Annual Overall and Epilepsy-Related Healthcare Utilization in Adult Epilepsy Patients in the United States

PIH77

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BACKGROUND

- Epilepsy, a brain disorder characterized by recurrent seizures over time, affects 50 million people worldwide and nearly 2.2 million Americans.[1-3]

- Although medications and other therapies may be used to treat epilepsy, many patients continue to have seizures that can greatly limit their daily activities and may also lead to significant healthcare utilization. [1,3]

OBJECTIVE

To compare annual overall and epilepsy-related healthcare utilization between adult patients (age ≥18 years) with stable and uncontrolled epilepsy.

METHODS

Study Design and Data Source

- A retrospective cohort study using data from Thomson Reuters MarketScan, a commercial HIPAA-compliant administrative claims database. Study period was 1/1/2007-12/31/2009.

Study Population and Study Timeframe

- Patients included in the study were adults aged ≥18 years old, diagnosed with epilepsy, and undergoing treatment with at least one antiepileptic drug (AED) [a] in 1/1/08-12/31/08 identification (ID) period.

  [a] AEDs included carbamazepine, clonazepam, divalproex, valproate, ethosuximide, felbamate, gabapentin, lacosamide, lamotrigine, levetiracetam, oxcarbazepine, phenobarbital, phenytoin, pregabalin, primidone, tiagabine, topiramate, vigabatrin, and zonisamide.
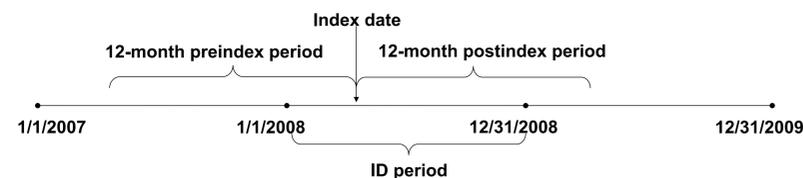
Inclusion Criteria:

- ≥2 medical claims for epilepsy (ICD-9-CM codes of 345.xx or 780.39) in any position at least 30 days apart during the ID period; and

- Cohorts were defined as:
  - **Stable** - on the same AED therapy (either monotherapy or combination therapy) for ≥12 months;
  - **Uncontrolled** - added additional AED treatment(s) [b] in the ID period (uncontrolled epilepsy).

  [b] Additional therapy was defined as ≥3 months of baseline therapy, followed by ≥3 months with both baseline and the additional AED.

Exclusion Criteria:

- Diagnosis of neuropathic or chronic pain, evidence of pregnancy, fibromyalgia, bipolar disorder, or migraines during the preindex or postindex period,[4] or

- <24 months of continuous enrollment; 12 months preindex and 12 months postindex

Study timeline showing 12-month preindex period and 12-month postindex period around Index date; 1/1/2007, 1/1/2008, 12/31/2008, 12/31/2009, with ID period marked.

Measures

Baseline measures: patient demographics (age, sex, U.S. census regions), usual care physician specialty, number of chronic conditions, Charlson comorbidity index,[5] and central nervous system (CNS) comorbidities (head injury, brain tumor, cerebrovascular disease/stroke, tuberous sclerosis, and depression/other mood disorders). All pharmacy and medical claims in the baseline (12-month preindex) period were reviewed to determine the baseline measures.
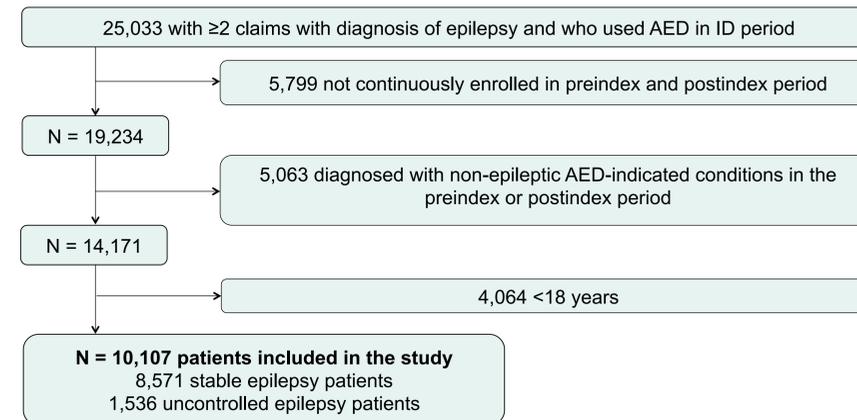
Outcome measures:

- Annual overall healthcare utilization (office visits, emergency department [ED] visits, inpatient hospitalizations, prescription medication use) was estimated using pharmacy and medical claims in the postindex year.

- Annual epilepsy-related utilization was estimated using claims with epilepsy in any diagnosis field or epilepsy related tests.

Statistical Analyses

- Descriptive statistics. Chi-square tests and t-tests were used to compare categorical variables and continuous variables, respectively.

- Logistic regression models were used to adjust for baseline measures.

- All data transformations and statistical analyses were performed using SAS© version 9.2 (SAS Institute, Cary, NC).

RESULTS

Cohort Identification

25,033 with ≥2 claims with diagnosis of epilepsy and who used AED in ID period
→ 5,799 not continuously enrolled in preindex and postindex period
N = 19,234
→ 5,063 diagnosed with non-epileptic AED-indicated conditions in the preindex or postindex period
N = 14,171
→ 4,064 <18 years
N = 10,107 patients included in the study
8,571 stable epilepsy patients
1,536 uncontrolled epilepsy patients

Demographic and Clinical Characteristics

- 84.8% of patients identified were classified as having stable epilepsy and 15.2% as having uncontrolled epilepsy

- Mean age was 42.8 years; 43 years for stable and 41.8 years for uncontrolled epilepsy patients

- A greater proportion of uncontrolled epilepsy patients compared to stable epilepsy patients were female (50.7% vs. 47.6%, P<0.001)

- 11.4% of patients were from the Northeast, 29.9% from the North Central, 42.3% from the South, and 16.5% from the West; the two cohorts did not differ significantly in geographic distribution

- Stable epilepsy patients received usual care most often from primary care physicians (40.6%), while uncontrolled epilepsy patients received usual care most often from neurologists (39.4%) (P<0.001)

Baseline Comorbidity Characteristics

- Uncontrolled epilepsy patients had a higher mean number of chronic conditions (2.7 vs. 2.2) and mean Charlson comorbidity index (0.7 vs. 0.5) (P<0.001).

- Compared to stable epilepsy patients, a significantly higher proportion of uncontrolled patients had a head injury (0.7% vs. 1.3%), brain tumor (3.5% vs. 6.2%), cerebrovascular disease/stroke (6.3% vs. 12.7%), and depression and other mood disorders (6.3% vs. 10.9%) (P<0.02).

Postindex Annual Healthcare Utilization

Postindex Annual Overall and Epilepsy-Related Healthcare Utilization

	Stable N=8,571	Uncontrolled N=1,536	All N=10,107	P Value
Annual Overall Healthcare Utilization				
No. with inpatient hospitalizations (%)				<0.001
0	7,727 (90.2)	1,255 (81.7)	8,982 (88.9)	
1	627 (7.3)	179 (11.7)	806 (8.0)	
2+	217 (2.5)	102 (6.6)	319 (3.2)	
Mean no. of days of stay among patients with inpatient hospitalizations	7.1 (11.0)	10.9 (29.5)	8.0 (17.6)	0.034
No. with ED visits (%)				<0.001
0	6,389 (74.5)	962 (62.6)	7,351 (72.7)	
1	1,422 (16.6)	327 (21.3)	1,749 (17.3)	
2+	760 (8.9)	247 (16.1)	1,007 (10.0)	
Mean no. of office visits (SD) [median]	9.0 (9.6) [6.0]	12.0 (11.6) [9.0]	9.4 (10.0) [7.0]	<0.001
Annual Epilepsy-Related Healthcare Utilization				
No. with epilepsy-related [a] inpatient hospitalizations (%)				<0.001
0	7,969 (93.0)	1,295 (84.3)	9,264 (91.7)	
1	494 (5.8)	171 (11.1)	665 (6.6)	
2+	108 (1.3)	70 (4.6)	178 (1.8)	
Mean no. of days of stay among patients with epilepsy-related [a] inpatient hospitalizations (SD)	5.6 (8.6)	8.9 (21.1)	6.5 (13.5)	0.018
No. with epilepsy-related ED visits (%)				<0.001
0	7,541 (88.0)	1,211 (78.8)	8,752 (86.6)	
1	795 (9.3)	218 (14.2)	1,013 (10.0)	
2+	235 (2.7)	107 (7.0)	342 (3.4)	
No. with vagus nerve stimulation (%)	14 (0.2)	10 (0.7)	24 (0.2)	<0.001
Mean no. of epilepsy-related [a] office visits (SD) [median]	2.2 (2.1) [2.0]	3.6 (3.0) [3.0]	2.4 (2.3) [2.0]	<0.001
No. who had EEG (%)				<0.001
0	7,294 (85.1)	1,098 (71.5)	8,392 (83.0)	
1	982 (11.5)	256 (16.7)	1,238 (12.2)	
2+	295 (3.4)	182 (11.8)	477 (4.7)	
No. who had brain imaging (%)				<0.001
0	6,983 (81.5)	1,007 (65.6)	7,990 (79.1)	
1	1,109 (12.9)	300 (19.5)	1,409 (13.9)	
2+	479 (5.6)	229 (14.9)	708 (7.0)	
No. with AEDs (%)				n/a
1	6,130 (71.5)	0 (0)	6,130 (60.7)	
2	1,947 (22.7)	1,122 (73.0)	3,069 (30.4)	
3	433 (5.1)	328 (21.4)	761 (7.5)	
4+	61 (0.7)	86 (5.6)	147 (1.5)	

[a] Claims with a diagnosis of epilepsy in any diagnosis field; SD: standard deviation; Emergency department [ED]

- In the postindex period, uncontrolled patients utilized both more overall and more epilepsy-related healthcare services than did stable epilepsy patients (P<0.034).

Adjusted Estimates for Uncontrolled vs. Stable Epilepsy Patients

Outcome Variable	Odds Ratio	95% Confidence Interval	P Value
Inpatient hospitalizations	1.82	1.56 – 2.13	<0.001
ED visit	1.64	1.46 – 1.84	<0.001
Epilepsy-related inpatient hospitalization	2.20	1.87 – 2.60	<0.001
Epilepsy-related ED visit	1.91	1.66 – 2.20	<0.001

Emergency department [ED]

- After adjusting for age, sex, region, usual care physician specialty, number of chronic conditions, Charlson comorbidity index, and CNS comorbidities:
  - the odds of hospitalization, ED visit, epilepsy-related hospitalization, and epilepsy-related ED visit were still greater in the uncontrolled epilepsy group (P<0.001).

LIMITATIONS

- Claims data are collected for the purpose of payment and not research, which may limit the degree to which claims data can accurately capture an individual's medical history and does not capture disease severity measures.

- The study population was a sample of managed care enrollees, which may not be generalizable to a non-managed care national population.

- Epilepsy-related costs account for less than 50% of total observed costs which suggests that comorbid conditions may account for the other costs and/or under-identification of epilepsy-related utilization

CONCLUSIONS

- Patients with uncontrolled epilepsy use significantly more healthcare services than those with stable disease.

- With appropriate management and available newer-generation AEDs, patients with uncontrolled epilepsy may gain better control of their seizures and comorbidities, which could lead to reduction in overall healthcare utilization and costs.

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