of several other negative outcomes including homelessness, use of inpatient substance treatment, and reincarceration. Structured drug treatment programs and other interventions should cater to veterans recently released from prison to offer help in these areas.

**KEYWORDS:** military veterans, incarceration, substance abuse, depression, reincarceration

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Many formerly incarcerated individuals experience significant barriers to reentry including homelessness, unemployment, and re-incarceration.<sup>1</sup> Military veterans—comprising approximately 8% of the prison population—are no exception to this trend: 30% of incarcerated veterans have a history of homelessness,<sup>2</sup> more than half report mental health or substance use disorders (SUD),<sup>3</sup> and many experience an increased risk of mortality upon release.<sup>4</sup> In the context of these barriers, one significant challenge faced by the entire criminal justice population upon release is relapsing into substance use.

Most formerly incarcerated veterans possess histories of substance abuse before imprisonment.<sup>3</sup> In a sample of 18000 formerly incarcerated veterans in contact with VA health care, half were diagnosed with at least one SUD, 40% of which were actively engaging in SUD treatment.<sup>5</sup>

Although prison may serve as a period of enforced sobriety,<sup>6</sup> and in fact rates of drug use *before* incarceration may be higher than those post-release,<sup>7</sup> it remains that substance abuse persists significantly after release from prison—particularly within the first months. One study indicated that 20% of adult prisoners used illicit drugs in the first year upon release.<sup>8</sup> Other studies have found higher estimates indicating that approximately 30% of adult prisoners used illicit drugs within one day after release and 50% used after just two weeks.<sup>9</sup> Expanding the criteria of substance abuse to include alcohol in addition to illicit drugs, the numbers became staggering. Shinkfield and Graffam<sup>10</sup>

observed that approximately 75% of prisoners used alcohol or other illicit drugs within one month after release.

Although the literature has investigated rates of time to drug use upon release in the general incarcerated population, there are several aspects that have yet to be addressed. The first is an evaluation of substance use patterns in a military veteran sample recently incarcerated. The second is the extent that reentry from prison predicts use in the context of other demographic and clinical variables. The third is the association of substance use with other negative clinical and psychosocial outcomes.

Rates of drug and alcohol use can be exacerbated by poor social support, inadequate economic resources, and medical comorbidity.<sup>11</sup> One group of medical conditions often comorbid with substance abuse is mental health disorders. In a large sample of recently released veterans, 35% were diagnosed with co-occurring mental health and substance use disorders,<sup>5</sup> which may in part be explained by the high rates of combat, sexual, and other trauma often experienced in the military.<sup>12,13</sup> Within the general incarcerated population, several studies indicated that one of the most significant pre-prison risk factors for increased likelihood of drug use is a diagnosis of a mental illness,<sup>14,15</sup> and that the rates of comorbidity between substance abuse and mental illness in a criminal population were higher than the those of the general population.<sup>16,17</sup>



The co-occurrence between crime, substance abuse, and mental illness has many potential causal pathways. Some hypotheses suggest that mental illness serves as the driving mechanism behind the association, that is, drug use functions to alleviate symptoms of mental illness,<sup>11,18,19</sup> while others suggest that the substance use or criminal involvement serves as the driving mechanism.<sup>18</sup> The interaction between these conditions is clear and ought to be addressed together.

There appears to be a strong association between substance abuse and depression, and depression and incarceration. Østergaard, Nordentoft, and Hjorthøj<sup>20</sup> observed that approximately one half of the male population with depression had a life-time diagnosis of a substance use disorder, and Swendsen and Merikangas<sup>21</sup> found that heavy drug use in adults is particularly associated with depression. Depression is also the most prevalent non-substance use mental illness experienced by prisoners with approximately 24% of prisoners being informed they had major depression.<sup>22</sup> This high rate of depression is a likely contributor to the high rate of suicide seen in recently released individuals.<sup>23</sup>

The study compares rates of substance use and negative outcomes between a matched sample of JIV and general veterans with comorbid substance use disorders and Major Depressive Disorder. This population of veterans who are formerly incarcerated and suffering from comorbid SUD and depression are at a significant high risk for substance use and other negative clinical outcomes. It is hypothesized that JIV will use at least once at a higher rate and that use will be associated with higher negative outcomes in the JIV condition.

## Method

### *Participants*

The sample was drawn from two groups of veterans. The first was a sample of 1000 justice involved veterans (JIV) defined as veterans released from the Texas Department of Criminal Justice between 2006 and 2010 and receiving care at a VA healthcare system. The second was a sample of 115,000 general (non-justice involved) veterans receiving care at the same VA healthcare system in 2006. Veterans with comorbid diagnoses of major depressive disorder and a substance use disorder were identified in each sample, resulting in 145 JIV and 3740 general veterans. Diagnoses were those that were identified at the first contact in the follow-up period and reflect active diagnoses; criteria for inclusion were based on DSM-IV criteria and were a substance related disorder not in full remission and a substance related disorder but the veteran was recently in a controlled environment. A reliable estimate of time since last use was not available. Using propensity matching using logistic regression with the case/control group variable with a 0 tolerance, JIV and general veterans were matched on age, race, gender, and medical comorbidities using the Charlson Comorbidity Index (CCI) score. 125 matched pairs were identified. Follow-up data was collected for six years on each sample

starting from the prison release date for the JIV sample, and from January 1, 2006 for the general veterans.

Table 1 presents complete demographic and clinical variables of samples. After matching, the samples were 99.2% male, and 58.4% from a racial or ethnic minority group. The average age was  $52.0 \pm 6.9$ . The average CCI score was  $1.5 \pm 1.9$  indicating the majority of veterans had a life expectancy based on medical conditions of greater than 10 years.

### *Data collection*

Rates of use were collected from the medical records for the six years after prison release for JIV, and from 2006 to 2011 for general veterans. Age, race, diagnoses, and medical comorbidities for the CCI were obtained through VA computerized clinical databases and were the official basis for clinical care and clinical treatment decisions. Substance use was collected through extensive chart reviews defined as the use of an illicit substance or alcohol, if an alcohol use disorder was present, and determined by a urine drug tests or self-report recorded in medical notes. Clinical outcomes were obtained through clinical databases using service codes for the various services used. Incarceration was assessed through a review of admission and release records obtained from the Texas Department of Criminal Justice

### *Statistical analysis*

Data was analyzed using SPSS v26. Logistic regression was used to determine the predictive value of variables in a model that incorporates demographic and clinical variables. Chi-square was used to determine differences in clinical outcomes and substance use rates; results were adjusted for multiple comparisons to minimize the likelihood of type I error. Cox-regression analyses were performed to evaluate differences in patterns of use over time.

## Results

A logistic regression was used to evaluate the effects of age, race, service-connected rating, second mental illness, marital status, and Charlson Comorbidity Index (Table 1). As can be seen in Table 2, three variables were found to be significantly associated with substance use: being a justice involved veteran, higher medical comorbidities, and the presence of a second mental illness. Within the overall model, justice involved veterans were 91% more likely to use substances, those with a second mental illness diagnosis were twice as likely to use, and each single point increase in the CCI was associated with a 36% increase in likelihood to use.

The Cox Regression survival analyses were performed to evaluate predictors of time-to-use with date of release from prison used as the index date for the JIV and January 1, 2006 used for the general veterans. Analyses of interaction terms between time and the targeted variables determined that the

**Table 1.** Comparison of demographic and clinical variables.

	JUSTICE INVOLVED VETERANS		GENERAL VETERANS		P VALUE
	N	PERCENTAGE	N	PERCENTAGE	
Male*	124	99.2	124	99.2	<i>P</i> = 1
Racial/Ethnic Minority*	73	58.4	73	58.4	<i>P</i> = .88
White	52	41.6	52	41.6	
African-American	65	52.0	63	50.4	
Other	8	6.4	10	8.0	
Marital Status					<i>P</i> = .18
Never Married	24	19.2	17	13.6	
Divorced/ Separated	72	57.6	65	52	
Widowed	6	4.8	6	4.8	
Married	23	18.4	37	29.6	
Comorbid other mental illness	72	57.6	76	60.8	<i>P</i> = .61
Alcohol use	117	93.6	118	94.4	<i>P</i> = .79
Amphetamine use	24	19.2	5	4.9	<i>P</i> = .001
Cocaine use	79	63.2	57	45.6	<i>P</i> = .005
Opioid use	25	20.0	17	13.6	<i>P</i> = .176
More than one substance	86	68.8	55	44.0	<i>P</i> = .001
	MEAN	SD	MEAN	SD	
Age*	52.0	7.0	52.0	7.0	<i>P</i> = 1.0
CCI*	1.5	2.0	1.5	2.0	<i>P</i> = 1.0
Service Connected Disability	22.4	33.7	34.4	40.4	<i>P</i> = .01

\* = matching variables.

variables were not time dependent. Results found the overall model was significant,  $X^2(10, N=250) = 19.8, P = .03$ . Variables that were significant predictors of time to use were CCI,  $P = .36$ , OR = 1.1, CI (1.01-1.14) and a second mental illness,  $P = .18$ , OR 1.5 (1.01-2.1). Justice involvement was not a significant predictor of rate of substance use over time, OR 1.3 (.94-1.7) within the model.

Three negative clinical outcomes were evaluated during the follow-up period—use of homeless services, inpatient substance treatment, and inpatient psychiatric treatment. To evaluate the temporal factors related to use and negative outcomes, veterans were subdivided into 5 categories: 1) services provided occurred before use, 2) use occurred before services, 3) use occurred without the service, 4) service provided without use, and 5) neither service was used nor use occurred. Three outcomes demonstrated significant differences in patterns between JIV and general veterans, homeless services,  $X^2(4, 250) = 18.9, P = .001$ , inpatient psychiatric treatment,  $X^2(4, 250) = 9.7, P = .043$ , and inpatient substance treatment,  $X^2(4, 250) = 11.6, P = .02$ . Table 3 presents the percentages of outcomes as well as

where significant differences between JIV and general veterans occurred.

Reincarceration within the follow-up period was also evaluated. A significant difference in rates of going to prison between JIV and general veterans was not identified when evaluating all unique permutations. However, when comparing JIV who used substances ( $n = 103$ ) to all other veterans ( $n = 147$ ), JIV imprisonment rates were significantly higher, 9.7 versus 2.0,  $X^2(1, N=250) = 7.2, P = .007$ .

## Discussion

The findings demonstrate that, compared to a matched sample of general veterans, veterans recently released from prison with diagnoses of a substance use disorder and depression demonstrate poorer outcomes—most notably an increased risk of drug use, with an even greater risk immediately upon release.

Additionally, JIV and general veterans had different patterns when evaluating substance use and specific outcomes. JIV had significantly higher rates of use prior to the use of homeless services, inpatient psychiatric treatment, and inpatient

substance treatment compared to general veterans. They also demonstrated neither using nor requiring these same services. One interesting finding is that JIV also had a higher rate of using homeless services before substance use compared to the general veterans. This finding highlights the reciprocal nature of substance use and homelessness.

The rates of substance use found in the current study are consistent with the literature, although lower than the higher estimates indicated in some studies. However, our study indicates rates significantly higher than those in a matched general veteran sample, a comparison few other studies have made. Moreover, the results suggest that the differences in rates of use were most

pronounced in the first three months after release than any other time period within the six-year follow up, indicating one is at greatest risk of substance use immediately upon release.

To be clear, our results do not provide evidence of causation of substance use and other negative outcomes. It is plausible that unassessed factors that precipitated incarceration may have also contributed to substance use following release. Additional factors including severity of substance use history and previous treatment may also covary with recent incarceration; these and other factors should be the focus of larger more focused studies in the future. However, the findings do suggest, that irrespective of potential causative moderators and mediators, those released from incarceration are at high risk for substance use and negative clinical outcomes. This information must be considered by service providers and program managers when working with these veterans.

There are several limitations to the study. The most prominent is the reliance on the veteran population seeking treatment at a VA facility. This limitation limits the generalizability of the findings, though the findings still have strong relevance to a population seeking services. For those who do not seek services it is impossible to predict use rates as arguments could be made to support both higher and lower rates.

The second limitation is a relative lack of granularity regarding severity of depressive symptoms or substance use, including time since last use. Though the outcomes were taken from the clinical medical record, it is possible that the rates of use may be conservative due to patients not being forthcoming with substance use. Additionally, the role of specific substances and different mental illness diagnoses as predictors for substance use and negative outcomes could not be evaluated due to limited power and concerns regarding collinearity; the contributions of these should be explored in future studies.

The findings suggest that an increased focus on structured drug treatment programs and other interventions may be beneficial for those recently released from prison, with a targeted focus on substance use, economic stability, and general

**Table 2.** Predictors of substance use.

VARIABLE	P	OR	95% C.I. FOR OR	
			LOWER	UPPER
Age	0.75	1.008	0.961	1.056
Service-Connected Rating	0.75	0.998	0.989	1.008
Charlson Comorbidity Index	0.01	1.361	1.092	1.696
Justice Involved Status	0.05	1.917	1.004	3.661
Marital Status: Married	0.17			
Never married		4.234	0.468	38.296
Separated or Divorced		2.119	0.998	4.497
Widowed		1.365	0.493	3.774
Comorbid Other Mental Illness	0.05	2.019	1.010	4.037
Race: African American	0.32			
Other		1.039	0.519	2.082
White		0.453	0.145	1.412

**Table 3.** Clinical outcomes by JIV status.

	HOMELESS SERVICES		INPATIENT PSYCHIATRIC		INPATIENT MEDICAL		INPATIENT SUBSTANCE	
	JIV	GENERAL	JIV	GENERAL	JIV	GENERAL	JIV	GENERAL
Outcome then Use	8a (6.4%)	21b (16.8%)	2a (1.6%)	2a (1.6%)	1a (0.8%)	3a (2.4%)	0a (0%)	3a (2.4%)
Use then Outcome	32a (25.6%)	52b (41.6%)	12a (9.6%)	26b (20.8%)	26a (20.8%)	27a (21.6%)	17a (13.6%)	30b (24%)
Use without Outcome	49a (39.2%)	30b (24%)	75a (60%)	75a (60%)	62a (49.6%)	73a (58.4%)	72a (57.6%)	70a (56%)
Outcome without Use	15a (12%)	11a (8.8%)	3a (2.4%)	4a (3.2%)	6a (4.8%)	1a (0.8%)	0a (0%)	1a (0.8%)
Neither Use nor Outcome	21a (16.8%)	11a (8.8%)	33a (26.4%)	18b (14.4%)	30a (24%)	21a (16.8%)	36a (28.8%)	21b (16.8%)

Different letters within outcomes indicate significant differences between JIV and General veterans.

well-being; a focused effort on enrolling those just out of prison is also warranted. The Health Care for Reentry Veterans (HCRV) program does much to help in these areas, most notably its efforts to increase veteran engagement in substance use disorder treatments upon reentry.<sup>5</sup> A significant issue, however, is the lack of detection of substance abuse. A study indicated that VA primary care practitioners may fail to detect SUDs in two-thirds of patients and psychiatric clinics may not detect them in one-third of patients.<sup>24</sup> Such programs ought to incorporate standard measures to better detect substance use. VA departments already offer integrated primary care and mental health services through patient aligned care teams (PACTs)—shown to reduce rates of emergency department visits, hospitalization, and mortality;<sup>25</sup> however, these programs are working to integrate substance abuse treatment either directly into primary/mental health care clinics or provide channels to obtain service at specialty drug abuse treatment centers.<sup>24</sup>

Though SUD and depression are the most prevalent psychiatric disorders in justice involved individuals, future studies will need to focus on additional high prevalence veteran diagnoses including PTSD. Additionally, future studies may need to be designed to capture higher levels of detail related to use and symptom severity.

### Author contribution

Conceived and designed the experiments: NS, JL.

Analyzed the data: JL, AC, NS.

Wrote the first draft of the manuscript: NS, JL.

Contributed to the writing of the manuscript: NS, JL.

Agree with manuscript results and conclusions: NS, JL.

Jointly developed the structure and arguments for the paper: NS, JL.


Made critical revisions and approved final version: JL, NS.

All authors reviewed and approved of the final manuscript.

### Author Note

Portions of these findings will be presented as a poster at the 2020 APA Convention in Washington D.C., United States. Inquiries regarding the data can be sent to James LePage at james.lepage@va.gov.

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