

Predictors of Incarceration Among Urban Adults With Co-Occurring Severe Mental Illness and a Substance Use Disorder

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Objective: People with severe mental illness and a co-occurring substance use disorder (co-occurring disorders) who live in urban areas experience high rates of incarceration. This study examined sociodemographic, clinical, economic, and community integration factors as predictors of incarceration among people with co-occurring disorders. **Methods:** This secondary analysis used data from a randomized controlled trial of assertive community treatment versus standard case management. In the parent study, researchers interviewed 198 people with co-occurring disorders from two urban mental health centers in Connecticut at baseline and every six months for three years. Researchers tracked incarceration, clinical engagement and status, employment, living situation, social relationships, and substance use. The study reported here used bivariate analyses and logistic regression analyses to compare individuals who were incarcerated during the study period with those who were not. **Results:** The overall incarceration rate was 38% during the study period. In multivariate analyses, prior incarceration predicted incarceration during the study period (odds ratio [OR]=3.26). Two factors were associated with a reduced likelihood of incarceration: friendships with individuals who did not use substances (OR=.19) and substance use treatment engagement (OR=.60). **Conclusions:** Positive social relationships and engagement in substance use treatment are promising service and policy targets to prevent incarceration in this high-risk population. (*Psychiatric Services* 65:1325–1331, 2014; doi: 10.1176/appi.ps.201300408)

The United States has the highest incarceration rate in the world (1). People with a severe mental illness (schizophrenia spectrum

disorder, bipolar disorder, or major depression) disproportionately experience involvement in the criminal justice system (2,3). Between six and 16 per

100 people with severe mental illness are incarcerated in a correctional facility at some point in their lifetime (4). Among people with severe mental illness, incarceration is five times more likely among those with a co-occurring substance use disorder than among those without a substance use disorder (5). The incarceration of people with severe mental illness imposes large fiscal and resource burdens on society and often exposes these individuals to violent victimization (6,7). Investigating the predictors of incarceration among people with severe mental illness is a critical step in developing risk assessments and preventive interventions.

Studies of risk factors among people with mental illness have generally focused on demographic correlates of incarceration (8–10). Two new analyses have also suggested that nondemographic risk factors predict incarceration among people with mental illness. In San Diego County, researchers linked mental health and jail records of 39,463 incarcerated and nonincarcerated individuals with mental illness (11), identifying several key risk factors for incarceration: previous incarceration, a co-occurring substance use disorder, homelessness, severe mental illness, male gender, no Medicaid insurance, and race-ethnicity (African American). In Florida, researchers analyzed a Medicaid claims data set

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of filled prescriptions and treatment use among a group of 4,056 outpatients with schizophrenia or bipolar disorder after hospital discharge (12). They found that medication possession and use of outpatient services were associated with reductions in the likelihood of arrest. Together, these findings suggest that functional outcomes (housing) and treatment receipt (use of outpatient services and medication) may effect incarceration. Long-term cohort data from people with co-occurring disorders support these findings, consistently showing strong associations among functional improvements, extent of treatment engagement, and reductions in substance use, when analyses control for demographic factors (13–17). Although half of people with severe mental illness also experience a diagnosable co-occurring substance abuse or dependence disorder in their lifetime (18), no study has previously examined demographic or clinical correlates of incarceration in this high-risk group.

Using data from a randomized controlled trial conducted in diverse urban settings, we examined demographic, clinical, and social factors as predictors of incarceration over three years. On the basis of previous work, our hypotheses were that previous incarceration, male gender, racial-ethnic minority background, having a psychotic disorder, and homelessness would increase the risk of future incarceration and that engagement in substance use treatment, employment, and positive social supports would decrease risk of future incarceration.

Methods

Participants

The parent study was a randomized controlled trial that compared assertive community treatment with standard clinical case management among 198 people with co-occurring mental and substance use disorders from two urban areas (19). All participants met the following inclusion criteria: major psychotic disorder (schizophrenia, schizoaffective disorder, bipolar disorder, or major depression with psychotic features); active substance use disorder (abuse or dependence on alcohol or other drugs within the past six months); high service use in the past

two years (two or more of the following: psychiatric hospitalizations, stays in a psychiatric crisis or respite program, emergency department visits, or incarcerations); homelessness or unstable housing; poor independent living skills; no pending legal charges, life-threatening medical conditions, or mental retardation; being scheduled for discharge to community living if currently staying in an inpatient facility; and willingness to provide written informed consent. Participants were all newly admitted to an outpatient treatment facility.

Procedures of the parent study

Participants enrolled between August 1993 and July 1998. Clinical researchers gathered information at baseline and every six months for the next three years with a standardized interview conducted by trained interviewers, along with clinician ratings of substance use disorder severity. Participants received \$15 for each interview and \$5 for urine and saliva screening. The institutional review boards of the Connecticut Department of Mental Health and Addiction Services, the Southwest Connecticut Mental Health System, Dartmouth College, and the University of Connecticut approved the protocol. The original publication of findings compared case management types and described the natural course of illness (19). Both models incorporated integrated treatment for mental and substance use disorders.

Measures

Clinical factors. Clinical interviewers established participants' diagnoses of mental and substance use disorders by using the Structured Clinical Interview for DSM-III-R (20). To supplement assessments of substance use disorders, clinicians (case managers) rated participants every six months on three standardized rating scales: the Alcohol Use Scale (AUS) (21), the Drug Use Scale (DUS), and the Substance Abuse Treatment Scale (SATS) (22). The AUS and DUS identify disorder severity on a 5-point scale based on *DSM-III-R* criteria: 1, abstinence; 2, use without impairment; 3, abuse; 4, dependence; and 5, severe dependence. Drug or alcohol use ratings

indicating abstinence or use without impairment indicated that participants were in control of their alcohol or drug use. The SATS indicates progressive involvement in treatment and movement toward long-term remission from a substance use disorder according to Osher and Kofoed's (23) model of treatment and recovery. Based on an 8-point scale, SATS ratings of 1 or 2 indicate early and late stages of engagement in treatment (the individual still meets criteria for substance abuse or dependence), ratings of 3 through 8 indicate that the person is engaged in treatment at various stages in addressing his or her substance use, ratings of 3 or 4 indicate stages of persuasion, ratings of 5 or 6 indicate stages of active treatment, and ratings of 7 or 8 indicate stages of relapse prevention and recovery. Attaining the late stage of active treatment or better (≥ 6) signifies that the individual has achieved a clinically meaningful remission and has demonstrated that he or she is actively working on or has attained long-term abstinence.

Community integration factors. Community integration factors included housing, social support, and employment. Residential status was assessed by using a residential timeline follow-back calendar, for which participants were asked to report where they had been living and for how long (including institutionalization) (24). We considered participants as having been homeless if they experienced at least one day of sheltered homelessness (for example, slept at a shelter or at a friend's house) or literal homelessness (for example, lived on the street) any time before incarceration during the study period. Researchers used an item from the Quality of Life Interview (25) to assess social relations. We recoded the item such that participants who in at least one interview before incarceration reported at least one close friend who did not use substances and did not live with the participant and was not part of treatment staff were rated as recipients of positive social support. We dichotomized employment status as having at least one day versus no days of competitive employment during the study period.

Outcome. The data set contained self-reported days of incarceration

collected retrospectively every six months during the three years of follow-up, along with incarceration data (admission and discharge dates) from the Department of Corrections. The primary outcome variable was whether an individual experienced one or more days of incarceration during the three years of follow-up (hereafter, “ever incarcerated” and “never incarcerated”). We assumed that the participant had been incarcerated if either source indicated an incarceration.

Statistical analysis

Descriptive statistics characterized the overall sample. To compare ever-incarcerated to never-incarcerated participants, we conducted chi square tests for dichotomous and categorical predictors and t tests for the continuous predictor (age).

Many clinical and social variables were based on the participants’ status during the study. To prepare for predictive modeling, the following variables relevant to the prediction of incarceration were recoded (dichotomized) to reflect their presence or absence before incarceration: alcohol use disorder, drug use disorder, cocaine use, social contact with a person who did not use substances, competitive employment, and homelessness. We used an algorithm to exclude measurement after incarceration during the study. For example, if participants were incarcerated in year 2 of follow-up and spent one or more days homeless before the incarceration event, they were considered homeless in the statistical analysis. If participants were incarcerated in year 2 of follow-up and did not spend one or more days homeless until after incarceration (for example, in year 3), they were considered not homeless. Similarly, the SATS score received in the interview before incarceration was used in the analysis for incarcerated participants (mean ± SD time before incarceration was 17.12 ± 10.09 months). For never-incarcerated participants, we used the 18-month follow-up SATS score. For never-incarcerated participants, for all variables other than the SATS score we used all available follow-up data to determine the value of each predictor variable.

We generated a correlation matrix to identify potential multicollinearity

Table 1

Baseline characteristics of 198 patients with co-occurring serious mental illness and a substance use disorder^a

Variable	N	%
Age (mean ± SD)	36.51 ± 7.80	
Male	142	72
Race-ethnicity		
White	54	27
Hispanic	28	14
African American	108	55
Other	7	4
Never married	145	73
Completed high school or higher	98	50
Primary diagnosis		
Schizophrenia	108	55
Schizoaffective disorder	43	22
Bipolar disorder	13	7
Major depression	19	10
Other mood disorder	1	1
Other psychotic disorder	12	6
Substance use disorder		
Alcohol	130	66
Crack cocaine	120	61
Cannabis	74	37
Medicaid or Medicare	156	84
Psychiatric hospitalization in the past year	99	50
Any competitive employment in the past year	34	17
Ever incarcerated before study	110	56
Ever homeless before study	78	39
Experimental condition		
Assertive community treatment	99	50
Standard case management	99	50
Study site		
1	100	51
2	98	50

^a Bivariate results by site and experimental condition are reported elsewhere (19).

between the variables measuring substance use. The SATS, DUS, and AUS scores and cocaine use were all strongly correlated. Therefore, we included only the SATS score, the most comprehensive description of substance use, in the regression models.

Next, we computed two multivariate logistic regression analyses that compared participants who were incarcerated during the study period with those who were not. For the first model, measures found in previous research to be predictive of incarceration were included. For the second model, we retained predictors that were related to incarceration at the $p < .25$ level in model 1 and added two social predictors—employment and social support. We conducted all analyses using IBM SPSS Statistics, version 19 (26).

Results

Table 1 summarizes information on baseline characteristics of the 198 par-

ticipants, who tended to be African American, male, unmarried, and poorly educated. Schizophrenia and schizoaffective disorder were more common than other diagnoses. Participants most frequently reported abusing alcohol and crack cocaine. Some of these descriptive findings were published in an earlier report (19).

Over three years, 75 participants (38%) were incarcerated. Table 2 shows the bivariate relationships between incarceration and hypothesized predictors. Other significant risk factors for incarceration included prior incarceration, young age, drug use disorder (including cocaine use), and one or more days homeless. Protective factors for incarceration included having a drug- and alcohol-free close friend and a higher SATS score (indicating limited or no substance use).

Among participants incarcerated during the study, the average SATS score was 2.79 ± 1.91 in the month

Table 2

Bivariate comparisons between participants with co-occurring disorders who were or were not incarcerated during the study period^a

Variable	Not incarcerated (N=123, 62%)		Incarcerated (N=75, 38%)		Test statistic	df	p
	N	%	N	%			
Baseline							
Age (mean±SD)	37.4±8.0		35.0±7.2		t=2.12	195	.04
Gender					$\chi^2=.82$	1	.36
Male	91	74	51	68			
Female	32	26	24	32			
Race-ethnicity					$\chi^2=13.65$	3	.003
White	42	36	12	17			
Hispanic	21	18	7	10			
African American	55	47	53	74			
Other	5	4	2	3			
Diagnosis					$\chi^2=.26$	1	.61
Mood disorder	22	18	11	15			
Psychotic disorder	101	82	62	85			
Prior incarceration					$\chi^2=19.28$	1	<.001
Yes	54	45	56	78			
No	65	55	16	22			
Experimental condition					$\chi^2=.02$	1	.88
Assertive community treatment	62	50	37	49			
Standard case management	61	50	38	51			
Site					$\chi^2=1.29$	1	.26
1	66	54	34	45			
2	57	46	41	55			
During study							
Alcohol use disorder					$\chi^2=3.12$	1	.08
Yes	96	78	50	67			
No	27	22	25	33			
Drug use disorder					$\chi^2=8.41$	1	.004
Yes	93	76	69	92			
No	30	24	6	8			
Cocaine use					$\chi^2=5.89$	1	.02
Yes	62	50	51	68			
No	61	50	24	32			
Social contact with a nonuser of substances					$\chi^2=13.04$	1	<.001
Yes	83	68	31	41			
No	40	33	44	59			
Competitive job					$\chi^2=3.48$	1	.06
Yes	47	38	19	25			
No	76	62	56	75			
Homeless					$\chi^2=6.38$	1	.01
Yes	56	46	48	64			
No	67	56	27	36			
Substance Abuse Treatment Scale stage					$\chi^2=33.64$	7	<.001
Preengagement	2	2	5	7			
Engagement	17	16	27	39			
Early persuasion	31	29	28	40			
Late persuasion	16	15	6	9			
Early active treatment	12	11	0	0			
Late active treatment	7	7	1	1			
Relapse prevention	18	17	2	3			
Remission or recovery	5	5	1	1			

^a Because of missing data for some variables, different denominators were used to calculate the percentages.

before incarceration, indicating that these individuals were engaged in treatment but still met criteria for substance abuse or dependence. By comparison, those who were not incarcerated during the study had a SATS mean score of 4.29 ± 1.30 , indicating that they were engaged in treatment and showed evidence of reduction in use for at least the past one month (fewer substances, smaller quantities, or both).

Table 3 shows the results of the final logistic regression model. Previous incarceration strongly predicted incarceration during the study, more than tripling the likelihood of incarceration. Having a drug- and alcohol-free close friend was associated with a reduced likelihood of incarceration of about four-fifths, and having a higher SATS score decreased the likelihood of incarceration by about half. Age, race-ethnicity, gender, employment, and one or more days of homelessness did not significantly predict incarceration in the final model. Incorporating employment and positive social support significantly improved the overall predictive model for incarceration over an initial model that excluded these predictors ($p < .001$ for chi square test comparing the -2 log likelihood of model 1 and model 2). [Results of the initial model are presented in an online data supplement to this article.] In two sensitivity analyses, we confirmed that the parent study's experimental condition did not predict incarceration status during the study by adding an indicator for assertive community treatment versus standard case management to the final model; removing previous incarceration from the final model did not change our interpretation of the results, except that homelessness predicted incarceration during the study (results not shown and available upon request).

Discussion

Over one-third of this sample of individuals with co-occurring disorders was incarcerated over the three-year study period. In multivariate analyses, previous incarceration, lack of positive social support, and lack of engagement in substance use treatment predicted incarceration. Bivariate analyses, but not multivariate analyses, supported other hypothesized relationships, perhaps

because some variables shared variance (for example, racial-ethnic minority status and previous incarceration). In bivariate analyses, participants who were younger, African American, previously incarcerated, abusing or dependent on drugs, homeless, at an early stage of substance use treatment, and lacking positive social supports were more likely to be incarcerated.

The higher rate of incarceration among participants who had previously been incarcerated is consistent with previous research (11,12,27), as is the higher incarceration rate for African Americans (28). However, proportionally fewer African Americans in this sample were incarcerated, compared with national rates (28). Close surveillance after release from incarceration and difficulty reinstating Medicaid benefits may intensify the risk of repeated criminal justice involvement (29–34). High rates of reimprisonment in this population have also been linked to inadequate treatment provided in jails and prisons (35), but we could not examine this possibility.

Engaging in substance use treatment as well as attaining abstinence distinguished never-incarcerated and ever-incarcerated participants in this study (Table 2). Substance use, not lack of treatment engagement, is often conceptualized as the immediate precipitant of incarceration (8,11). The only other study that examined the relationship between treatment engagement and incarceration also found a significant protective effect (12). Our study provides a complement to these results by controlling for substance use remission status. Treatment-seeking behavior may indicate a willingness to make significant changes in one's social life and living situation. Programs that incorporate stages of treatment corresponding to client needs can facilitate those changes. For example, providing structured housing in a safe community away from disruptive peers may prevent contacts with the police (36).

This study extended previous research by emphasizing potentially modifiable measures (social network, employment, and housing) that might inform both treatment and prevention efforts (5,27). Individuals with co-occurring disorders often are socially disadvantaged by cognitive and emo-

Table 3

Logistic regression model of predictors of incarceration over a three-year follow-up among participants with co-occurring disorders^a

Variable	OR	95% CI	p
Age	.96	.91–1.02	.15
Male (reference: female)	.98	.37–2.59	.97
Race-ethnicity (reference: white)			
Hispanic	1.67	.61–4.59	.32
African American	.81	.20–3.22	.76
Other	.08	.01–1.30	.08
Psychotic disorder (reference: mood disorder)	.97	.31–3.09	.96
Prior incarceration (reference: none)	3.26	1.38–7.71	.007
Homeless (reference: no)	2.21	.99–4.93	.06
Substance Abuse Treatment Scale	.60	.45–.79	<.001
Employment (reference: none)	.77	.32–1.89	.57
Social contact with a nonuser of substances (reference: none)	.19	.08–.43	<.001

^a For the initial model without employment or social contact: N=170, -2 log likelihood=172.704. For the final model with employment and social contact included: N=170, -2 log likelihood=154.709. Change in model fit: $\chi^2=17.99$, $df=2$, $p<.001$

tional difficulties and can be drawn into social groups that deviate from social norms in dangerous ways and engage in illegal acts (37,38). Drug- and alcohol-free close friends may facilitate recovery by keeping people with co-occurring disorders away from individuals and environments that trigger the desire for drugs or otherwise enhance the likelihood of drug use, enabling them to spend time learning a skill or working (38). Having close friends who are drug and alcohol free is also associated with fewer overall social contacts in terms of activity amounts and social contacts (14). Stable social networks that rely on a few meaningful members may serve a protective function by focusing the person on meaningful relationships and by lessening his or her likelihood of beginning a negative relationship. Employment status was unrelated to incarceration, but rates of employment may have been too low to allow us to discern a relationship. Prior homelessness did not predict incarceration, except when prior incarceration was removed from the analysis—an indication that the typical client experienced both incarceration and homelessness in the past or else had neither experience. Previous research has found strong associations between homelessness, having a co-occurring drug use disorder, and incarceration (5,8,11,36,39), in keeping with this finding.

Several limitations deserve mention. Although this is one of the first

longitudinal observational studies of incarceration among people with co-occurring disorders, generalizability is limited to individuals receiving treatment in highly urbanized environments. Because the sample consisted of patients who were receiving treatment, the hypothesis that insurance status moderates treatment receipt, which in turn influences incarceration rates, could not be tested. The never-incarcerated individuals had a greater opportunity to be homeless, gain friendships or employment, and engage in treatment than the individuals who were incarcerated at some time in the study. Other variables may not have been predictive because of a lack of variation in the sample.

Also, in our analyses, we included a measure of treatment engagement that was not independent from alcohol or drug use. Participants in the parent study met criteria for substance use or dependence at baseline and were newly admitted to the treatment facility; thus this scale was appropriate to track both their subsequent engagement in treatment and progress addressing substance use. However, this scale does not provide information about participants who never engaged in treatment and who achieved remission of their substance use disorder. The small number of sites was also a limitation of the study, as was the age of the data. The richness of the data collected allowed us to conduct analyses not possible with more recent

data. Finally, this descriptive study does not permit causal interpretations.

Three important clinical implications arise from this study. First, preventing initial incarceration should be a primary goal because incarceration predicts more incarceration. Second, promoting outreach and engagement with treatment for substance use through mental health courts may help prevent induction into the incarceration-reincarceration spiral (40,41). Third, positive social supports may prevent incarceration. Group self-help communities, such as Alcoholics Anonymous and Double Trouble in Recovery, foster such friendships by encouraging healthy behaviors among individuals that are based on a shared group identity of abstinence-friendly lifestyle goals and behaviors (42–45).

Conclusions

Facilitating engagement in substance use treatment and providing help to find positive social supports within the community may help individuals with co-occurring mental and substance use disorders reduce the risk of incarceration.

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Submissions Invited for Datapoints Column

Datapoints encourages the rapid dissemination of relevant and timely findings related to clinical and policy issues in psychiatry. National or international data, especially from large representative databases, are preferred. The editors are particularly interested in data that can be accessed by other researchers. Topics may include differences or trends in diagnosis and practice patterns or in treatment modalities, especially across different care settings or in the context of new policies or payment sources. The analyses should be straightforward, so that the data displayed tell a clear story. The text should follow the standard research format and include a brief introduction, description of the methods and data set, description of the results, and comments on the implications or meanings of the findings.

Datapoints columns must include one figure or table, and because the column is limited to one printed page, it is therefore limited to 350–400 words. Submissions with multiple authors are discouraged because of space constraints; submissions with more than four authors should include justification for additional authors.

Inquiries or submissions should be directed to column editors Amy M. Kilbourne, Ph.D., M.P.H. (amykilbo@umich.edu), or Tami L. Mark, Ph.D. (tami.mark@truvenhealth.com).