NR6-47

Assessing Medication Adherence and Health Care Utilization and Cost Patterns Among Hospital Discharged Patients With Schizoaffective Disorder

Michael Markowitz,[1] Sudeep Karve,[2] Dong Jing Fu,[1] Jean-Pierre Lindenmayer,[3] Chi-Chuan Wang,[2] Sean D Candrilli,[2] Larry Alphs[1]

[1] Janssen Scientific Affairs, LLC, Titusville, NJ, United States; [2] RTI Health Solutions, Research Triangle Park, NC, United States; [3] New York University, New York, NY, United States

ABSTRACT

Purpose: Following hospital discharge, patients with schizoaffective disorder have a high likelihood of rehospitalization. The objective of this study was to assess patterns in psychotropic medication adherence and health care utilization and costs during clinically relevant preadmission (in 60-day intervals, over 6 months) and postdischarge periods (in 60-day intervals, over 12 months) among patients with schizoaffective disorder.

Methods: We conducted a retrospective cohort analysis of the MarketScan Multi-State Medicaid Database (2004-2008). Patients with an inpatient admission for schizoaffective disorder and continuous health plan enrollment were included. Medication (antipsychotics, antidepressants, and mood stabilizers) adherence (proportion of days covered [PDC]), and all-cause and schizoaffective disorder-related health care utilization and costs were assessed during the preadmission and postdischarge periods. Health care utilization and costs (2010 US dollars) were compared between each adjacent 60-day postdischarge period, using univariate and multivariate regression analyses. No adjustment was made for multiplicity.

Results: Among 1,193 patients included, 39% were male, 43% black, and 92% were "discharged to home for self-care" following an inpatient admission. Medication adherence rates declined in the preadmission periods (182-121 days: 65%; 120-61 days: 49%; 60-0 days: 46%). Compared with the 60-day preadmission period (46%), the adherence rate increased in the initial 60-day postdischarge period (80%) and remained relatively stable in the remaining five 60-day postdischarge periods (range: 58%-63%). Both schizoaffective disorder-related (mean: $2,370 vs. $1,765; $P < 0.001$) and all-cause (mean: $5,277 vs. $4,310; $P < 0.001$) health care costs were significantly higher in the initial 0-60 day postdischarge period compared with the adjacent 61-120 day postdischarge period. The primary drivers of schizoaffective disorder-related costs in the 0-60 day postdischarge period were rehospitalization (mean: $860; standard deviation [SD]: $3,923) and pharmacy (mean: $954; SD: $926). Both all-cause and schizoaffective disorder-related costs declined and remained stable after the initial 60-day postdischarge period.

Conclusion: We observed a high rate of rehospitalization during the initial 60-day postdischarge period compared with the 61-120 day postdischarge period among patients with schizoaffective disorder. The medication adherence and resource utilization patterns outlined in our study should help identify high-risk patients and aid in the design of interventions that may help reduce the likelihood of inpatient admissions and the associated downstream costs.

BACKGROUND

- Schizoaffective disorder is a psychiatric disorder characterized by presence of mood symptoms and psychotic symptoms, which often makes the clinical diagnosis challenging.[1,2]
- Even with the lower prevalence (0.32%) compared with schizophrenia (1.1%),[3] a study suggests that a greater number of hospital discharged patients had a schizoaffective disorder diagnosis (primary) than had schizophrenia.[4]
- Medication regimens for schizoaffective disorder are often complex polypharmacy as clinicians attempt to manage both the psychotic and mood symptoms.
- Following discharge from the hospital, patients with schizoaffective disorder often face challenges transitioning to the community and are at increased risk of readmission.[5-7]
  - Studies have shown patients with schizoaffective disorder had a greater likelihood of relapse and rehospitalization compared with patients with schizophrenia.
  - The high risk of rehospitalization that incurs significant health care utilization and costs imposes increased economic burdens on society.
- However, antipsychotic adherence and economic burden across various clinically relevant preadmission and postdischarge periods have not been evaluated among patients with schizoaffective disorder.

OBJECTIVE

- To assess patterns in adherence to psychotropic medications and health care utilization and associated costs during clinically relevant preadmission (in 60-day intervals, over 6 months) and postdischarge periods (in 60-day intervals, over 12 months) among patients experiencing schizoaffective disorder-related hospitalization.

METHODS

Study Design and Data Source

- Retrospective longitudinal cohort analysis of the MarketScan Multi-State Medicaid Database for the period January 1, 2004, to December 31, 2008.
- This database contains Medicaid claims from 11 states, including utilization records and costs for inpatient, outpatient, physician office, ancillary services, and pharmacy services. For confidentiality purposes, information on the states contributing data to this database is not available to researchers.
- Patient characteristics, including demographic details (e.g., age, sex, health coverage, and race) and Medicaid enrollment, also are available in this database.
- Unique encrypted enrollee identifiers were used to link files and track patients longitudinally.

Study Cohort

Inclusion Criteria

- Patients with an inpatient admission with a primary diagnosis of schizoaffective disorder (ICD-9-CM: 295.7x) between July 1, 2004, and December 31, 2007, and associated hospital discharge on or before December 31, 2007
- Continuous Medicaid enrollment during the 6-month period before the index admission date, during the index inpatient admission, and during the 12-month period after the index discharge date
  - Index admission date: date of the first observed inpatient admission
  - Index discharge date: date of discharge associated with the index admission
- At least one schizoaffective disorder-related outpatient or physician office visit, or at least two prescription claims for antipsychotics or mood stabilizers during the 6-month period before the index admission date or 12-month period after the index discharge date

Exclusion Criteria

- Patients with schizoaffective disorder-related inpatient admissions (secondary diagnosis) during the 6-month period prior to the index admission date
- Patients with at least one primary diagnosis claim for schizophrenia or bipolar disorder, or more than two primary diagnoses claims for unipolar disorder during the 12-month period following the index discharge date
- Patients aged 18 years or younger at their index admission date and aged 65 years or older at their follow-up end date
- Patients with dual eligibility (i.e., Medicaid and Medicare)
- Patients without mental health and substance abuse coverage

Study Measures

Medication Adherence

- Adherence to schizoaffective disorder–related medications (i.e., antipsychotics and mood stabilizers) was assessed using PDC.
  - PDC = Total days of drug availability (days' supply) in the period of evaluation ÷ (Number of days in the period of evaluation – Number of days hospitalized during the period of evaluation).
  - Since the data do not include inpatient drug use details, we assumed that patients were 100% adherent to their supplied medications during an inpatient stay.
- For antipsychotic depot preparations* (i.e., risperidone, fluphenazine, haloperidol) without details on the days' supply, the following approved dosage durations were used as a proxy for days' supply:
  - Risperidone long-acting injection: 2 weeks
  - Haloperidol long-acting injection: 4 weeks
  - Fluphenazine long-acting injection: 4 weeks
- Patients with a PDC value of less than 0.8 (i.e., < 80% adherence) were classified as nonadherent, and patients with a PDC value of 0.8 or greater were classified as adherent.

Health Care Utilization and Costs

- Overall (i.e., all-cause) and schizoaffective disorder-related health care utilization and costs were assessed for care settings, including inpatient, outpatient, physician office, emergency department, pharmacy, and ancillary care.
  - Schizoaffective disorder-related utilization was defined as medical claims with schizoaffective disorder as the primary diagnosis (ICD-9-CM: 295.7x) or pharmacy claims for antipsychotics or mood stabilizers.
- Health care costs were assessed and adjusted to 2010 US dollars using the medical care component of the Consumer Price Index.
  - In cases where an inpatient stay spanned two or more follow-up time periods, we calculated a per-day cost (i.e., total cost for the inpatient episode ÷ length of stay [LOS]) for each inpatient episode. We then assigned costs to each follow-up period, based on the LOS in that period.

Other Covariates

- Other patient characteristics assessed included age, sex, race, health plan type, basis of Medicaid eligibility, and index hospitalization discharge status.
- Baseline comorbidity burden was assessed during the 6-month period before the index admission using the Deyo-adapted Charlson Comorbidity Index (CCI) score.[8]
- The 6-month preadmission period all-cause health care cost served as a proxy measure for schizoaffective disorder severity.
  - Patients were categorized as "high cost" (i.e., costs ≥ 75th quartile) or as "nonhigh cost" (i.e., costs < 75th quartile).

Statistical Analyses

- Descriptive analyses were used to generate mean values, medians, ranges, and SDs for continuous variables and frequency distributions for categorical variables.
  - Paired t-tests tests were used to compare unadjusted differences in continuous outcomes, and McNemar's test was used to compare categorical measures for the preadmission and postdischarge periods.
- Covariate-adjusted multivariable analyses were conducted using different regression models based on the type of study measure assessed.
  - For count data (e.g., number of physician office visits), we used repeated measures Poisson or negative binomial regression models. The selection of Poisson or negative binomial regression models was based on model fit assessed using a Pearson chi-square test.
  - For dichotomous measures (e.g., had a physician office visit), we used repeated measures logistic regression models.
  - For cost outcomes (e.g., all-cause physician office visits costs), we used repeated measures generalized linear models with a log-link function and gamma distribution. Differences in predicted costs were compared using paired t-tests.
  - No adjusted comparisons of adherence measures were performed.
  - No adjustment was made for multiplicity.
- Adherence to antipsychotics and mood stabilizers was assessed during the 6-month preadmission period and for the 12-month postdischarge period. However, in order to have consistency in the comparison periods, adherence was compared only between the 6-month period prior to the index admission date and the 6-month postindex discharge date period.
- Finally, health care utilization and associated costs were assessed during the 12-month postdischarge period and compared between each adjacent 60-day postindex period (i.e., 0-60 days, 61-120 days, 121-180 days, 181-240 days, 241-300 days, 301-364 days) during the 12-month postdischarge period.

* The following information concerns a use that has not been approved by the US Food and Drug Administration.

RESULTS

Patient Characteristics

- After applying all inclusion and exclusion criteria, we identified 1,193 hospital discharged patients with schizoaffective disorder.
- The mean age of these patients was 41 (SD = 12) years; 61% of patients were female, and 43% were black.
- Approximately 68% of patients had fee-for-service health coverage.
- 75% of patients were classified as high-cost users, and 92% were "discharged to home for self-care" following an inpatient admission.

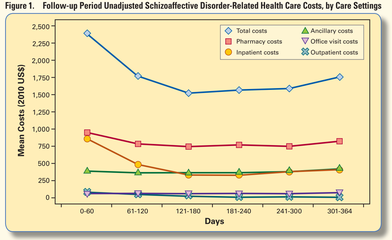
Medication Adherence

- Mean (SD) adherence for the overall 12-month postdischarge period was 0.65 (0.33).
- Mean (SD) adherences for the 6-month preadmission and 6-month postdischarge periods were 0.54 (0.37) and 0.69 (0.32), respectively.
- Medication adherence rates declined in the preadmission periods (182-121 days: 65%; 120-61 days: 49%; 60-0 days: 46%).
- Compared with the 60-day preadmission period (46%), the adherence rate increased in the initial 60-day postdischarge period (80%), declined in the 61-120 day postdischarge period (63%), and remained relatively stable in the remaining four 60-day postdischarge periods (range: 58%-63%).

Unadjusted Health Care Utilization and Costs (Figure 1)

- A larger percentage of patients were rehospitalized during the initial 60-day postdischarge period compared with the 61-120 day postdischarge period (all-cause: 16% vs. 10%; schizoaffective disorder-related: 11% vs. 6%).
- Both schizoaffective disorder-related (mean: $2,370 vs. $1,765; $P < 0.001$) and all-cause (mean: $5,277 vs. $4,310; $P < 0.001$) health care costs were significantly greater in the initial 0-60 day postdischarge period compared with the adjacent 61-120 day postdischarge period (Figure 1).
- The primary drivers of schizoaffective disorder-related costs in the 0-60 day postdischarge period were rehospitalization (mean: $860; SD: $3,923) and pharmacy (mean: $954; SD: $926); these drivers accounted for over 76% of the total schizoaffective disorder-related costs.
- Following the initial 60-day postdischarge period (all-cause mean: $5,277; schizoaffective disorder mean: $2,370), both all-cause and schizoaffective disorder-related costs declined during the 61-120 day postdischarge period (all-cause mean: $4,310; schizoaffective disorder mean: $1,765) and remained stable during the remaining 60-day postdischarge periods (all-cause range of the means: $4,601-$3,998; schizoaffective disorder range of the means: $1,748-$1,523).

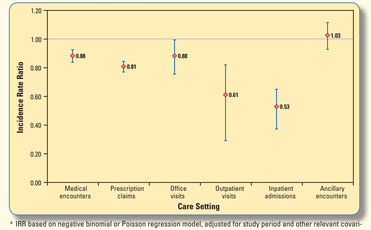
Figure 1. Follow-up Period Unadjusted Schizoaffective Disorder-Related Health Care Costs, by Care Settings



Covariate-Adjusted Health Care Utilization and Costs (Table 1, Figure 2)

- Similar to the unadjusted results, the covariate-adjusted results indicated that patients had a lower rate for schizoaffective disorder-related inpatient admission in the 61-120 day postdischarge period compared with the 0-60 day postdischarge period (incidence rate ratio [IRR]: 0.53; 95% confidence interval [CI]: 0.41-0.69) (Figure 2).
- No significant differences in schizoaffective disorder-related hospitalization rates were observed for other follow-up periods, including 121-180 days (IRR: 0.79; $P = 0.15$; Ref: 61-120 days), 181-240 days (IRR: 0.96; $P = 0.82$; Ref: 121-180 days), 241-300 days (IRR: 1.1; $P = 0.77$; Ref: 181-240 days), and 301-364 days (IRR: 1.1; $P = 0.69$; Ref: 241-300 days) (data tables available upon request).
- Compared with the 61-120 day postdischarge period, the total predicted all-cause and schizoaffective disorder-related medical costs were significantly higher in the 0-60 day postdischarge period (Table 1) (all-cause mean: $5,291.15 vs. $4,523.71, $P < 0.0001$; schizoaffective disorder-related: mean $2,472.54 vs. $2,125.10).
- Similarly, patients had significantly greater mean predicted schizoaffective disorder-related costs for care settings, including inpatient ($7,377 vs. $6,698, $P < 0.0001$), pharmacy ($1,060 vs. $979, $P < 0.0001$), and outpatient ($1,343 vs. $843, $P < 0.0001$) during the 0-60 day postdischarge period compared with the 61-120 day postdischarge period.

Figure 2. Follow-up Period Risk-Adjusted IRRs* for Schizoaffective Disorder-Related Health Care Utilization, by Care Setting



* IRR based on negative binomial or Poisson regression model, adjusted for study period and other relevant covariates (i.e., sex, race, age, CCI score, plan type, discharge status, adherence to antipsychotics and mood stabilizers, 6-month preadmission period all-cause health care cost).

The figure presents IRRs and corresponding 95% CIs.

Table 1. Covariate-Adjusted Predicted All-Cause and Schizoaffective Disorder-Related Costs, by Care Setting (Follow-up Period: 0-60 Days vs. 61-120 Days)

Cost Outcome, by Care Setting	Mean Predicted Cost*		Mean Difference	*P* Value
	0-60 Days	61-120 Days		
Medical costs				
All-cause	$5,291.15	$4,523.71	$767.40	< 0.0001
Schizoaffective disorder-related	$2,472.54	$2,125.10	$347.40	< 0.0001
Pharmacy costs				
All-cause	$1,672.88	$1,448.47	$224.40	< 0.0001
Schizoaffective disorder-related	$1,060.34	$979.19	$81.14	< 0.0001
Office visit costs				
All-cause	$346.55	$358.44	-$11.89	< 0.0001
Schizoaffective disorder-related	$429.77	$424.63	$5.14	<0.0001
Outpatient visit costs				
All-cause	$708.21	$576.13	$132.10	< 0.0001
Schizoaffective disorder-related	$1,343.02	$843.25	$499.80	< 0.0001
Inpatient visit costs				
All-cause	$9,200.21	$7,585.05	$1,615.20	< 0.0001
Schizoaffective disorder-related	$7,376.61	$6,698.03	$678.60	< 0.0001
Ancillary encounters costs				
All-cause	$1,849.88	$1,780.44	$69.45	< 0.0001
Schizoaffective disorder-related	$1,102.46	$1,139.79	-$37.34	< 0.0001

* Predicted cost based on generalized linear model, adjusted for follow-up period and other relevant covariates (i.e., sex, race, age, CCI score, plan type, discharge status, antipsychotic adherence, preindex period health care cost). *P* value based on paired t-test comparing the 0-60 days and 61-120 days postdischarge periods.

LIMITATIONS

- These results may not be generalizable to individuals enrolled in other federal (e.g., Medicare, Veteran's Administration), commercial health plans, or to individuals without health coverage. Additionally, we used several inclusion and exclusion criteria, such as continuous Medicaid enrollment, which may also limit generalizability.
- Several clinical and sociodemographic factors that could affect medication adherence and health care utilization and costs (e.g., disease severity, side effects, income, and educational level) are unavailable in the data.
- Assessment of administrative claims-based adherence assumes that the prescription refilled is consumed as expected.
  - However, in certain instances, patients may discontinue, stockpile, or discard medication, thus leading to overestimation of PDC.
- Details on medications used during an inpatient stay were not available.
- Antidepressants were not included in the adherence analysis, although they are frequently used in treating schizoaffective disorder.

DISCUSSION AND CONCLUSIONS

- To the best of our knowledge, this is the first study to assess adherence and trends in health care utilization and costs at important clinically relevant posthospital discharge periods among patients with schizoaffective disorder.
- Medication adherence declined from 65% during the 182-121 day period to 46% during the 60-0 day period prior to the index inpatient admission. The low and decreased adherence observed prior to the index admission may be associated with the index admission.
- Although a high adherence rate was observed in the first 60-day postdischarge period (80%), the adherence remained relatively low (range: 58%-63%) after the first 60 days postdischarge. We could not find other studies assessing posthospital discharge adherence patterns among patients with schizophrenia or schizoaffective disorder. However, a recent study assessing medication adherence during the 3- and 6-month postdischarge periods among hospital discharged patients with depression reported similar findings.[9]
- Future research may focus on postdischarge medication-taking behaviors and design interventions that help patients with schizoaffective disorder stay on the prescribed therapy regimen.
- A high rate of inpatient admission and health care costs was observed during the initial 60 days after a discharge among patients with schizoaffective disorder. This finding suggests that patients may have a higher risk of rehospitalization as they transition to the community care setting.
  - Further research is required to better understand and manage transition care after discharge.
- The medication adherence and resource utilization patterns outlined in our study should help identify high-risk patients and aid in the design of interventions that may help reduce the likelihood of inpatient admissions and the associated downstream costs.

REFERENCES

1. Lake CR, Hurwitz N. Schizoaffective disorder merges schizophrenia and bipolar disorders as one disease–there is no schizoaffective disorder. Curr Opin Psychiatry. 2007 Jul;20(4):365-79.
2. Malhi GS, Green M, Fagiolini A, Peselow ED, Kumari V. Schizoaffective disorder: diagnostic issues and future recommendations. Bipolar Disord. 2008 Feb;10(1 Pt 2):215-30.
3. Perälä J, Suvisaari J, Saarni SI, Kuoppasalmi K, Isometsä E, Pirkola S, et al. Lifetime prevalence of psychotic and bipolar I disorders in a general population. Arch Gen Psychiatry. 2007 Jan;64(1):19-28.
4. DeFrances CJ, Cullen KA, Kozak LJ. National Hospital Discharge Survey: 2005 annual summary with detailed diagnosis and procedure data. Vital Health Stat 13. 2007 Dec;(165):1-209.
5. Doering S, Müller E, Kopcke W, Pietzcker A, Gaebel W, Linden M, et al. Predictors of relapse and rehospitalization in schizophrenia and schizoaffective disorder. Schizophr Bull. 1998;24(1):87-98.
6. Klinkenberg WD, Calsyn RJ. Predictors of receipt of aftercare and recidivism among persons with severe mental illness: a review. Psychiatr Serv. 1996 May;47(5):487-96.
7. Thompson EE, Neighbors HW, Munday C,Trierweiler S. Length of stay, referral to aftercare, and rehospitalization among psychiatric inpatients. Psychiatr Serv. 2003 Sep;54(9):1271-6
8. Deyo RA, Cherkin DC, Ciol MA. Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. J Clin Epidemiol. 1992;45(6):613-9.
9. Zivin K, Ganoczy D, Pfeiffer PN, Miller EM, Valenstein M. Antidepressant adherence after psychiatric hospitalization among VA patients with depression. Adm Policy Ment Health. 2009 Nov;36(6):406-15.

DISCLOSURES

Michael Markowitz, Dong Jing Fu, and Larry Alphs are employees of Janssen Scientific Affairs, LLC. Sudeep Karve, Sean D Candrilli, and Chi-Chuan Wang are employees of RTI Health Solutions. Jean-Pierre Lindenmayer has received grant/research support from Janssen, Lilly, Astra-Zeneca, Johnson & Johnson, Pfizer, BMS, Otsuka, Dainippon, and Roche and is a consultant for Janssen, Lilly, Merck, Shire, and Lundbeck.

CONTACT INFORMATION

Michael Markowitz, MD, MBA, MSPH
Director, Clinical Development, Epidemiology

Janssen Scientific Affairs, LLC
1125 Trenton-Harbourton Road
Titusville, NJ 08560

Phone: +1.609.730.3277
E-mail: MMarkowi@its.jnj.com

Presented at:
2012 American Psychiatric Association Annual Meeting
May 5-9, 2012
Philadelphia, PA, United States

Funding for this study was provided by Janssen Scientific Affairs, LLC, Titusville, NJ, United States.