Epilepsy & Behavior 31 (2014) 307–311

Contents lists available at ScienceDirect

Epilepsy & Behavior

journal homepage: www.elsevier.com/locate/yebeh

Healthcare utilization of patients with epilepsy in Yuma County, Arizona: Do disparities exist?

Yeeck Sim [a], Brandon Nokes [b], Seenu Byreddy [a], Jenny Chong [a], Bruce M. Coull [a], David M. Labiner [a,c,*]

[a] Department of Neurology, University of Arizona, Tucson, AZ, USA
[b] College of Medicine, University of Arizona, Tucson, AZ, USA
[c] Department of Pharmacy Practice and Science, College of Pharmacy, University of Arizona, Tucson, AZ, USA

ARTICLE INFO

Article history:
Received 13 August 2013
Revised 8 October 2013
Accepted 14 October 2013
Available online 5 November 2013

Keywords:
Hispanic
Epilepsy
Cost
Border community
Patient behavior
Seizure
Epidemiology

ABSTRACT

The aim of this study was to describe the disparities in healthcare utilization and costs between Hispanic and non-Hispanic patients with seizures or epilepsy. We reviewed the insurance status and healthcare resource utilization data from 2005 to 2008 for all patients with seizures and epilepsy seen at the Yuma Regional Medical Center (YRMC). Charges for medical services provided to Hispanic patients with epilepsy between the ages of 18 and 49 were significantly less than those for non-Hispanic patients with epilepsy (Hispanic: $3167.63 versus non-Hispanic: $5154.36, $P < 0.001$). Taking into account the differences in insurance status, setting of care, and total number of procedures, we still saw a significant difference in charges between the two groups at the outpatient settings. These data differ from currently available data on national and Eastern US Hispanic patients with epilepsy, suggesting that patients in this border community are somehow different from Hispanics elsewhere in the US.

1. Introduction

It is estimated that 1 in 26 individuals in the United States will develop epilepsy or a related seizure disorder by age 75, with a global prevalence between 4 and 6/1000 people [1–3]. Within the US, recent data from the Behavioral Risk Factor Surveillance Survey (BRFSS) report the lifetime prevalence for epilepsy to be between 11.5/1000 and 22/1000 [4]. However, studies show that the prevalence of epilepsy among various ethnic groups, such as Hispanics and non-Hispanic whites, varies by location. Epilepsy has been reported to be more prevalent among Hispanics in New York, whereas in California and Arizona, the prevalence of epilepsy in Hispanics has been reported to be lower than in non-Hispanics [1,5–9].

Regardless of ethnicity, however, epilepsy prevalence among individuals of lower socioeconomic status is consistently high [1,10]. Within the US, individuals in border communities such as Yuma County, Arizona, experience limitations in access to care because of lower socioeconomic status and decreased healthcare facility and provider availability [11]. According to the 2012 US census data, the poverty rate in Yuma is approximately 20% [12]. In a 2010 assessment of border community healthcare access, up to 25% of citizens within border communities, including Yuma County, were uninsured [11], although patients requiring specialized care such as epilepsy management are less likely to be uninsured [5,13]. The Epilepsy Foundation reported in 2000 that 18% of patients with epilepsy were uninsured [13], although more recent data from California place this number closer to 10% [5].

Underinsured patients tend to have greater medical costs related to poorer disease management, and this is especially true for patients with epilepsy [14]. These greater out-of-pocket costs are related to Emergency Department encounters, epilepsy-related comorbidities such as injuries, as well as indirect costs, such as lost wages and unemployment. A recent study reported that uninsured individuals may have decreased quality of care, indicated by significantly fewer outpatient visits, fewer appointments with neurologists, and greater antiepileptic drug (AED) costs compared with patients with private insurance [15]. The direct costs of epilepsy include costs required to treat the underlying disease, such as physician visits, AEDs, and, for some, surgeries. Indirect costs include lost wages, unemployment, and other medical comorbidities [16]. In general, the costs associated with epilepsy and seizure care are largely associated with the indirect costs of seizure development and are attributable to nonepilepsy-related care [15,17].

Epilepsy care in Hispanics has been relatively understudied, especially with regard to access to care and costs of services within border communities. Historically, it has been reported that within the US, access to care for Hispanics was limited because of lack of insurance and increased out-of-pocket costs [11,15]. However, a number of the studies related to Hispanic epilepsy costs either sampled national trends or were limited to the Eastern US [18–20]. The population characteristics in

* Corresponding author at: Department of Neurology, University of Arizona, 1501 N. Campbell Avenue, PO Box 245023, Tucson, AZ 85724, USA. Fax: +1 520 626 2111.
E-mail address: labinerd@neurology.arizona.edu (D.M. Labiner).

1525-5050/$ – see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.yebeh.2013.10.018

Yuma are unique and unlike those in most parts of the US. In Yuma County, over half (60.1%) of the population is Hispanic, whereas 34.6% of the population is non-Hispanic whites [12].

To our knowledge, no previous studies have looked explicitly at the costs of epilepsy care within border communities such as Yuma County, Arizona. To better elucidate the cost of care for patients with epilepsy and seizures within this border community, administrative data from the Yuma Regional Medical Center (YRMC) were used to investigate the healthcare resource utilization and insurance status of patients with seizure or epilepsy conditions between 2005 and 2008. We also sought to understand whether the underlying cost differences, if any, were attributable to the length of hospital stay or the number of procedures performed either in or out of the hospital. We hypothesized that behavior of patients with epilepsy within this border community and healthcare costs may be different from those previously reported for other populations within the US.

2. Methods

Data between January 2005 and July 2008 were obtained from YRMC. The data contained patient demographics including age, sex, and ethnicity; location of residence by city, state, and zip code; discharge status; setting of care; length of stay during a visit; insurance status; and the total charges in dollars for each encounter. For each encounter, up to five diagnoses were available using the International Classification of Disease, Ninth Revision (ICD-9) codes, and up to three procedure columns were reported using the ICD-9 procedure codes.

The ICD-9 codes of interest in this study were 345.0–345.9 (epilepsy); 094.89 (epilepsy and syphilis-related); 123.1 (epilepsy and cysticercosis-related); 123.9 (epilepsy and parasite-related); 333.2 (progressive familial epilepsy); 347.0 (epilepsy and sleep-related); 907.0 (epilepsy due to traumatic injury); 780.3 and 780.39 (convulsions); and 780.31–780.32 (febrile convulsions). The ICD-9 procedure codes were examined both overall and within each setting of care.

Only patients who reported that they were living in Yuma County were included. Hispanics were self-identified at the time of encounter. Hispanic and non-Hispanic Yuma County cases with seizure and/or epilepsy coded during the visit (hereafter known as the group with epilepsy) were assessed together, while Hispanic and non-Hispanic patients who were not coded with seizure and/or epilepsy codes on any visit served as respective control groups. The data were stratified by age: children (0–17 years), adults (18–64 years), and seniors (65 years and older). In more detailed analyses, the adult group was further divided into three groups: 18–33 years, 34–49 years, and 50–64 years.

Insurance status was categorized into three groups: 1) no insurance/self-pay; 2) public insurance including Arizona Health Care Cost Containment System (AHCCCS —Arizona's Medicaid program), Tricare/Military/Veteran's Affairs, and other government health programs, such as Medicare; and 3) private insurance (e.g., commercial plans such as Blue Cross and Worker's Compensation).

The emergency department and after-hours clinic visits were analyzed together (ED), while hospital outpatient visits were also analyzed together with outpatient clinic visits (OP). A small number of patients visited numerous "other" sources of care such as the Foothills Clinic (a neighborhood facility where mainly non-Hispanic patients were seen), outpatient surgery, and perinatal services. Information about the specialties of the physicians seeing these patients was not available.

The data were analyzed with IBM SPSS version 20.0. Comparisons between the Hispanic and non-Hispanic groups with epilepsy were made in terms of total charges, procedure codes, length of stay, insurance status, and setting of care using independent sample t-tests for continuous variables, and the Pearson chi-square test for comparing frequencies. Differences were considered significant at the $P \leq 0.05$ level.

Table 1
Patient demographics.

	Hispanic	Non-Hispanic	Total
Total patients	66,663	69,157	135,820
Patients with epilepsy	960 (1.44%)	1282 (1.85%)	2242
Mean age without epilepsy (years)	28 (+/−22)	47 (+/−26)	135,820
Mean age with epilepsy (years)	28 (+/−24)	48 (+/−26)	2242
Male	520 (44.9%)	639 (55.1%)	1159 (51.7%)
Female	440 (40.6%)	643 (59.4%)	1083 (48.3%)
With insurance	869 (90.5%)	1121 (95.2%)	2090 (93.2%)

We also conducted a multiple regression analysis with total charges as the dependent variable and ethnicity (Hispanic/non-Hispanic); length of stay; number of procedures performed; number of comorbid diagnoses; and insurance status — public (yes/no), private (yes/no), and self-pay or no insurance (yes/no) as predictors.

3. Results

3.1. Patient demographics

Across all 4 years from January 2005 to June 2008, a total of 960 Hispanic patients with epilepsy and 1282 non-Hispanic patients with epilepsy utilized YRMC facilities. Hispanics represented about half (51.9%) of the number of visits, while the non-Hispanic group represented the other half (48.1%). The average age of Hispanic patients was significantly younger than that of non-Hispanic patients; Hispanic patients with epilepsy were also significantly younger than non-Hispanic patients with epilepsy (Table 1).

3.2. Total charges

The mean total charge for each visit was significantly less for Hispanics than for non-Hispanics with epilepsy. However, on further analysis, this difference was significant only in adults aged 18–64 but not in children or seniors. Furthermore, when the adults were examined in smaller age groups to account for possibly skewed ages, the difference was significant in the 18- to 49-year group but not significant among those between 50 and 64 years. Those not in the group with epilepsy did not show significant charge differences when stratified by age, except for the 65 and over seniors where the Hispanic patients had higher charges compared with non-Hispanic patients (Table 2).

3.3. Insurance status

Among those with epilepsy, proportionately more young Hispanic adults (age: 18–33) had private insurance compared with their non-Hispanic cohort. Fewer young Hispanic adults in the group with

Table 2
Mean total charges in $ US.

	Hispanic	Non-Hispanic	Significance
Seizure/epilepsy			
Age 0–17	1605.40	1662.80	NS
Age 18–33	2285.52	3660.98	$P < 0.001$
Age 34–49	4979.16	6406.15	$P < 0.027$
Age 50–64	8624.43	10573.02	NS
Age 65+	10825.81	10386.80	NS
Age 18–64	3279.91	6846.40	$P < 0.001$
Age 18–49	3167.63	5154.36	$P < 0.001$
Without seizure/epilepsy			
Age 0–17	1810.00	1837.18	NS
Age 18–33	2869.16	2824.67	NS
Age 34–49	3006.87	3033.08	NS
Age 50–64	4124.87	4005.40	NS
Age 65+	6089.02	5677.51	$P < 0.001$

All ages in years. Mean in $. NS: not significant.