Effects of Outpatient Treatment on Risk of Arrest of Adults With Serious Mental Illness and Associated Costs

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Objective: **This study examined whether possession of psychotropic medication and receipt of outpatient services reduce the likelihood of posthospitalization arrest among adults with serious mental illness. A secondary aim was to compare service system costs for individuals who were involved with the justice system and those who were not.** ***Methods:*** **Claims data for prescriptions and treatments were used to describe patterns and costs of outpatient services between 2005 and 2012 for 4,056 adult Florida Medicaid enrollees with schizophrenia or bipolar disorder after discharge from an index hospitalization. Multivariable time-series analysis tested the effects of medication and outpatient services on arrest (any, felony, or misdemeanor) in subsequent 30-day periods.** ***Results:*** **A total of 1,263 participants (31%) were arrested at least once during follow-up. Monthly medication possession and receipt of outpatient services reduced the likelihood of any arrests (misdemeanor or felony) and of misdemeanor arrests. Possession of medications for 90 days after hospital discharge also reduced the likelihood of arrest. Prior justice involvement, minority racial-ethnic status, and male sex increased the risk of arrest, whereas older age decreased it. Criminal justice and behavioral health system costs were significantly higher for the justice-involved group than for the group with no justice involvement.** ***Conclusions:*** **Routine outpatient treatment, including medication and outpatient services, may reduce the likelihood of arrest among adults with serious mental illness. Medication possession over a 90-day period after hospitalization appears to confer additional protection. Overall, costs were lower for those who were not arrested, even when they used more outpatient services. (*Psychiatric Services* 64:856–862, 2013; doi: 10.1176/appi.ps.201200406)**

Adults with serious mental illness are at increased risk of criminal justice involvement (1,2) and, as a result, are grossly overrepresented in correctional settings. More than 1.25 million adults with mental illness are incarcerated in the United States (3), and more than two million adults with serious mental illness are admitted to jails annually (4). The proportion of adults with serious mental illness on probation and parole is similarly high (5), approximately two to four times as high as the proportion in the general population (6). Not only do these high proportions represent significant costs for the criminal justice system (7–10), they also indicate substantial disruptions in treatment (11) and quality of life (12). The community-based service system often struggles to intervene effectively with this population (13), which represents a substantial proportion of community mental health consumers.

Involvement in the justice system of adults with serious mental illness has emerged as a major issue, but there are varying perspectives on the potential for mental health treatment to reduce the risk of arrest (14). Some commentators emphasize the importance of criminogenic factors, such as antisocial peers and criminal thinking, arguing that treatment of psychiatric symptoms alone will not reduce justice involvement (15). Others focus on the role of mental illness, suggesting that psychiatric treatment, such as psychotropic medications and outpatient treatment, should contribute to reductions in arrests (16,17).

No one disputes that justice-involved adults with serious mental illness should receive outpatient treatment. The empirical literature on whether psychotropic medications or routine outpatient

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services are protective against justice involvement is limited but promising. In one study, receipt of clozapine by psychotic patients with prior criminal justice involvement was associated with decreased recidivism (18). The interaction between receipt of second-generation antipsychotics and outpatient services was also associated with reduced arrests over time (17). Other studies have found that participation in specialty services programs is associated with reduced likelihood of arrest (3,11,19–21). Moreover, some evidence suggests that outpatient treatment exerts differential effects on risk of arrest as a function of the type of crime (for example, misdemeanors versus felonies) (22), but more research is needed.

The importance of achieving a better understanding how to reduce justice involvement in this population cannot be overstated. This is an expensive population that strains the multiple service systems with which it interacts (23). However, few studies have described cost differences or potential cost savings associated with diversion or routine outpatient services for adults with mental illness (24). In fact, two of the most rigorous systematic reviews of cost-benefit analyses of correctional interventions (25,26) did not include samples of adults with mental illness. Moreover, results of research focused on mentally ill populations have been equivocal, and cost savings may have been attributable to cost-shifting from the justice system to the public community treatment system (4,27).

There remains a critical gap in our knowledge of the effects of outpatient treatment on the likelihood of arrest of adults with serious mental illness, as well as the associated costs. In this study, we examined the role of psychotropic medication possession and receipt of routine outpatient services in reducing risk of arrest among adults with schizophrenia and bipolar disorder. We focused on these two disorders because of the important role of outpatient treatment in guideline recommendations for these disorders (28–32) and because persons with these disorders are overrepresented in the criminal justice system (33). We also examined whether possessing medication immediately after discharge from an index hospitalization served as a protective mechanism, reducing the likelihood of arrest over time. Finally, we conducted between-group comparisons of the criminal justice and behavioral health system costs for persons arrested during follow-up and those who were not arrested.

Methods

Sample

State of Florida Medicaid files were used to identify the study population. Information on demographic characteristics, treatment, and Medicaid enrollment of all persons in the target population was obtained from Medicaid files, and this information was used as a link to records of Florida's Department of Children and Families (DCF) and the Florida Department of Law Enforcement (FDLE). Individuals with schizophrenia or bipolar disorders who were enrolled in Medicaid at any point between July 1, 2004, and June 30, 2005, and who experienced a hospitalization during this period constituted the primary sample (N=4,056). Medicaid and DCF service event and cost records and FDLE arrest records were then reviewed between July 1, 2005, and May 31, 2012, for eligible persons. Study procedures were approved by the University of South Florida Institutional Review Board.

Measures

Dependent variables. We evaluated the likelihood of any arrest, any felony arrest, any misdemeanor arrest, frequency counts of these three variables, and criminal justice and service system costs. Arrest records were obtained from the FDLE, which included classifications of the type of crime. Dichotomous arrest variables were created (arrest=1, no arrest=0), as were count variables of arrests in a given month, and the data were structured as person-month observations. The average cost of an arrest (including costs for police, booking, court, attorney, and sheriff transportation) was based on inflation-adjusted estimates from a previous study (8).

Independent variables. Monthly medication possession—that is, high possession during a given month (see below)—was constructed from Medicaid pharmacy records. We calculated the number of days in a given month in which the individual had a supply of a prescribed psychotropic medication. The monthly medication possession ratio was calculated only for pharmacy claims that corresponded to treatment of the primary psychiatric disorder. High-possession months were those in which the filled supply of medication covered 80% or more days (34–36). Months in which 80% or more of the days were covered by a diagnosis-corresponding prescription were considered high-possession months and coded as 1. (Depot medication claims were coded as high possession for a given month.)

Monthly routine outpatient services were operationalized to include the monthly receipt of outpatient therapy or case management or any other outpatient encounter (including substance abuse treatment) that was not a crisis service, a one-time assessment, or a medication refill. The total number of claims for Medicaid- and DCF-funded outpatient services in a given month was summed. The dollar amounts of each paid claim were used to indicate the service cost.

Possession of medication in the 90 days after the index hospitalization was calculated and divided into tertiles. Persons with diagnosis-corresponding prescriptions (as described above) for one of the three 30-day periods were coded 1; a code of 2 was used for those in possession of medication for two of the 30-day periods; and a code of 3 indicated possession for all three of the 30-day periods. Indicator variables were created on the basis of this coding scheme for use in the multivariable regressions.

Region was indicated by seven indicator variables. Specifically, arrest rates for persons receiving services in the central, central east, central west, north central, northeast, northwest, and southwest regions of Florida were compared with rates of persons receiving services in the southeast region.

Race-ethnicity and sex were represented by indicator variables in the analysis. Hispanics, blacks or African Americans, and those from other racial-ethnic groups were compared

Table 1

Characteristics of 4,056 adult Florida Medicaid enrollees with schizophrenia or bipolar disorder

Characteristic	N	%
Region		
Central	407	10
Central east	300	7
Central west	533	13
North central	199	5
Northeast	381	9
Northwest	275	7
Southeast	1,896	47
Southwest	65	2
Demographic		
Sex		
Female	2,239	55
Male	1,817	45
Race-ethnicity		
White	1,913	47
Black or African American	1,008	25
Hispanic	761	19
Other	374	9
Age (M±SD)	37.3±12.4	
Prior arrest	883	22
Clinical		
Diagnosis		
Bipolar disorder	1,264	31
Schizophrenia	2,792	69
Index hospitalization length of stay (M±SD days)	5.9±7.5	
Medication possession after hospital discharge		
0 of 90 days	1,006	25
30 of 90 days	797	20
60 of 90 days	734	18
90 of 90 days	1,519	37

with non-Hispanic whites. Males were compared with females.

Age was measured continuously and indexed to age at release from the index hospitalization and increased by one on each of the participant's birthdays.

Diagnosis was obtained from Medicaid claims. Primary diagnoses on claims were grouped into two categories: schizophrenia and bipolar disorder. A hierarchical coding scheme was used to count the number of claims that listed each diagnosis; the most frequent diagnosis was used for a given participant.

Data structure

Analytic files based on Medicaid-funded and DCF-funded treatment and cost data and FDLE arrest data were created that contained multiple observations per person. Our post–index hospitalization study period consisted of 77 months (between July 2005 and May 2012). We then created a vertical data shell representing this time period. In this data structure, each month became a separate record and each type of service event or status, such as receiving treatment or being arrested, became a separate variable. Each person's Medicaid and DCF claims were examined for receipt of any behavioral health services (for example, pharmacy fills and targeted case management) that occurred in a given month during the observation period. Outpatient treatment was lagged by 30 days to afford examination of the impact of services on arrests in the next 30-day period.

Analysis

We used repeated-measures regression techniques to analyze lagged Medicaid- and DCF-reimbursed outpatient service encounter claims in terms of the likelihood of being arrested in the next 30-day period. All available 30-day periods were included as long as the person was in the community for at least 15 days. If an arrest resulted in less than 15 days in the community, the 30-day period containing the arrest was still included in analyses. We estimated robust standard errors to account for the nonindependence of observations and controlled for time. Logistic models were used to estimate dichotomous outcomes, and negative binomial models were used to estimate count outcomes. Negative binomial models were estimated to accommodate dispersion in the count data. We examined the negative binomial dispersion parameters to confirm that negative binomial models were indeed better-fitting models than Poisson models. All analyses were conducted with SAS, version 9.2.

Results

Sample characteristics

Table 1 summarizes information on the 4,056 adults. The mean±SD age was 37±12 (range 18–64), and more than half were women (55%). One-quarter were black or African American (25%), just under half (47%) were non-Hispanic white, 19% were Hispanic, and the remaining 9% were in the category "other." Sixty-nine percent had a diagnosis of schizophrenia. Twenty-two percent had been arrested in the 12 months before the index hospitalization.

Nearly half of the sample (47%) lived in the southeast region of the state; 13% lived in the central west region and 10% in the central region. Smaller proportions of the sample lived in the other three regions.

Post–index hospitalization arrests

After the index hospitalization, 1,263 participants (31%) were arrested at least once during the follow-up period. The 1,263 participants were arrested a total of 5,477 times. Most were arrested on misdemeanor charges; 1,084 participants accounted for a total of 3,609 misdemeanor arrests.

Multivariable models

Table 2 presents the multivariable regression results for the three dichotomous arrest outcomes, and Table 3 presents the multivariable regression results for the three count outcomes. A significant negative association was found between routine outpatient services and high medication possession in the prior 30-day period and any arrest and any misdemeanor arrest in the next 30-day period; that is, outpatient services and medication possession were associated with a reduced risk of these arrests. A reduced risk of all measured arrest types was also noted for participants who possessed medication in each of the three 30-day periods immediately after discharge from the index hospitalization, compared with those who did not possess medications during any of the three 30-day periods. The same effect, however, was not significant for those possessing medication for only 30 or 60 of the 90 days.

Similar results were found for count outcomes (Table 3). As above, monthly possession of prescribed psychotropic medications and monthly receipt of routine outpatient services were associated with number of any arrests and number of misdemeanor arrests. Medication possession for the first 90 days (all three 30-day periods) after discharge from the index hospitalization was associated with fewer arrests of all types.

Table 2

Multivariable regression models of arrests among adult Florida Medicaid enrollees with schizophrenia or bipolar disorder, by type of crime[a]

Characteristic	Any arrest			Any felony arrest			Any misdemeanor arrest		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Time: month	.98	.98–.98	.001	.95	.95–.96	.001	.99	.99–.99	.001
Demographic									
Male (reference: female)	1.50	1.29–1.75	.001	1.36	1.13–1.62	.001	1.56	1.31–1.86	.001
Race-ethnicity (reference: white)									
Black or African American	1.50	1.26–1.80	.001	1.60	1.28–1.98	.001	1.44	1.18–1.76	.001
Hispanic	1.31	1.06–1.60	.010	1.67	1.32–2.12	.001	1.13	.90–1.43	.292
Other	1.22	.89–1.67	.215	1.21	.88–1.66	.246	1.22	.84–1.77	.299
Age	.99	.99–1.00	.013	.98	.98–.99	.001	1.00	.99–1.00	.393
Prior arrest (reference: no)	4.99	4.26–5.84	.001	5.15	4.30–6.16	.001	4.71	3.93–5.64	.001
Clinical									
Schizophrenia (reference: bipolar disorder)	.86	.72–1.02	.087	.90	.73–1.11	.320	.85	.70–1.03	.098
Index hospitalization length of stay	.99	.98–1.00	.076	.99	.98–1.00	.103	.99	.98–1.00	.150
Medication possession after hospital discharge (reference: 0 days)									
30 days	1.04	.87–1.25	.654	1.04	.83–1.31	.725	1.04	.85–1.28	.714
60 days	.86	.68–1.07	.177	.81	.63–1.04	.092	.89	.68–1.15	.372
90 days	.56	.46–.69	.001	.57	.44–.74	.001	.57	.46–.72	.001
High monthly medication possession (reference: <80% of days)	.88	.79–.98	.025	1.06	.89–1.26	.527	.77	.67–.88	.001
Monthly N of routine outpatient services	.99	.98–1.00	.004	.99	.98–1.00	.069	.99	.98–1.00	.004

[a] All multivariable models controlled for region of the state.

We reran the analyses shown in Table 2 and Table 3 and included only the 30-day periods in which the participant was in the community for the entire time (all 30 days). None of the findings changed appreciably.

Across all arrest outcomes, male participants and black or African-American participants were significantly more likely than female and white participants to be arrested. Hispanic participants were also at increased risk of arrest across all outcomes, except for misdemeanor arrests. A significant negative association was found between age and any arrest or a felony arrest; the association with misdemeanor arrests was not significant. The strongest association was found between arrest in the year before the index hospitalization and arrest after discharge. A prior arrest increased the risk of subsequent arrest by a factor of approximately 5 across all arrest outcomes.

No significant differences in arrest outcomes were found between those with bipolar disorder and those with schizophrenia. A nonsignificant trend ($p<.15$) was found across all arrest outcomes for an association between a longer index hospitalization and a reduced risk of arrest over time.

Criminal justice involvement and service system costs

Between-group comparisons showed that mean costs and mean number of encounters for acute care services, including psychiatric hospitalization and emergency mental health services, were significantly higher for participants with criminal justice involvement than for those with no involvement (inpatient costs, $t=-4.76$, $df=2,063$, $p<.001$; inpatient encounters, $t=-2.94$, $df=2,505$, $p=.003$; emergency services costs, $t=-4.17$, $df=1,266$, $p<.001$; and emergency services encounters, $t=-4.64$, $df=1,240$, $p<.001$). Conversely, mean outpatient costs and encounters, including routine outpatient services and psychotropic medications, were significantly higher for participants with no justice system involvement (routine outpatient costs, $t=4.21$, $df=2,970$, $p<.001$; routine outpatient encounters, $t=5.35$, $df=3,087$, $p<.001$; pharmacological costs, $t=9.65$, $df=2,525$, $p<.001$; and pharmacological encounters, $t=13.80$, $df=2,367$, $p<.001$).

The mean total assessed costs (that is, acute care, outpatient care, assessment, and criminal justice) for the 1,263 justice-involved participants was \$94,771±\$106,890—significantly higher than for those with no justice system involvement (\$68,348±\$100,700) ($t=-7.39$, $df=2,337$, $p<.001$). Even when the justice system costs were not included, the justice-involved group had significantly higher average total treatment costs than those with no involvement ($t=-3.96$, $df=3,967$, $p<.001$). Finally, the total costs were divided by the length of follow-up (range 2,071–2,464 days); the mean daily cost was significantly higher for the justice-involved group—\$40.61± \$45.07 versus \$29.49±\$43.17 ($t=-7.45$, $df=3,967$, $p<.001$).

Discussion

This study used Florida Medicaid data to identify a population of adults with schizophrenia or bipolar disorder who were discharged from an index hospitalization. We examined multiple arrest outcomes—any arrest, felony arrest, and misdemeanor arrest—and whether outpatient treatment, including pharmacological and routine outpatient interventions, affected risk

Table 3

Multivariable regression models for arrests among adult Florida Medicaid enrollees with schizophrenia or bipolar disorder, by number of arrests and type of crime[a]

Characteristic	N of arrests			N of felony arrests			N of misdemeanor arrests		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Time: month	.98	.98–.98	.001	.95	.94–.95	.001	.99	.99–.99	.001
Demographic									
Male (reference: female)	1.53	1.30–1.80	.001	1.39	1.16–1.66	.001	1.60	1.33–1.93	.001
Race-ethnicity (reference: white)									
Black or African American	1.50	1.25–1.81	.001	1.66	1.34–2.06	.001	1.44	1.17–1.77	.001
Hispanic	1.30	1.05–1.61	.018	1.58	1.25–2.00	.001	1.18	.92–1.51	.202
Other	1.22	.87–1.72	.242	1.19	.86–1.63	.292	1.23	.82–1.85	.321
Age	.99	.99–1.00	.028	.98	.98–.99	.001	1.00	.99–1.00	.428
Prior arrest (reference: no)	4.79	4.05–5.66	.001	4.89	4.08–5.85	.001	4.72	3.89–5.71	.001
Clinical									
Schizophrenia (reference: bipolar disorder)	.86	.72–1.02	.083	.89	.72–1.08	.241	.86	.70–1.04	.124
Index hospitalization length of stay	.99	.98–1.00	.060	.99	.98–1.00	.043	.99	.98–1.00	.098
Medication possession after hospital discharge (reference: 0 days)									
30 days	1.03	.85–1.25	.767	1.01	.81–1.27	.906	1.03	.83–1.28	.766
60 days	.87	.68–1.10	.231	.79	.62–1.01	.063	.89	.68–1.18	.433
90 days	.54	.43–.67	.001	.54	.41–.70	.001	.54	.43–.69	.001
High monthly medication possession (reference: <80% of days)	.88	.78–.99	.035	1.00	.84–1.19	.982	.78	.68–.90	.001
Monthly N of routine outpatient services	.99	.98–1.00	.007	.99	.98–1.00	.142	.99	.98–1.00	.004

[a] All multivariable models controlled for region of the state.

of future arrests. We also examined group differences in costs to the criminal justice system and behavioral health service system between those who were and were not arrested during follow-up.

We found that high medication possession and receipt of routine outpatient services reduced the risk of arrest. Moreover, there was an additional protective effect against arrest for individuals in possession of their prescribed pharmacological medications for 90 days after discharge from their index hospitalization. This effect was not found for those who possessed medications for fewer than 90 days after discharge, suggesting that consistent medication possession after hospital discharge is critical in reducing the likelihood of arrests.

In addition, participants who were arrested after discharge from their index hospitalization used a different, and more costly, mix of services than those who were not arrested. Individuals in the former category were more likely than those in the latter to be hospitalized and to use emergency services. We cannot determine from our data why this service mix was different, but the combination of intensive, expensive services and arrests suggests that these individuals' lives were in considerable disarray without the benefit of ongoing routine outpatient treatment. It also highlights the challenges in engaging and treating justice-involved adults with serious mental illness in a consistent and cost-effective manner (37).

Receipt of outpatient services appeared to exert differential effects on risk of arrests for felonies and for misdemeanors (23). Outpatient services were significantly related to reductions in misdemeanor arrests but not felony arrests. Future research should explore reasons for this difference, and findings from studies on violence and mental disorders may provide a starting point. Two pathways to violence risk in mentally ill populations have been identified—one associated with mental illness itself, including psychotic symptoms, and another associated with premorbid conditions, including childhood antisocial behaviors (38). These pathways are also associated with different treatment outcomes (39). Thus pathways to arrest should be considered when evaluating the relationship between outpatient treatment and criminal justice involvement.

There are several limitations to this study. The analysis did not control for differential selection into treatment or reasons for discontinuing treatment at a given time. We were able to control for some, but not all, theoretically and clinically relevant covariates. For example, no time-invariant or time-dependent substance use measures were available. In addition, arrest rates may show regression to the mean over time for adults with serious mental illness. Also, the analyses were limited to secondary data from one state and to individuals who were enrolled in Medicaid at any point between July 1, 2004, and June 30, 2005. Though we were able to capture data on DCF-funded (that is, non-Medicaid) routine and emergency inpatient and outpatient services, we were not able to capture data on medication possession during months when an individual had no Medicaid coverage. It is important to note that our measure of medication possession is only an

assessment of whether an individual possessed enough medication to cover 80% or more of the days in a 30-day period, not whether the medication was actually taken. Finally, because this was a retrospective study based on secondary data, we were unable to randomly assign participants and test for specific causal mechanisms related to reductions in arrest vis-à-vis outpatient services. Future research should test such potential mechanisms and examine whether mechanisms differ based on treatment modalities or clinical profiles.

Conclusions

Reducing criminal justice involvement among adults with serious mental illness remains an important task facing mental health researchers and clinicians. The findings of this study add to a growing body of evidence regarding the role of outpatient treatment in reducing the likelihood of arrest (9,11,17,23,40). Routine outpatient treatment, including pharmacological and outpatient services—both of which are guideline-recommended treatments for serious mental illness—may not be administered with the intent of reducing justice involvement. However, receipt of such treatment reduced the likelihood of subsequent arrests for adults with schizophrenia and bipolar disorder.

However, the challenge involves how to implement an effective, continuous system of care (41). Specific questions include: How do we improve the management of transitions between institutions and communities and increase continuity of care during these transitions? How do we ensure that people making a transition to the community access services during the transition? How do we maintain involvement in both pharmacological and routine outpatient services over time for adults with serious mental illness? Future research, policy, and treatment development should endeavor to answer these core questions.

Acknowledgments and disclosures

The study was funded by the Florida Agency for Health Care Administration under contract MED134 and by the Stanley Medical Research Institute via a subcontract through Duke University. The content is solely the responsibility of the authors and does not necessarily represent the official views of the funding sources.

The authors report no competing interests.

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