Compliance with Anti-Depressant Medication among Prison Inmates with Depressive Disorders

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Jacques Baillargeon, Ph.D.[1]
Salvador Contreras, M.D.[2]
James J. Grady, Dr.P.H. [3]
Sandra A. Black, Ph.D.[4]
Owen Murray, D.O.[5]

Correspondence and reprint requests should be sent to Dr. Jacques Baillargeon,

Department of Pediatrics, University of Texas Health Science Center at San Antonio,

7703 Floyd Curl Drive, San Antonio TX 78284-7802

Email: baillargeon@uthscsa.edu

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1 Department of Pediatrics, University of Texas Health Science Center, San Antonio, TX
2 Department of Psychiatry, University of Texas Health Science Center, San Antonio, TX
3 Department of Preventive Medicine and Community Health, University of Texas Medical Branch, Galveston TX
4 Center on Aging, University of Texas Medical Branch, Galveston TX
5 Correctional Managed Health Care, University of Texas Medical Branch, Galveston TX

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Abstract

Objective: The study assessed correlates of anti-depressant medication compliance among Texas Department of Criminal Justice (TDCJ) prison inmates.

Methods: The study population consisted of 5,305 TDCJ inmates who were diagnosed with one of three depressive disorders: major depression, dysthymia, and bipolar disorder. The primary outcome measure under study was anti-depressant medication compliance. Information on medical conditions, sociodemographic factors, and medication compliance was obtained retrospectively from an institution-wide medical information system.

Results: TDCJ inmates treated with selective serotonin reuptake inhibitors (SSRIs) did not exhibit improved medication compliance compared to those treated with tricyclic antidepressants TCAs. In fact, among inmates with all depressive disorders and bipolar disorders, those treated with TCAs exhibited greater compliance, even when adjusting for sociodemographic factors. Moreover, among inmates with depressive disorders male gender, black race, and older age were positively associated with medication compliance scores.

Conclusion: This investigation provides no evidence that expanded SSRI use would improve adherence to pharmacologic treatment of depressive disorders in the Texas prison system. Our findings also suggest that correctional administrators may wish to target younger inmates and females with interventions to improve medication compliance.

Introduction

Research indicates that US prison inmates exhibit elevated rates of mental illness (1-4). In view of this, understanding patterns of mental health care in correctional settings holds both clinical and public health relevance. Depressive disorders are particularly prevalent among prison inmate populations (4, 5-7) and are treated predominantly with pharmacotherapy (8). Poor compliance with prescribed anti-depressant regimens may undermine the medication's effectiveness, thereby increasing morbidity and its attendant costs. Improving medication compliance, therefore, is integral to improving the overall effectiveness and cost-efficiency of mental health care in correctional settings. Unfortunately, no information currently exists on medication compliance among prison inmates. The purpose of the present study, therefore, was to assess anti-depressant medication compliance, as well as sociodemographic correlates, among TDCJ prison inmates diagnosed with depressive disorders.

Methods

The cohort under study consisted of 5,305 prison inmates who were incarcerated in the Texas Department of Criminal Justice (TDCJ) system for any duration dating from December 1, 1998 through March 1, 1999 and who were diagnosed with one of three depressive disorders: major depression, dysthymia, and bipolar disorder. Texas houses one of the largest prison populations in the US and together with California houses almost one-third of all US prison inmates (9). Inmates who were not identified as white, black or Hispanic comprised less than one percent of the population, and were therefore included in the white category.

Diagnoses of depression as well as all medical conditions were made by physicians or mid-level 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 lasts approximately 60 minutes and consists of a detailed medical and mental health history, a comprehensive medical physical examination, and a number of diagnostic procedures. Medication prescription and compliance data are maintained on all inmates who are prescribed medication during their incarceration. For a majority of medication prescribed in the TDCJ, inmates are required to pick up each dose of their 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 anti-depressant medication: TCAs and SSRIs. Medication compliance was calculated by dividing the number of doses taken by the number of doses prescribed during the study period.

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. The present study assessed only those medical conditions that were present during the period of investigation. Furthermore, because one of the primary goals of this study was to assess whether medication compliance differed significantly according to anti-depressant medication class, we dropped all subjects (n=943) who were simultaneously prescribed TCAs and SSRIs. It was determined that for patients on more than one major class of anti-depressants, the side-effects of one medication may have caused poor compliance with the other. Preliminary assessment of the median compliance scores and interquartile ranges for this subgroup showed that they did not differ substantially on either the TCA or the SSRI outcome from the subgroups under study.

Univariate analysis indicated that the outcome of interest, anti-depressant medication, did not meet the assumption of being approximately normally distributed. Therefore, a non-parametric one-way analysis of variance procedure, the Kruskal-Wallis test, was used to assess differences across the study factors of interest. Subsequently,

pair-wise comparisons were made using the Wilcoxon rank sum test when the Kruskal-Wallis test was significant $p<.05$. Logistic regression analysis was then employed to examine which study factors were statistically associated with the dichotomous response factor, a medication compliance score of less than 50 percent.

Results

Table 1 presents the sociodemographic characteristics of the entire TDCJ population. The first column shows that the vast majority of TDCJ inmates were male and between 30-49 years of age. Whites and Hispanics constituted 28.7 and 26.3 percent, respectively, of the study population while blacks comprised 45.0 percent. The subsequent columns of table 1 present the rates of depressive disorders according to the sociodemographic factors. The table shows that the rates of depressive disorders were almost three times as high among females as among males. Moreover, the rate of depressive disorder among whites was substantially higher than among Hispanics or blacks. No clear disease patterns, however, were exhibited according to age category.

Table 2 presents median medication compliance estimates and corresponding interquartile ranges for inmates with depressive disorders. The first column shows that among inmates with depressive disorders, the overall median compliance score was .79. Inmates treated with TCAs had a higher median medication compliance score than inmates treated with SSRIs ($p <.05$); males exhibited a higher overall compliance than females (<.05); Hispanics had a lower score than blacks ($p <.05$); and compliance scores increased in a stepwise fashion according to age group ($p <.05$). The subsequent columns of the table show that among inmates who were diagnosed with major depression, dysthymia, and bipolar disorder, all of the aforementioned associations persisted except that of compliance scores among Hispanics versus blacks.

Table 3 presents the results of the logistic regression model predicting medication compliance scores below 50 percent. The first row shows that, for all depressive

disorders and each sub-classification of the condition, inmates prescribed SSRIs had a greater risk of poor medication compliance than those who were prescribed TCAs. Examination of the 95 percent confidence intervals, however, shows that this risk was significantly elevated in only two of the disease categories under study: all depressive disorders combined, and bipolar disorders. The second row shows that for all disease categories, females exhibited a significantly elevated risk of poor anti-depressant compliance. Assessment of the covariate race, in the third row, shows that for only two of the disease categories, all depressive disorders and dysthymia, blacks demonstrated a significantly decreased risk of poor compliance, relative to the referent, whites. No other significant race differences were exhibited. Examination of the covariate age, in the fourth row, shows that for all disease categories under study, the risk of poor compliance decreased in a step-wise fashion according to age category. In the final disease category, bipolar disorder, however, the 95 percent confidence interval associated for the 50 and over age group included one, indicating that this estimate was not statistically significant.

DISCUSSION

As a result of federal court decisions in the 1970s, US prison inmates hold a constitutional right to health care (8). Given this population's reported elevated risk of mental disorders (1-4), understanding how the mental health care needs of prison inmates are met holds clinical and public health relevance. Due to scarce resources and a limited number of mental health practitioners, pharmacotherapy is the primary mode of treatment for depressive disorders in most US prisons (8). Despite this, little is known about the predictors of anti-depressant medication compliance in either incarcerated or non-incarcerated populations. The purpose of the present study, therefore, was to assess correlates of anti-depressant compliance among Texas prison inmates.

Currently, pharmacotherapy for depression, in both correctional and non-correctional settings, consists predominantly of two major classes of drugs: tricyclic anti-depressants (TCAs) and selective serotonin reuptake inhibitors (SSRIs) (10-12). One of the primary goals of this study was to compare medication compliance scores among inmates who were prescribed SSRIs to those who were prescribed TCAs. Research indicates that among non-incarcerated populations, SSRIs, which were introduced in the late 1980s, are now prescribed more frequently than TCAs (12, 13). In fact, as part of the Texas Medication Algorithm Project (TMAP), a consensus-based medication algorithm identified SSRIs as one of the first lines of treatment for major depressive disorders. They recommended the use of TCAs only as a secondary line of treatment following inadequate response to SSRIs and other new generation anti-depressants (14).

Although both TCAs and SSRIs are both associated with side effects (15), some investigators hold that patients treated with TCAs are more likely than those treated with SSRIs to discontinue their treatment because of adverse medication effects (13, 16-17). Alternatively, other investigators have reported no statistically significant differences between TCAs and SSRIs in the rate of treatment discontinuation due to side effects (11, 15). Moreover, while SSRIs are dramatically more expensive than TCAs (12), no consensus has been reached on which class of anti-depressant yielded more cost-effective overall treatment. Some investigators contend that the increased expenses of SSRIs are offset by a decrease in unnecessary medical work-ups and costs associated with untreated depression (13). Others hold that using TCAs as the first choice with SSRIs reserved for patients not doing well initially is the most cost-effective treatment policy (18).

In contrast to some of the aforementioned findings (13, 16-17), the present study showed that overall compliance with anti-depressant medication was slightly higher among inmates who were prescribed TCAs than among those who were prescribed SSRIs. Moreover, among inmates in the disease categories all depressive disorders and bipolar disorders, those prescribed TCAs demonstrated a statistically significant

decreased risk of poor (less than 50 percent) compliance than those who were prescribed SSRIs. In interpreting these findings, it is important to point out that patients on TCAs may have been on their medication for comparatively longer durations and may therefore have become more tolerant of medication-related side-effects. Because information on duration of prescription time was not available for the present study population, it was not possible to evaluate the potential confounding effect of this variable. Alternatively, it is possible that the pronounced sedative effects associated with a majority of TCAs (19) are well received by inmates who are adjusting to the stresses of institutional life. The sedative effects of TCAs, therefore, may have contributed to the improved compliance among inmates prescribed this class of medication.

The present study also shows that anti-depressant compliance scores among inmates varied according to a number of sociodemographic factors. For example, female inmates diagnosed with depressive disorders demonstrated lower overall compliance scores and an elevated risk for compliance scores under 50 percent than their male counterparts. This finding is consistent with previous reports by a number of investigators that in non-correctional settings, females exhibit poorer medication compliance than males (20-22). It is not clear what drives these gender-related differences. With regard to anti-depressant medication in particular, some investigators have suggested that some of the side effects of anti-depressant medication, specifically weight gain, may be more poorly tolerated by females than by males (22). Furthermore, women of child-bearing age may fear the adverse effect of medication on a potential pregnancy (22). This factor may be a particularly strong determinant among female prisoners incarcerated for very short periods of time, given that they are more likely to be unaware of their pregnancy status for substantial portions of their sentence terms.

The present study also showed that compliance scores were positively correlated with age. No previously published information has indicated such a step-wise increase in medication compliance associated with age. In fact, some studies show that the elderly

are at particularly high risk for poor medication compliance (23). It will be important to assess whether this finding is unique to prison inmates, particularly to inmates with depressive disorders. A number of other patient factors have been reportedly associated with poor medication compliance, including low socioeconomic status, history of substance abuse, presence of paranoid ideation, and divorced status (20, 24). Unfortunately, information on these and other potentially informative factors was not available in the TDCJ study population. In order to broaden our understanding of medication compliance in correctional settings, it will be important for future investigators of prison inmates to examine how these factors relate to anti-depressant medication compliance.

Conclusion

The present study showed that inmates treated with SSRIs did not exhibit improved compliance scores in comparison to those treated with TCAs. In fact, for each depressive disorder under study, as well as for the aggregate all depressive disorders category, inmates on TCAs had higher compliance scores. Even after controlling for sociodemographic factors, inmates treated with TCAs had reduced rates of poor compliance. Some investigators (11, 13) have argued that despite their higher cost, SSRIs would ultimately be more effective and cost-efficient than TCAs due to their improvements with patient compliance. Clearly, the present study's findings provide no such evidence. Moreover, while SSRIs are reportedly safer in overdose than TCAs (25), this risk of such an outcome is substantially reduced in prison settings due to a system of daily, supervised drug administration. It is important to note, however, that this risk would reappear upon release from prison. This study's findings of sociodemographic correlates of medication compliance also holds relevance to correctional health practitioners. Correctional administrators may wish to target subgroups of inmates with

depressive disorders who are at particular risk for poor compliance, most notably females and younger inmates.

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Table 1: Prevalence of depressive disorders among TDCJ prison inmates

Variable	All Inmates (n=139,573)		All Depressive Disorders (n=5,305)	Major Depression (n=2,767)	Dysthymia (n=1,839)	Bipolar Disorder (n=1,149)
	N	%				
Entire Cohort						
	139,573	100	3.8	2.0	1.3	0.8
Gender						
Male	130,506	93.5	3.2	1.7	1.1	0.6
Female	9,067	6.5	9.2	4.4	2.7	2.7
Race						
White	40,040	28.7	7.0	3.4	2.3	2.0
Hispanic	36,676	26.3	1.8	1.0	0.6	2.6
Black	62,858	45.0	2.9	1.7	1.1	0.4
Age						
18-29	44,842	32.1	3.2	1.7	1.2	0.7
30-49	83,396	59.8	4.1	2.2	1.4	0.9
50+	11,336	8.1	3.5	1.8	1.2	0.6

Table 2: Median medication compliance estimates for inmates with depressive disorders, by anti-depressant medication class and sociodemographic factors

Variable	All Depressive Disorders (n=2,554)	Major Depression (n=1,385)	Dysthymia (n=916)	Bipolar Disorder (n=467)
Overall	0.79 (0.63-0.89)	0.79 (0.63-0.89)	0.78 (0.63-0.89)	0.79 (0.59-0.90)
Treatment				
SSRI	*0.75 (0.56-0.87)	*0.75 (0.58-0.89)	*0.75 (0.58-0.86)	*0.71 (0.45-0.85)
TCA	0.80 (0.65-0.89)	0.80 (0.66-0.86)	0.79 (0.64-0.89)	0.81 (0.64-0.90)
Gender				
Male	*0.80 (0.64-0.90)	*0.80 (0.64-0.90)	*0.79 (0.64-0.89)	*0.81 (0.62-0.90)
Female	0.74 (0.53-0.84)	0.74 (0.56-0.85)	0.74 (0.54-0.84)	0.73 (0.44-0.84)
Race				
White	0.79 (0.62-0.89)	0.79 (0.63-0.89)	0.79 (0.62-0.89)	0.79 (0.61-0.89)
Hispanic	[a]0.77 (0.60-0.88)	0.76 (0.59-0.89)	0.75 (0.57-0.88)	0.80 (0.58-0.87)
Black	0.79 (0.65-0.89)	0.80 (0.66-0.89)	0.77 (0.62-0.88)	0.79 (0.55-0.91)
Age				
18-29	[b,c] 0.74 (0.54-0.86)	[b,c] 0.74 (0.56-0.87)	[b,c] 0.73 (0.54-0.86)	[b,c] 0.71 (0.43-0.85)
30-49	[d] 0.80 (0.65-0.89)	[d] 0.80 (0.66-0.89)	[d] 0.77 (0.62-0.88)	[d] 0.81 (0.63-0.90)
50+	0.86 (0.74-0.93)	0.86 (0.74-0.93)	0.84 (0.74-0.91)	0.90 (0.79-0.96)

*Pairwise comparisons, based on the Wilcoxon rank sum test, are significant at </=.05.
a=Hispanics vs. blacks, b= 18-29 vs. 30-49, c= 18-29 vs. 50+, d= 30-49 vs. 50+

Table 3: Estimated odds ratios from logistic regression predicting medication compliance scores below 50 percent

	All Depressive Disorders	Major Depression	Dysthymia	Bipolar Disorder
Pharmacotherapy [a]				
SSRI	*1.52 (1.17-1.97)	1.26 (0.86-1.83)	1.58 (0.98-2.54)	*2.04 (1.21-3.42)
Gender [b]				
Female	*2.01 (1.51-2.66)	*2.15 (1.42-3.26)	*1.77 (1.07-2.92)	*2.23 (1.30-3.82)
Race [c]				
Black	*0.73 (0.57-0.94)	0.76 (0.54-1.07)	*0.59 (0.38-0.90)	1.35 (0.75-2.42)
Hispanic	1.05 (0.75-1.48)	1.16 (0.74-1.83)	1.14 (0.65-2.00)	0.84 (0.30-2.36)
Age [d]				
30-49	*0.50 (0.39-0.63)	*0.49 (0.35-0.68)	*0.57 (0.32-0.86)	*0.43 (0.26-0.73)
50 +	*0.24 (0.13-0.44)	*0.22 (0.10-0.50)	*0.23 (0.80-0.68)	0.26 (0.05-1.19)

* 95 percent confidence interval does not include one.
[a]Reference category= TCA, [b] Reference category= males, [c] Reference category= whites,
[d] Reference category= age group 18-29