ANNUAL TOTAL MEDICAL COSTS IN PATIENTS WITH BIPOLAR DISORDER BY TREATMENT CLASS

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Abstract

Introduction: This study examines annual direct medical plus prescription drug costs per patient among patients with bipolar disorder treated with different classes of medications.

Methods: A retrospective administrative claims database study of patients with bipolar disorder (ICD9 codes 296.0x, 296.1x, 296.4x, 296.5x, 296.6x, 296.7x, or 296.8x) from January 2001 through December 2004. Patients with at least 6 months of insurance coverage prior to their first index prescription and 12 months afterward were grouped into 3 cohorts based on treatment patterns: 1) atypical antipsychotic medication only (APM); 2) other bipolar medication only (BPM—defined for the study as conventional antipsychotics, primary mood stabilizers, potential mood stabilizers, and the anticonvulsants zonisamide and tiagabine); or 3) a combination of both treatments (COMBO). A control cohort of untreated bipolar patients (NM) with a similar insurance coverage period was used for comparisons. Regression models, controlling for potential demographic, severity, and comorbidity confounders, were used to compare annual direct medical and drug costs.

Results: Analysis of the 1211 patients revealed the following annual direct medical costs per patient: 1) APM only = $7775 (n=51); 2) BPM only = $7029 (n=522); 3) COMBO= $9175 (n=366); 4) NM = $6042 (n=272). Patients who used COMBO therapy had significantly higher medical costs (*P*<0.05) than those in the BPM or NM groups, but the difference was not significant when compared with the APM group. COMBO patients reported the highest mental-health-related emergency department visit and inpatient admission rates.

Conclusion: Patients on a combination of atypical antipsychotics and other bipolar medications had significantly higher medical costs compared with the BPM and NM cohorts. Further research is needed to determine if this increased cost is a marker of underlying disease severity and the number of comorbidities, both bipolar disorder-related and non-related.

Introduction

- Bipolar disorder, a chronic disease with high rates of recurrence, is associated with a significant healthcare burden[1]
- Patients with bipolar disorder have high rates of relapse, and frequently show suboptimal response to conventional pharma-cotherapy. This appears to be reflected in the high inpatient treatment costs reported for the condition[2]
- Attempts to identify predictors of health service utilization have shown that factors such as the number of episodes, comorbid health conditions (both mental and non-mental), and comorbid evidence of substance-abuse predict greater utilization[2,3]
- Current treatment guidelines suggest the use of combination therapy, including the adjunct use of atypical antipsychotics for more severe cases of bipolar disorder[4]

Objective

- To study annual direct medical and prescription drug costs per patient among patients with bipolar disorder treated with different classes of psychotropic medication

Methods

Data Source

- Data were obtained from the Human Capital Management Services Research Reference Database (HCMS RRDb), containing adjudicated claims and demographic data from over 300,000 employees and their covered dependents over the calendar years from 2001-2004
- Adult patients (employees and spouses) with bipolar disorder (type I and type II) were identified using International Classification of Disease, 9th Edition (ICD-9) diagnostic codes (primary, secondary, and tertiary)

Index Dates

- Patients on psychotropic medication were assigned an index prescription date at the time of their first prescription
- Patients on psychotropic medication were assigned to: 1) atypical antipsychotic medication only (APM); 2) other bipolar medication (BPM) only – defined as conventional antipsychotics, primary mood stabilizers, potential mood stabilizers, and the anticonvulsants zonisamide and tiagabine; and 3) a combination of both treatment groups (COMBO)
- The control cohort identified with bipolar disorder but not receiving any bipolar-related medication (NM) was assigned an average prescription index date based on the patients on psychotropic medications

Statistical Analysis

- For group-to-group comparisons, annual direct medical and prescription costs, including those for non-psychiatric related treatment, were measured for the year following the prescription index date
- The total costs were adjusted using regression modeling and controlling for age, gender, region, employee versus spouse, tenure, marital status, full-time/part-time status, and salary. In addition, the models were controlled for Charlson Comorbidity Index, bipolar-specific medical costs, other medical costs (all three measured during the 6 months prior to the index date), and bipolar-specific medical services received during the index year (drug costs not included in analysis)

Results

- Patient demographics are shown in **Table 1**
- The costs for the patients in the COMBO group were significantly higher than for those in the BPM or NM groups (**Table 2**)
- The APM group was not significantly different than the BPM, NM, and COMBO groups
- There was no significant difference in other between-group comparisons

  - Patients in the COMBO group had a higher likelihood of psychiatric-related emergency department visits (significantly higher than the APM and BPM groups, *P*<0.05) (**Figure 1**)
  - Psychiatric-related inpatient visits were higher for the COMBO group than all other groups (significantly higher than the BPM and NM groups, *P*<0.05) (**Figure 2**)

Table 1. Population Demographics

| | Group A APM[‡] | | Group B BPM[‡] | | Group C COMBO[‡] | | Group D NM[‡] | | |
	N	Mean (95% Confidence Interval for Mean)	N	Mean (95% Confidence Interval for Mean)	N	Mean (95% Confidence Interval for Mean)	N	Mean (95% Confidence Interval for Mean)	Significant Differences[§]
Age*	51	43.28 (40.33, 46.22)	522	41.81 (41.05, 42.58)	366	41.23 (40.33, 42.12)	270	42.99 (41.96, 44.01)	
% Female	51	62.7% (49.0, 76.5%)	522	64.4% (60.2%, 68.5%)	366	67.2% (62.4%, 72.0%)	272	57.7% (51.8%, 63.6%)	
% Employees (vs Spouses)	51	49.0% (34.8%, 63.2%)	522	62.1% (57.9%, 66.2%)	366	54.6% (49.5%, 59.8%)	272	68.4% (62.8%, 73.9%)	D>C
% Married[†]	23	47.8% (25.7%, 69.9%)	298	48.3% (42.6%, 54.0%)	183	32.8% (25.9%, 39.7%)	175	58.3% (50.9%, 65.7%)	B>C, D>C
% White[†]	12	75.0% (46.3%, 100.0%)	206	85.9% (81.1%, 90.7%)	109	79.8% (72.2%, 87.5%)	101	80.2% (72.3%, 88.1%)	
% Black[†]	12	16.7% (0.0%, 41.4%)	206	5.3% (2.2%, 8.4%)	109	8.3% (3.0%, 13.5%)	101	6.9% (1.9%, 12.0%)	
% Hispanic[†]	12	8.3% (0.0%, 26.7%)	206	7.3% (3.7%, 10.9%)	109	3.7% (0.1%, 7.3%)	101	5.9% (1.3%, 10.6%)	
% Exempt[†]	24	12.5% (0.0%, 26.8%)	312	26.6% (21.7%, 31.5%)	193	16.1% (10.8%, 21.3%)	177	25.4% (18.9%, 31.9%)	B>C
% Full-time[†]	25	84.0% (68.6%, 99.4%)	324	92.0% (89.0%, 94.9%)	200	87.5% (82.9%, 92.1%)	186	93.0% (89.3%, 96.7%)	
Tenure*[†]	25	11.45 (7.76, 15.14)	324	10.53 (9.57, 11.50)	200	9.69 (8.46, 10.92)	186	11.69 (10.32, 13.06)	
Annual Salary[†]	25	$48,247 ($39,273, $57,222)	323	$50,436 ($47,568, $53,305)	200	$45,605 ($42,710, $48,499)	186	$56,796 ($52,108, $61,483)	D>C

*As of the index diagnosis date (date of first bipolar diagnosis between 2001-2003 such that the patient had 3 months of enrollment prior to and 12 months of enrollment after that date).

[†]Tenure, salary, marital status, race, exempt status, and full-time status are reported only for employees, not for spouses.

[‡]Other bipolar-related drugs include conventional antipsychotics, primary and potential mood stabilizers, and some anticonvulsants. The treatment group for a given patient was determined based on drug claims information. These groups are mutually exclusive.

[§]Significant at the *P*<0.05 level.

Table 2. Annual Adjusted Direct Medical Plus Prescription Costs by Bipolar Disorder Treatment Group*[,†]

Psychotropic Drug Class	N	Adjusted Mean Costs	Standard Error	95% Confidence Interval
APM	51	$7775	$1046	($5724, $9826)
BPM	522	$7029	$296	($6449, $7608)
COMBO	366	$9175	$461	($8272, $10,079)
NM	272	$6042	$352	($5352, $6733)

*Costs measured in the year following the index prescription date

[†]Costs shown are adjusted using regression modeling and controlling for age, gender, location, employee vs. spouse, prior comorbidity index, prior bipolar-specific medical costs, prior other medical costs, index date, and bipolar-specific medical services. Interaction terms include interactions between employees and marital status, race, full-time/part-time status, and salary.

Figure 1. Annual adjusted likelihood of psychiatric-related emergency department visits by bipolar disorder treatment group*[,†]
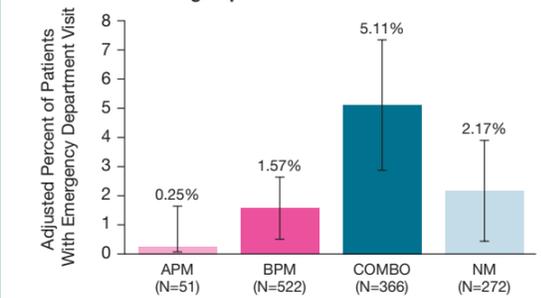
*Includes mental disorder inpatient hospital visits during the year following the index prescription date. For all cohorts, the subjects were required to have 18 months of health insurance enrollment (6 months prior and 12 months after index date).

[†]Percentages shown are adjusted using regression modeling, controlling for age, gender, location, employee vs. spouse, prior comorbidity index, prior bipolar-specific medical costs, prior other medical costs, index date, and bipolar-specific medical services. Interaction terms include interactions between employees and marital status, race, full-time/part-time status, and salary.

Figure 2. Annual adjusted likelihood of psychiatric-related inpatient hospital visit by bipolar disorder treatment group*[,†]
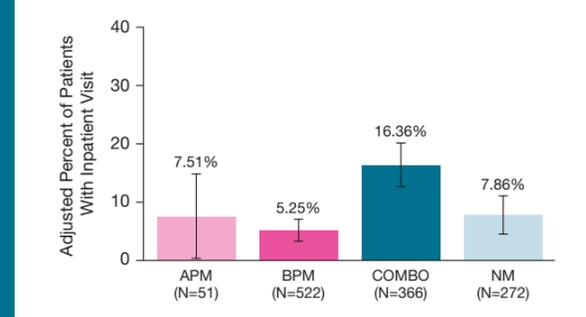
*Includes mental disorder inpatient hospital visits during the year following the index prescription date. For all cohorts, the subjects were required to have 18 months of health insurance enrollment (6 months prior and 12 months after index date).

[†]Percentages shown are adjusted using regression modeling, controlling for age, gender, location, employee vs. spouse, prior comorbidity index, prior bipolar-specific medical costs, prior other medical costs, index date, and bipolar-specific medical services. Interaction terms include interactions between employees and marital status, race, full-time/part-time status, and salary.

Conclusions

- Patients on combination therapy with both atypical antipsy-chotics and other bipolar medications have significantly higher healthcare costs than patients on either other bipolar-related medication or no bipolar-related medications
- This study suggests that emergency department visits and inpatient hospitalizations are substantial cost-drivers for the group of patients on combination therapy
- Further research is required to address potentially preventable reasons for emergency department and inpatient visits
- This type of investigation should include evaluation of adherence to medication guidelines by clinicians, and adherence to medication regimens by patients. In addition, adequate treatment of comorbid health conditions and substance abuse must be targeted

References

1. Gardner H, et al. The impact of bipolar disorder on an employed population. *J Clin Psychiatry* 2006;in press.
2. Kleinman LS, et al. Costs of bipolar disorder. *Pharmacoeconomics* 2002; 21:601-622.
3. Brook RA, et al. Incurring greater health care costs: risk stratification of bipolar disorder employees. *Prim Care Companion J Clin Psychiatry* 2006; in press.
4. Suppes T, et al. The Texas Implementation of Medication Algorithms: Update to the Algorithms for Treatment of Bipolar I Disorder. *J Clin Psychiatry* 2005;66:870-886.