

Economic Impact of Tardive Dyskinesia Among Hospitalized Schizophrenia Patients: Evidence from US Administrative Data

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Research Objective

- To estimate the prevalence of TD among patients hospitalized with schizophrenia, examine trends over time in prevalence, and to estimate the incremental impact of TD on length of hospital stay and total inpatient cost of care.

Introduction

- Tardive dyskinesia (TD) is a neurological side effect of long-term exposure to antipsychotic medications characterized by involuntary movements of the limbs and face such as lip smacking, facial grimacing, and tongue protrusion.
- TD can be both physically and emotionally distressing for patients and has been associated with social isolation, low self-esteem, and poor quality of life.
- While there is a substantial literature on patient-reported outcomes for patients with schizophrenia and TD, little is known about how TD may impact inpatient outcomes when a patient with schizophrenia is hospitalized.

Study Design

- Observational, retrospective
- HCUP National Inpatient Sample (NIS), 2012-2021
- Cohort: patients hospitalized with schizophrenia
- Multivariable statistical methods: logistic regression, GLM (gamma distribution with log link function); propensity scores

Principal Findings

- Among 450,870 patients with a primary diagnosis of schizophrenia admitted to a US hospital between 2012 and 2021, 3,226 (0.72%) had a TD diagnosis.
- Patients with TD tended to be older, female, covered by Medicare, and have more comorbidities.
- After controlling for covariates, a TD diagnosis was associated with a longer LOS of 4.5 days ($P < 0.0001$) and greater costs of \$4,874.06 ($P = < 0.0001$) which was confirmed by the propensity score analysis.
- After matching, patients with TD had a significantly longer LOS (17.6 days vs. 11.5 days, $p < 0.0001$) and significantly higher costs (\$18,487 vs. \$12,361, $p < 0.0001$) than matched patients without TD.

Conclusions

- A diagnosis of TD is associated with significantly poorer economic outcomes among patients hospitalized for schizophrenia.
- TD is not only a burdensome neurological side effect of antipsychotic treatment but also as a potential driver of healthcare resource utilization in this vulnerable population.

Implications for Policy

- The substantial incremental burden of TD (an additional ~4.5 days in length of stay and approximately \$4,900 in added costs per admission) underscores the need for antipsychotic stewardship.
- Clinicians and formulary managers should weigh the risk of TD when selecting antipsychotic agents, especially for patients in the identified high-risk subgroups.
- Preferentially using second-generation antipsychotics with lower TD risk, or considering novel agents, could reduce the downstream clinical and economic consequences documented in this study.

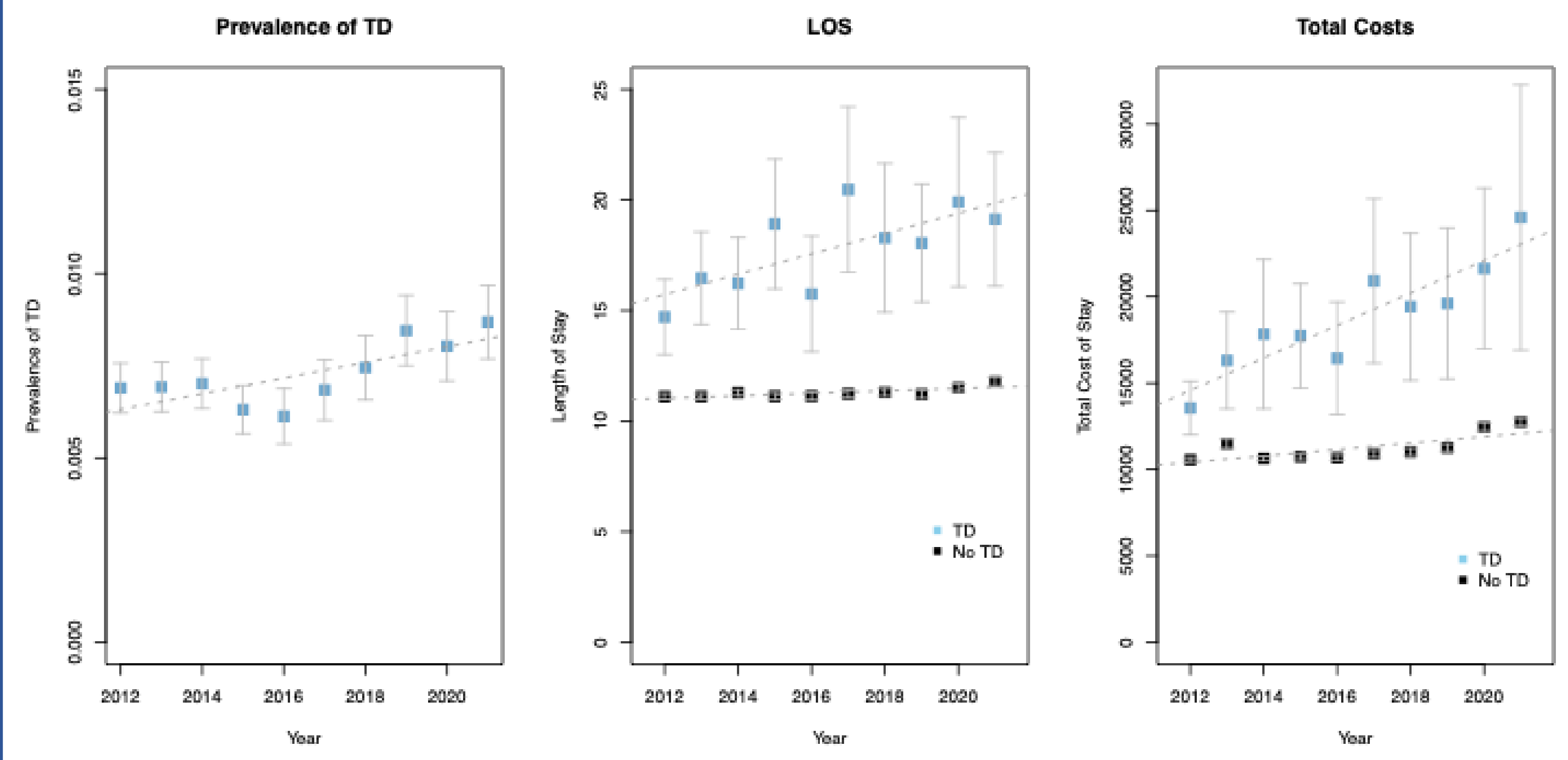


Tardive dyskinesia (TD) is associated with significantly longer length of stay and greater total inpatient costs for patients hospitalized with schizophrenia.



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Descriptive Statistics of Patients with Schizophrenia Stratified by TD

Variable	No TD (N=447,644)	TD (N=3,226)	P-Value
Age			
18-29	42.8%	55.7%	<0.0001
30-39	22.7%	4.3%	
40-49	22.2%	7.9%	
≥50	19.5%	14.7%	
Sex			
Female	36.6%	48.0%	<0.0001
Male	63.4%	52.0%	
Race			
White	41.5%	52.0%	<0.0001
Black	35.7%	30.6%	
Hispanic	12.0%	6.6%	
Asian	2.8%	2.8%	
Other	3.8%	2.8%	
Missing	4.1%	5.2%	
Payer			
Medicare	39.3%	60.5%	<0.0001
Medicaid	40.7%	27.0%	
Commercial	11.2%	7.2%	
Other	8.8%	5.3%	
Hospital Size			
Small	21.2%	21.8%	<0.0001
Medium	27.4%	25.3%	
Large	51.4%	52.9%	
Hospital Region			
Northeast	23.6%	22.8%	<0.0001
Midwest	21.6%	24.6%	
South	34.7%	35.2%	
West	20.1%	17.4%	
Hospital Location			
Rural	7.4%	10.4%	<0.0001
Urban Non-Teach	28.2%	23.2%	
Urban Teach	64.4%	66.4%	
Charlson Comorbidity Index			
0	0.47	0.75	<0.0001
1	65.2%	49.4%	
2	25.6%	33.2%	
3+	7.1%	12.0%	
	2.2%	5.4%	

Logistic Regression for Odds of TD Diagnosis

Variable	Odds Ratio	95% Confidence Lower	Upper	P-Value
Age				
18-29	REFERENCE			
30-39	1.68	1.36	2.06	0
40-49	3.29	2.72	3.98	<0.0001
≥50	8.11	6.80	9.68	<0.0001
Sex				
Male	REFERENCE			
Female	1.23	1.15	1.32	<0.0001
Race				
White	REFERENCE			
Black	0.85	0.78	0.92	<0.0001
Hispanic	0.61	0.52	0.70	<0.0001
Asian	1.07	0.86	1.32	0.557
Other	0.80	0.64	0.99	<0.0001
Missing	1.14	0.97	1.34	0.114
Payer				
Medicare	REFERENCE			
Medicaid	0.70	0.64	0.76	<0.0001
Commercial	0.67	0.59	0.77	<0.0001
Other	0.70	0.60	0.83	<0.0001
Hospital Size				
Small	0.91	0.83	1.00	0.045
Medium	0.88	0.81	0.96	<0.0001
Large	REFERENCE			
Hospital Region				
Northeast	REFERENCE			
Midwest	1.14	1.03	1.26	<0.0001
South	1.08	0.98	1.19	<0.0001
West	1.04	0.93	1.17	<0.0001
Hospital Location				
Rural	1.06	0.94	1.19	0.385
Urban Non-Teach	0.71	0.65	0.78	<0.0001
Urban Teach	REFERENCE			
Charlson Comorbidity Index				
0	REFERENCE			
1	1.12	1.03	1.21	0.005
2	1.14	1.02	1.28	0.026
3+	1.40	1.19	1.65	<0.0001

GLM of Total Inpatient Costs

Variable	Marginal Effect	95% Confidence Lower	Upper	P-Value
TD				
No	REFERENCE			
Yes	4.50	3.80	5.20	<0.0001
Age				
18-29	REFERENCE			
30-39	-0.80	-0.92	-0.68	<0.0001
40-49	-0.79	-0.91	-0.67	<0.0001
≥50	1.10	0.98	1.23	<0.0001
Sex				
Male	REFERENCE			
Female	1.06	0.97	1.14	<0.0001
Race				
White	REFERENCE			
Black	-0.85	-0.95	-0.76	<0.0001
Hispanic	-1.24	-1.36	-1.11	<0.0001
Asian	0.97	0.69	1.26	<0.0001
Other	0.58	0.35	0.81	<0.0001
Missing	1.31	1.09	1.54	<0.0001
Payer				
Medicare	REFERENCE			
Medicaid	-1.32	-1.41	-1.22	<0.0001
Commercial	-1.21	-1.33	-1.09	<0.0001
Other	-1.56	-1.70	-1.41	<0.0001
Hospital Size				
Small	-1.28	-1.38	-1.18	<0.0001
Medium	-1.40	-1.49	-1.31	<0.0001
Large	REFERENCE			
Hospital Region				
Northeast	REFERENCE			
Midwest	-5.26	-5.35	-5.17	<0.0001
South	-5.94	-6.04	-5.84	<0.0001
West	-3.56	-3.67	-3.44	<0.0001
Hospital Location				
Rural	-1.08	-1.21	-0.94	<0.0001
Urban Non-Teach	-2.01	-2.09	-1.92	<0.0001
Urban Teach	REFERENCE			
Charlson Comorbidity Index				
0	REFERENCE			
1	-0.06	-0.16	0.04	<0.0001
2	0.31	0.14	0.48	0.024
3+	1.89	1.52	2.25	<0.0001

GLM of Length of Stay

Variable	Marginal Effect	95% Confidence Lower	Upper	P-Value
TD				
No	REFERENCE			
Yes	4.874.06	4,027.49	5,720.62	<0.0001
Age				
18-29	REFERENCE			
30-39	-877.68	-1,013.35	-742.01	<0.0001
40-49	-907.10	-1,058.20	-755.99	<0.0001
≥50	713.01	571.18	854.85	<0.0001
Sex				
Male	REFERENCE			
Female	1,079.22	980.32	1,178.12	<0.0001
Race				
White	REFERENCE			
Black	-834.58	-937.45	-731.70	<0.0001
Hispanic	-1,329.57	-1,476.48	-1,182.67	<0.0001
Asian	1,508.44	1,181.60	1,835.28	<0.0001
Other	1,595.38	1,254.31	1,936.44	<0.0001
Missing	4,084.34	3,637.97	4,530.72	<0.0001
Payer				
Medicare	REFERENCE			
Medicaid	-1,211.79	-1,322.45	-1,101.12	<0.0001
Commercial	-1,151.26	-1,309.59	-992.92	<0.0001
Other	-1,717.83	-1,868.52	-1,567.14	<0.0001
Hospital Size				
Small	-217.48	-371.93	-63.03	<0.0001
Medium	-892.16	-983.40	-800.92	<0.0001
Large	REFERENCE			
Hospital Region				
Northeast	REFERENCE			
Midwest	-6,219.92	-6,310.46	-6,129.37	<0.0001
South	-8,196.14	-8,296.49	-8,095.79	<0.0001
West	-2,086.09	-2,259.76	-1,912.43	<0.0001
Hospital Location				
Rural	-641.45	-783.19	-499.71	<0.0001
Urban Non-Teach	-2,811.26	-2,902.65	-2,719.86	<0.0001
Urban Teach	REFERENCE			
Charlson Comorbidity Index				
0.00	REFERENCE			
1.00	242.82	130.58	355.06	0.87
2.00	1,171.61	973.58	1,369.65	<0.0001
3+	3,405.82	3,017.51	3,794.12	<0.0001