Antipsychotic Prescribing Patterns in the Texas Prison System

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Although prison inmates are reported to exhibit elevated rates of psychotic disorders, little is known about antipsychotic pharmacotherapy in correctional settings. Therefore, the purpose of this study is to describe antipsychotic prescribing patterns in one of the nation's largest prison systems. The study population consisted of 3,750 Texas Department of Criminal Justice (TDCJ) inmates diagnosed with schizophrenic disorders, nonschizophrenic psychotic disorders, or both. In 1998, among inmates diagnosed with schizophrenic disorders, 14.6 percent were prescribed atypical antipsychotic agents, and 85.4 percent were prescribed typical antipsychotic agents. Among inmates diagnosed with nonschizophrenic psychotic disorders, 89.3 percent were prescribed typical antipsychotic agents, while 10.7 percent were prescribed atypical antipsychotic agents. Black males and females were prescribed atypical antipsychotic agents less frequently than their counterparts. Understanding such prescribing patterns is integral to the efficient and cost-effective planning of correctional mental health care.

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One of the unintended consequences of the widespread deinstitutionalization of psychiatric patients has been an increase in the proportion of severely mentally ill incarcerated in the U.S. prison system.[1,2] Consistent with these reports, a number of investigators have found that U.S. prison inmates exhibit elevated rates of mental illness[3–5] and psychotic disorders in particular.[1,3,6]

Antipsychotic agents, both typical and atypical, constitute the primary form of pharmacotherapy used to treat inmates diagnosed with psychotic disorders. However, typical antipsychotics, which have been used to treat both acute and chronic psychosis since the 1950s, are associated with a number of adverse side effects including acute dystonias, drug-induced parkinsonism, akathisia, and tardive dyskinesia (TD).[7,8] Alternatively, atypical antipsychotics are reported to have a broader spectrum of efficacy in the treatment of schizophrenic pathology, a more favorable safety profile, and result in better patient adherence than typical antipsychotics.[9–11] More specifically, atypical agents are associated with lower extrapyramidal symptoms,[10] lower neurocognitive impairment,[12] and improved efficacy in treating both typical neuroleptic-responsive and typical neuroleptic-refractory patients.[9] Despite these benefits, atypical antipsychotics are considerably more expensive than standard agents.[7] Correctional health care administrators and clinicians thus are faced with difficult decisions regarding allocation of scarce resources to best address the pharmacotherapeutic needs of their inmate patients. Unfortunately, no published information is currently available on antipsychotic pharmacotherapy in correctional settings. Therefore, the purpose of the present study was to describe antipsychotic prescribing patterns in the Texas Department of Criminal Justice (TDCJ) prison population, one of the three largest prison systems in the United States.

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Methods

The cohort under study consisted of 3,750 prison inmates who were (1) incarcerated in the TDCJ system for any duration dating from January 1, 1998 through December, 1998; (2) diagnosed with either a schizophrenic or nonschizophrenic psychotic disorder; and (3) prescribed antipsychotic medication during 1998. Texas houses one of the largest prison populations in the United States and together with California houses almost one-third of all U.S. prison inmates.[13]

Diagnoses of all psychotic disorders were made by physicians or midlevel practitioners at the time of each inmate's initial evaluation and/or subsequent medical encounters. All inmates in Texas are required to have medical and mental health examinations at the time of intake. This evaluation consists of a detailed medical and mental health history, a comprehensive medical physical examination, and laboratory diagnostic procedures.

All clinical, pharmacological, and sociodemographic data used in the present investigation were obtained from an institution-wide medical information system. This system is routinely updated to ensure that the information is reflective of the inmates' current health status. However, preliminary assessment of the database revealed that a small proportion of individuals (less than 5%) was erroneously coded as having the outcome under study (either schizophrenic or nonschizophrenic psychotic disorder). Unfortunately, because the present study did not have systemwide access to inmate medical charts, investigators could not compare the information from the two sources to determine the exact proportion of misclassified diagnoses across the entire TDCJ system. After consultation with a number of TDCJ mental health practitioners and health records experts, we concluded that restricting the study to only those inmates who were diagnosed with either of the aforementioned disorders and who also were prescribed antipsychotic medication during 1998 would yield the most reliable information.

Medication prescription data are maintained on all inmates who are prescribed medication during their incarceration. Inmates at all TDCJ facilities are required to pick up each dose of their prescribed medication at a designated "pill window." Each dose is then recorded and entered into a computerized database. The present study examined two broad classes of antipsychotic agents, typical and atypical. Typical antipsychotics consisted of any of the following: chlorpromazine, fluphenazine, haloperidol, mesoridazine, molindone, perphenazine, thioridazine, thiothixene, and trifluoperazine. Atypical antipsychotics consisted of clozapine, olanzapine, risperidone, and quetiapine. It also is important to note that inmates who were not identified as white, black, or Hispanic comprised less than one percent of the population and therefore were included in the white category.

For the bivariate statistical analyses used in the present study, the percentages of inmates prescribed antipsychotic agents were compared according to sociodemographic factors by generating the prevalence estimates and associated 95 percent confidence intervals (CIs) for each subgroup under study. Subgroups with CIs that did not overlap were considered to have exhibited differences that were statistically significant. Logistic regression was then used to assess the association of the explanatory variables of gender, age, race, and violent offense status with one of the two dichotomous response factors, prescription of either a novel or standard antipsychotic agent.

Results

Table 1 presents the distribution of sociodemographic factors among all TDCJ inmates and among the two subgroups under study, those with schizophrenic disorders and those with nonschizophrenic psychotic disorders. The table shows that the vast majority of TDCJ inmates were male and between 30 and 49 years of age. Whites and Hispanics constituted 28.7 and 26.3 percent, respectively, of the study population while blacks comprised 45.0 percent. Among inmates with schizophrenic and nonschizophrenic psychotic disorders, blacks, inmates aged 30 to 49 years, and those convicted of violent crimes were substantially over-represented.

Table 2, which presents the prevalence of pharmacotherapy-treated psychotic disorders among TDCJ inmates, shows that both schizophrenic and nonschizophrenic psychotic disorders occurred in about two percent of the prison population. Examination of schizophrenia by sociodemographic factors showed that it was more common among blacks than whites, and, in turn, more common among whites than Hispanics. Moreover, schizophrenia was more

Table 1 Distribution of Sociodemographic Factors, All TDCJ Inmates, All Inmates with Schizophrenic Disorders, and All Inmates with Nonschizophrenic Psychotic Disorders

	All Inmates		Schizophrenic Disorders		All Nonschizophrenic Psychotic Disorders	
Variable	*N*	%	*N*	%	*N*	%
Entire cohort	139,573	100	2,258	100	2,058	100
Gender						
Male	130,506	93.5	2,094	92.7	1,882	91.4
Female	9,067	6.5	164	7.3	176	8.6
Race						
White	40,040	28.7	476	21.1	607	29.5
Hispanic	36,676	26.3	324	14.3	329	16.0
Black	62,858	45.0	1,458	64.6	1,122	54.5
Age (years)						
18–29	44,842	32.1	345	15.3	451	21.9
30–49	83,396	59.8	1,735	76.8	1,472	71.5
50+	11,336	8.1	178	7.9	135	6.6
Offense						
Violent	60,440	43.3	1,119	49.6	1,025	49.8
Nonviolent	79,134	56.7	1,139	50.4	1,033	50.2

common among inmates aged 30 to 49 years than among the 50-years and over or 18- to 29-year age groups. Finally, schizophrenia was significantly elevated among inmates who were incarcerated for having committed violent offenses. The second column of Table 2, which presents nonschizophrenic psychotic disorders, shows that these diagnoses were significantly elevated among the following subgroups: females, inmates aged 30 to 49 years, and those convicted of violent offenses.

Table 3 presents the proportion of TDCJ inmates prescribed antipsychotic medication during 1998. Among inmates diagnosed with schizophrenic disorders who were treated with antipsychotic agents, 85.4 percent were treated with typical agents only and 14.6 percent were treated with atypical antipsychotic agents. Likewise, among those with nonschizophrenic psychotic disorders who were treated with antipsychotic medication, 89.3 percent were treated with typical agents only, and 10.7 percent were prescribed atypical agents. The table shows that among both subgroups females, blacks, and nonviolent criminals were prescribed atypical antipsychotic agents less frequently than their counterparts. However, examination of the 95 percent CIs associated with all of the aforementioned estimates indicates that only females exhibited a decrease in atypical antipsychotic use that reached statistical significance.

Table 2 Percentage of Pharmacotherapy-Treated Psychotic Disorders among TDCJ Inmates (*N* = 139,573) by Sociodemographic Factors[a]

Variable	Schizophrenic Disorders	All Nonschizophrenic Psychotic Disorders
Entire cohort	1.6 (1.5–1.7)	1.5 (1.4–1.6)
Gender		
Male	1.6 (1.5–1.7)	1.4 (1.3–1.5)
Female	1.8 (1.5–2.1)	1.9 (1.6–2.3)
Race		
White	1.2 (1.0–1.4)	1.5 (1.3–1.7)
Hispanic	0.8 (0.6–1.1)	0.8 (0.7–1.1)
Black	2.3 (2.2–2.5)	1.8 (1.7–1.9)
Age (years)		
18–29	0.8 (0.6–0.9)	1.0 (0.8–1.2)
30–49	2.1 (1.9–2.2)	1.8 (1.6–1.9)
50+	1.6 (1.2–1.9)	1.2 (0.9–1.5)
Offense		
Violent	1.9 (1.7–2.0)	1.7 (1.6–1.8)
Nonviolent	1.4 (1.3–1.5)	1.3 (1.2–1.4)

[a]95% CIs are presented in parentheses.

Table 4 presents the results of the logistic regression that examined the influence of study factors on prescription of antipsychotic agents. Among both disease subgroups (schizophrenic disorders and nonschizophrenic psychotic disorders), only female gender and black race were positively associated with the use of standard antipsychotic agents. Conversely, both of these factors were negatively associated with the use of atypical antipsychotics.

Discussion

Research consistently indicates that prison inmates exhibit elevated rates of psychotic disorders.[1,2]

Table 3 Percentage of TDCJ Inmates Prescribed Antipsychotic Agents in 1998 by Medical Condition, Medication Type, and Sociodemographic Factors[a]

	Schizophrenic Disorders (N = 2,258)		Nonschizophrenic Psychotic Disorders (N = 2,058)	
Treatment	Typical only	Atypical	Typical only	Atypical
Overall	85.4 (83.8–86.8)	14.6 (13.2–16.1)	89.3 (87.8–90.5)	10.7 (9.4–12.1)
Gender				
Male	84.7 (82.8–86.6)	15.3 (13.4–17.2)	88.4 (86.7–90.2)	11.6 (09.8–13.3)
Female	95.1 (88.4–101.8)	04.9 (01.9–11.6)	98.3 (92.5–103.9)	01.7 (0.00–07.4)
Race				
White	81.5 (77.0–86.0)	18.5 (14.0–23.0)	84.8 (81.3–88.3)	15.2 (11.6–18.6)
Hispanic	82.4 (76.9–87.9)	17.6 (12.1–23.1)	86.9 (82.2–91.7)	13.1 (08.3–17.8)
Black	87.4 (84.8–90.0)	12.6 (10.0–15.2)	92.3 (89.8–94.9)	07.7 (05.1–10.2)
Age (years)				
18–29	87.0 (81.6–92.3)	13.0 (07.7–18.4)	88.0 (83.9–92.1)	11.9 (07.8–16.1)
30–49	85.2 (82.8–87.6)	14.8 (12.4–17.2)	89.7 (87.4–91.9)	10.3 (08.1–12.6)
50+	84.8 (77.4–92.2)	15.2 (07.8–22.6)	88.9 (81.4–96.4)	11.1 (03.7–18.6)
Criminal offense				
Violent	84.6 (82.0–87.2)	15.4 (12.8–18.0)	88.5 (86.1–90.8)	11.5 (09.1–13.9)
Nonviolent	86.2 (83.7–88.8)	13.8 (11.2–16.3)	90.0 (87.7–92.4)	10.0 (07.6–12.3)

[a]95% CIs in parentheses.

However, little is known about the delivery of mental health care, pharmacotherapy in particular, in correctional settings. In fact, no information has been published on antipsychotic prescribing patterns in the U.S. prison system. A number of studies of nonincarcerated samples have shown that atypical antipsychotics are more efficacious in treating of schizophrenic pathology than typical antipsychotics.[10, 11] Moreover, these newer agents are reportedly associated with lower extrapyramidal symptoms,[10] lower neurocognitive impairment,[12] improved efficacy in treating both neuroleptic-responsive and neuroleptic-refractory patients,[9] and better patient adherence[9–11] than standard agents.

The findings of the present study indicate that among inmates who were treated with pharmacotherapy for psychotic disorders, the vast majority (85.4% with schizophrenia and 89.3% with nonschizophrenic psychotic disorders) were prescribed typical antipsychotic agents in 1998. A substantially smaller proportion of the two subgroups, 14.6 and 10.7 percent, respectively, were prescribed atypical

Table 4 Estimated Odds Ratios from Logistic Regression Predicting Antipsychotic Medication Prescribing Patterns[a]

	Schizophrenic Disorders		Nonschizophrenic Psychotic Disorders	
Treatment	Typical only	Atypical	Typical only	Atypical
Gender				
Male	1.00 (—)	1.00 (—)	1.00 (—)	1.00 (—)
Female	3.33 (1.62–6.86)*	0.30 (0.15–0.62)*	6.74 (2.13–21.34)*	0.15 (0.05–0.47)*
Race				
White	1.00 (—)	1.00 (—)	1.00 (—)	1.00 (—)
Hispanic	1.07 (0.74–1.55)	0.93 (0.64–1.35)	1.21 (0.82–1.79)	0.83 (0.56–1.22)
Black	1.52 (1.15–2.02)*	0.66 (0.50–0.87)*	2.04 (1.49–2.80)*	0.49 (0.36–0.67)*
Age (years)				
18–29	1.00 (—)	1.00 (—)	1.00 (—)	1.00 (—)
30–49	0.83 (0.59–1.17)	1.20 (0.85–1.69)	1.09 (0.77–1.52)	0.92 (0.66–1.29)
50+	0.85 (0.51–1.43)	1.17 (0.70–1.97)	1.09 (0.59–2.01)	0.92 (0.50–1.70)
Criminal offense				
Nonviolent	1.00 (—)	1.00 (—)	1.00 (—)	1.00 (—)
Violent	0.91 (0.72–1.15)	1.10 (0.87–1.40)	0.91 (0.69–1.22)	1.09 (0.82–1.45)

[a]95% CIs presented in parentheses.
*95% CI does not include one (estimate is significantly different from the reference group).

agents. These findings are reflective of the TDCJ formulary for the treatment of schizophrenia, which stipulates that treatment must be attempted with two typical antipsychotic agents before approval is sought for an atypical antipsychotic agent. In view of the dramatically higher cost of atypical agents,[7,9] the aforementioned prescribing differential is not surprising. In fact, research indicates that although the average 30-day treatment of standard antipsychotic agents ranges from 9 to 85 dollars, the cost for a similar regimen of atypical agents ranges from 200 to over 300 dollars.[9] It would be informative to compare the present study's findings to those of a nonincarcerated sample. However, no published information on the rates of typical versus atypical antipsychotic prescribing patterns in the general population currently exists. It is important to note that atypical antipsychotics recently have become the first line of treatment in some public mental health systems.[14]

Prescribing patterns in the Texas prison system varied substantially according to a number of the sociodemographic factors under study. For example, females diagnosed with either schizophrenia or nonschizophrenic psychosis were prescribed atypical antipsychotic agents substantially less frequently than their male counterparts. The multivariate analyses showed that these associations persisted even after adjusting for other sociodemographic factors. It is difficult to determine the driving forces behind such gender differences in prescribing practices. For example, the side-effect profile associated with standard antipsychotics, including the incidence of TD, is reported to be similar for males and females.[15] It is possible that such gender-differentiated prescribing patterns may simply reflect treatment patterns that existed before incarceration. However, no information currently exists on the association of gender and antipsychotic prescribing practices in the general population.

Examination of prescribing patterns according to race showed that blacks were prescribed atypical antipsychotic agents less frequently than whites or Hispanics in both schizophrenic and nonschizophrenic diagnostic categories. The reduced rate of atypical antipsychotic prescribing among blacks is especially pertinent in view of previous findings that blacks are at increased risk of developing TD,[15,16] a side effect associated with many typical antipsychotic agents. It will be important for future investigations to assess the underlying reasons for these race discrepancies in prescribing practices. Once again, it is possible that such discrepancies merely reflect treatment patterns that existed before incarceration. It will be particularly important to examine whether the side-effect profile among black inmates is improved by the expanded use of atypical antipsychotics. However, it is important to note that information on the side-effect profile by race was not available for the present study.

Under current TDCJ policy, patients prescribed antipsychotic agents are monitored carefully for all medication-related side effects, particularly TD. In fact, each time a new drug is prescribed, practitioners are required to hold a clearly documented discussion with the inmates that includes information on the risks, benefits, alternative typical agents available, and the protocol for the use of atypical agents. This discussion must include detailed information and documentation of the possible development of TD. Additionally, assessment of TD, using a standardized instrument, is carried out at baseline and a minimum of every three months. If it is determined that a patient has developed TD, the practitioner holds an in-depth discussion of the pros and cons of discontinuation of current treatment and instituting an alternative treatment.

Both the bivariate and the multivariate findings show that among both diagnostic categories, TDCJ inmates incarcerated for violent offenses were prescribed atypical antipsychotics slightly more frequently than nonviolent inmates. However, neither of these findings was statistically significant. To date, research indicates that atypical antipsychotics are effective in treating aggression associated with psychosis.[7,14,17,18] Because aggression is a particularly common symptom among inmates with psychotic disorders,[7] information on effective management tools for this condition is especially relevant to correctional health care providers. It will be important for future investigators to assess whether the efficacy advantages of atypical agents in treating aggression persists in future studies and to continue examining variations in prescribing patterns according to violent offense status.

Conclusions

Atypical antipsychotic agents, which have proven effective in treating psychotic patients who have either not responded well or who experienced intolerable side effects to typical antipsychotics,[7] are being used increasingly as the first line of pharmacother-

apy.[14] The introduction of atypical antipsychotics has provided an improved but more expensive tool for managing schizophrenia and thus has prompted some debate about how best to spend scarce resources in the treatment of patients with psychotic disorder.[9] Some argue that the advantages of the newer drugs, including tolerability, adherence to treatment, longer remission of symptoms, and fewer hospitalizations may offset the initial costs of the medication.[9, 19] In view of this, it will be important for future studies to track antipsychotic prescribing practices in inmate populations and to explore the driving forces behind these patterns.

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