

Using Pharmacy Data on Partial Adherence to Inform Clinical Care of Patients With Serious Mental Illness

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Objective: Low adherence to antipsychotic medications is a risk factor for poor outcomes for people with serious mental illness. Pharmacy data might be used by health systems to identify partially adherent patients for interven-

tions. This study assessed whether using pharmacy data is an accurate screening method for identifying at-risk patients. **Methods:** Administrative data were used to identify 1,712 veterans as having schizophrenia or a schizoaffective or bipolar disorder and who had 12-month antipsychotic medication possession ratios (MPRs) of less than .80. Patients' charts were reviewed for alternative explanations for low rates of filling prescriptions for antipsychotic medication. **Results:** Of 1,712 patients whose pharmacy data indicated partial adherence (MPRs less than .80), 17% (N=297) may have been adherent. Patients with bipolar disorder had higher odds of receiving a false-positive designation (adjusted odds ratio of 1.8, 95% confidence interval of 1.31–2.39). **Conclusions:** MPRs constructed from pharmacy data can be a useful first screen for identifying patients who need assistance with medication adherence. (*Psychiatric Services* 58: 864–867, 2007)

Antipsychotic medications are a first-line treatment for people with schizophrenia and schizoaffective disorder and may be a useful treatment for some patients with bipolar disorder (1,2). Partial adherence to antipsychotic medications is a

significant risk factor for rehospitalization, and an estimated 50% to 75% of patients with schizophrenia will relapse within a year after cessation of antipsychotic medications (3). As many as 40% of patients are at least partially nonadherent with their antipsychotic medications (4). Despite this well-documented challenge, clinicians continue to have difficulty identifying patients who may need help with adherence (5).

Pharmacy data have been used to quantify adherence to a wide range of medications for research purposes. Several studies of either Department of Veterans Affairs (VA) or Medicaid patient populations have demonstrated that poor antipsychotic medication adherence as identified through pharmacy data is related to important clinical and health system outcomes, such as inpatient hospital utilization and costs (6–10). Some researchers have suggested that the increasing availability of pharmacy refill data may allow health care systems to identify patients for targeted interventions to improve adherence (10). Although pharmacy data may be a valid and reliable means to estimate average adherence rates in populations of patients, if a health care system were to use these data to inform clinical care for individuals, the measure would need reasonable predictive value.

In this study, we examined the po-

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tential clinical use of one measure of medication adherence constructed from pharmacy data and commonly used in research, the medication possession ratio (MPR). We chose this measure on the basis of our experience in using it to identify patients with severe mental illness for an intervention to improve medication adherence. We also investigated by chart review whether patients with a bipolar diagnosis had a different false-positive rate of nonadherence than those with schizophrenia.

Methods

This retrospective study was conducted with administrative and clinical chart data from four VA hospitals and their associated community-based outpatient clinics. The local institutional review board at each site approved a clinical trial of which this report is a component. The review boards approved a waiver of consent for access to personal health information for screening purposes for the study. Screening data for patients who did not enroll in the clinical trial were masked from the records.

Demographic, 12-month pharmacy, and inpatient hospitalization data were obtained from facility-level administrative data for all patients who received a diagnosis of schizophrenia, schizoaffective disorder, or bipolar disorder between August 2002 and September 2004. Patients had to have filled at least two prescriptions for antipsychotic medication within a 12-month period at one of the study sites to be included in the study. Data were extracted from each VA facility's Veterans Health Information Systems and Technology Architecture, the information infrastructure that supports the administrative operations' electronic medical record in the VA, and physician medication order entry. Recent reports have indicated that VA administrative data have high levels of concordance between administrative and medical record data (11). Diagnoses of schizophrenia recorded in VA inpatient administrative data and in Medicaid claims data closely reflect clinical diagnoses of schizophrenia (12). Further, VA

mental health services users have been shown to receive low proportions of their mental health care outside the VA system (13).

The MPR was calculated as the days of medication supply that patients received in the one-year period divided by the number of days that patients were outpatients during the year. In the event of concurrent prescriptions for multiple antipsychotic medications, the weighted average of the MPRs was computed. Patients

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were given credit for "days adherent" for days spent in inpatient hospitalization. Patients who received less than 80% of antipsychotic medication were considered to have partial adherence. Although published reports do not yet suggest a specific threshold at which partial adherence with antipsychotics becomes problematic,

taking 80% or more of one's prescribed medications has often been used as a traditional cutoff point for "good adherence" (9,14).

A list of patients with MPRs less than .80 was distributed to research associates at each of the four sites. Medical records for each patient for the prior 12 months were abstracted to determine whether there were explanations for patients' low MPRs other than partial adherence. After an initial iterative coding process, four possible alternative explanations were considered: transferring mental health services to a different VA facility or non-VA treatment setting, receiving depot antipsychotic medications during at least part of the year, moving to a different place of residence or spending significant portions of the year out of state, or having antipsychotic medications discontinued or decreased on the basis of clinical reasons documented in the medical record but not having orders changed in the prescription order.

Frequencies were computed dichotomously for false positives (yes or no), meaning the low MPR reflected nonadherence but the chart indicated at least one alternative explanation for the low rating. Frequencies of false positives were then broken down according to the categories previously described. Multivariate logistic regression analysis was used to evaluate the probability of obtaining a false-positive designation by diagnosis, with controls for demographic, site, and clinical characteristics. Statistical analyses were completed with the SAS System for Windows, release 9.1.3.

Results

A total of 4,394 patients were identified as having a diagnosis for inclusion in the study, and 39% of these patients (N=1,712) had an MPR of less than .80. Among these patients with a low MPR, 1,577 (92%) were male and the mean±SD patient age was 52±11.31 years. Of the veterans in the low MPR sample, 997 (58%) were white, 573 (33%) were African American, 44 (3%) were Hispanic, and 98 (approximately 6%) were of unknown race or ethnicity. Approximately 64% (or 1,099) had a diagnosis of schizo-

Table 1

Proportion of patients with low medication possession ratios who may have been adherent to antipsychotic medication

Reason for false positive ^a	N	% of total sample (N=1,712)	% with a false positive (N=297)
Transferred mental health care services to a different veterans facility or nonveteran treatment setting	58	3	20
Taking depot antipsychotic medications	59	4	20
Changed place of residence or spends significant parts of the year out of state	39	2	13
Antipsychotic discontinued or decreased for clinical reasons that were documented in the medical record, even though the prescription order was not changed	141	8	48

^a A false positive occurred when a patient had a low medication possession ratio, indicating nonadherence, but an alternative explanation was available, as indicated.

phrenia or schizoaffective disorder, and 613 (36%) had a diagnosis of bipolar disorder. Thirteen percent of patients (N=218) had some indication of problematic substance use on chart review. The MPR for the 1,712 patients with low MPRs was $.40 \pm .21$. Upon chart review, we found that 297 patients (about 17%) with MPRs less than .80 had explanations for low MPRs other than or in addition to partial adherence. These patients' MPRs may have represented false positives for partial adherence.

Table 1 presents the percentages of patients who had one of four possible explanations for low MPRs other than partial adherence, resulting in false-positive screens when looking at MPRs. Forty-seven percent (N=141) of the patients with false-positive results appeared to have low MPRs because their physicians intentionally discontinued or decreased their antipsychotic medication sometime in the year but did not change the pharmacy order. In most cases, the antipsychotic medication was discontinued, but if it was not, the MPR was recalculated on the basis of the chart notes to verify that the MPR was above .80. Clinical notes indicated that 58 (20%) of patients with false positives transferred to another VA facility or outside of the VA health care system during the year, and another 59 (20%) were on depot medications, resulting in an artificially low oral antipsychotic MPR. Finally, 39 (13%) of these patients appeared to have moved or to have been spending part of the year out of state during the calculation period.

Because continuous antipsychotic therapy is strongly recommended for patients with schizophrenia but many patients with bipolar disorder may receive antipsychotic medications on a more intermittent basis, we examined the odds of receiving false positives for poor antipsychotic adherence by diagnosis, controlling for potentially confounding covariates of race, age, site location, and clinical characteristics using multivariate logistic regression. After the analyses controlled for covariates, the odds of having a false-positive screen were 80% higher for patients with bipolar disorder than for patients with schizophrenia or schizoaffective disorder (odds ratio [OR]=1.8, 95% confidence interval [CI]=1.3–2.4). This result was virtually identical to the unadjusted OR for false positives among people with bipolar disorder compared with those with schizophrenia (OR=1.8, CI=1.3–2.7).

Discussion

This was the first study to examine the feasibility of using the MPR as a screening tool to identify patients in health care organizations with partial adherence for systematic interventions to improve adherence. Our data suggest that a low MPR is a reasonable first-screen indicator of partial adherence but that only a relatively small percentage of patients will have clear alternative explanations in their medical charts for inconsistent filling of prescriptions. Our study data indicated that antipsychotic MPRs may be a less useful screen for patients with bipolar disorder than for patients

with schizophrenia. For a health system, the MPR might be used to efficiently identify people who may benefit from additional support with adherence. The MPR could also be used as input for decision support tools for shared decision making between clinician and patient regarding medications.

This study has several limitations. The study used VA pharmacy and clinical data, which were captured in a mandated electronic record and were of high quality. Other organizations, however, may have less complete or less reliable data. Findings may not generalize to other patient populations. The VA patient population is generally older, is more predominantly male, and has lower socioeconomic status than the larger U.S. population (15).

Perhaps the most important caution regarding inferences made from these data is that this study cannot provide a rigorous, formal evaluation of the MPR as a screening tool for clinically significant partial adherence to antipsychotic medication. Although we believe that ascertaining the proportion of patients that most obviously had false-positive ratings on chart review is an important step in evaluating the clinical usefulness of a measure of adherence that could be systematically and inexpensively used to improve clinical care, our chart abstraction method is conditional on patients' having a positive screen for partial adherence. As such, our study does not provide detailed information about the test operating characteristics of the MPR. Future research

might include efforts to prospectively ascertain the proportion of poorly adherent patients identified by alternative methods and to then compare these methods with the MPRs derived from pharmacy data.

Conclusions

Several researchers have suggested that the MPR could be used to inform clinical practice, not only for research and quality improvement but also during clinical encounters. This study takes a first step in establishing the MPR as a clinically useful way to estimate adherence among individual patients by providing the proportion of patients with MPRs less than .80 who are likely not filling their prescriptions more than 80% of the time. Providing systematic, timely information regarding usage of antipsychotic medication may facilitate better patient-physician communication regarding medication use and may allow patients to benefit from targeted, evidence-based interventions to address adherence challenges.

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