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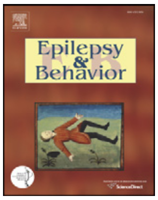

Outpatient education reduces emergency room use by patients with epilepsy

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ABSTRACT

Epilepsy is a costly diagnosis, with emergency room (ER) visits and hospital admissions comprising a large portion of total direct cost. An educational intervention to decrease the number of ER visits was implemented on outpatients with epilepsy, using educational handouts and DVD. The number of ER visits declined significantly in the four months following intervention compared with the preceding four months. This finding supports patient education as a valuable tool to reduce ER use, which may, in turn, cut down on health-care cost.

1. Introduction

Epilepsy is the fourth most common neurological disorder in the United States, affecting 2.2 million people. One in 26 people will develop epilepsy at some point in their lifetime. The annual medical direct cost of epilepsy in the United States ranges from $9.6 billion to $12.5 billion. This excludes indirect cost from losses in quality of life and productivity [1]. A population-based study in 1995 showed that ER visits and hospital admissions comprised 26% of epilepsy direct costs, and the annual cost of ER visits was estimated to be $72,696 [2]. Using data from the 1993 to 2003 National Hospital Ambulatory Medical Care Survey, we estimated that seizure accounts for one million ER visits annually or 1% of all ER visits in the United States. These data did not include federal, military, and Veterans Affairs hospitals. Hospital admission was the endpoint of 23% of seizure-related ER visits compared with 13% of nonseizure visits [3].

Among patients with epilepsy, factors associated with increased use of ER service are increased seizure frequency, reduced medication, suboptimal self-management, increased anxiety, increased depression, increased felt stigma, and lower social and medical epilepsy knowledge [4]. Patients with poorer scores on Quality of Life in Epilepsy Inventory—10 and more frequent seizures have more ER visits and inpatient admissions compared with those with opposite traits [5]. Socioeconomic factors also play a role in ER use, with lower socioeconomic status correlated with increased ER use. Uninsured patients with epilepsy are more likely to use the ER for treatment of their seizures [1]. Intervention with the goal of minimizing these different factors may reduce ER visits.

A systematic review of interventions to reduce ER use related to various illnesses has shown that education has the greatest effect [6]. Sufficient patient education on epilepsy and self-management may be the first step. Couldridge et al. have identified specific, needed information for patients with epilepsy, their families, and caretakers. This includes, but is not limited to, epilepsy knowledge, medication and side effects, seizure control, injury prevention, psychological and social issues [7].

Few studies have looked at ways to reduce ER use by patients with epilepsy. One nurse-led self-management intervention was conducted to optimize patient's self-management skills and knowledge of appropriate ER use. Interestingly, this intervention did not reduce ER use. Its authors suggested that too short duration of educational sessions may not be sufficient to change self-management skills [8]. A case series with four pediatric patients with epilepsy showed that a care management checklist could decrease ER visits and/or unplanned hospitalizations [9].

2. Purpose of study

The objective of our study was to assess whether educating clinic patients on epilepsy self-management and seizure first aid would reduce

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Abbreviations: ER, emergency room; AED, antiepileptic drug; DVD, digital video disc; FDA, Food and Drug Administration; EMS, emergency medical service; QI, quality improvement.

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ER visits related to their epilepsy in the four months following education. Self-management includes proper antiepileptic drug (AED) use and compliance, awareness of potential AED side effects, awareness of common seizure triggers and harmful lifestyles and ways to avoid these, and compliance with clinic follow-up appointments.

3. Materials and methods

3.1. Study design

This study was a quality improvement (QI) project; thus, it was exempted from IRB approval. Participating medical students were required to present our QI project data for a maximum of eight months, as part of their curriculum. Patient population was from the adult neurology clinic of a tertiary medical center with a major regional referral base. Participants had to have an established epilepsy diagnosis but without concurrent nonepileptic spells. New referrals and follow-up patients received a one-page questionnaire during clinic visits from August to November 2013. The questionnaire (Supplement 1) asked to provide the number of and reason for ER visits related to their epilepsy over the previous year and to comment on measures that could have prevented their ER visit. The three-item questionnaire had a Flesch–Kincaid level of grade 5.2. One of the three adult epileptologists reviewed the questionnaire during the clinic encounter and initiated education. They discussed the main points of our project, highlighting seizure first aid and the proper use of ER service, specifically when to seek and not seek emergency medical care. For patients with cognitive deficits, a caretaker and/or family member were present during the entire educational session. Following initial education by a physician, a clinic nurse provided more in-depth education using handouts and an optional Epilepsy Foundation DVD. Participants were told that three medical students would conduct a telephone follow-up for four months to collect posteducation information on further ER visits related to epilepsy and the reason for visits. Each medical student was assigned specific participants to follow and was instructed to ask similar questions from the questionnaire. Follow-up data were documented on the second page of the questionnaire. The questionnaires were routinely reviewed every month by the medical students and primary investigator to monitor completion and potential problems with data collection. Medical students created an Excel file of these data, which was routinely submitted to the primary investigator. A master Excel file of all available data was created by the primary investigator. Data on ER visits for those who could not be reached through telephone were gathered from their electronic medical record.

3.2. Handouts and DVD

Handouts were on general epilepsy care plan; a list of available FDA-approved AEDs, their common side effects and drug interactions, as well as a list of herbal supplements that may provoke seizures; common seizure triggers and harmful lifestyles and ways to avoid these; medication and transportation assistance programs and available local income-based clinics; seizure first aid for complex partial seizures and for convulsions; and when to call and to not call 911. Guidance on seizure first aid was based on Epilepsy Foundation's recommendations [10]. A copy of the handout on seizure first aid and decision-making process for calling 911 is included in the Supplementary materials (Supplement 2). General epilepsy care plan emphasized optimization of self-management. In addition, the care plan provided an expected telephone response when patients or caretakers called the clinic for a possible emergency situation. The optional DVD, entitled *Understanding and Assisting People with Epilepsy*, was purchased from the Epilepsy Foundation online store [11]. The DVD was 14 min and 45 s in duration. Content is on general epilepsy education, including perspective of patients and medical providers on epilepsy diagnosis, epilepsy facts, description of different types of seizure, seizure triggers, seizure first aid, and when to call and to not call 911.

3.3. Data analysis

Most patients who visited the ER did so only once during either the preeducation or the posteducation period. Therefore, instead of analyzing the number of ER visits, we treated ER visitation as dichotomous (no visits versus any visits) and used McNemar tests to compare each patient's ER visitation before and after education.

We used Fisher's exact tests and permutation tests to explore whether groups of patients, for example, groups defined by DVD viewership, differed before or after education in the number of ER visits.

4. Results

4.1. Background of participants

Ninety clinic patients participated in this project and received education. There were 48 males and 42 females. Their ages ranged from 15 to 82 years. All had an established diagnosis of epilepsy and without concurrent nonepileptic spells. Twenty (22.2%) were new referral patients, while 70 (77.7%) were follow-up patients. Forty-eight (53.3%) had intractable epilepsy, while the rest (46.7%) had controlled epilepsy. Eighty-nine (98.9%) had medical insurance coverage with private or commercial insurance, Medicare, and/or Medicaid. Of them, 37 (41.1%) had Medicare with or without Medicaid, while seven (7.8%) had Medicaid only. Only one participant (1.1%) lacked medical insurance.

4.2. Educational materials

All 90 participants received and reviewed educational handouts during their clinic encounters. Each doctor spent no more than 5 min for each participant, without interfering with the allotted clinic visit time. A clinic nurse spent no longer than 15 min on reviewing handouts with each participant. All 90 participants were willing to have one-to-one education by their doctor and then nurse, but not all were willing to take time to watch the DVD. Excluding DVD viewing (14 min and 45 s), a participant spent no more than 20 min receiving education. Fifty participants (55.6%) watched the DVD (see Table 1).

Emergency room visits were significantly less frequent following education ($p < 0.0001$ according to McNemar statistics) among those who received only the handout and also among those who also viewed the DVD.

Digital video disc was watched either by the patient alone (17.8%), by the patient with family or caretaker present (36.7%), or by the caretaker only (1.1%). Four patient groups, defined in Table 2, did not differ in the number of ER visits either before education ($p = 0.77$) or after education ($p = 1.0$). This finding suggests that the change in the number of posteducation ER visits did not differ between those who viewed the DVD and those who did not.

Table 1
Number of patients who report 0, 1, or 2 ER visits before and after education, categorized by whether they viewed DVD in addition to handouts.

Number of ER visits	Before education (n = 90)			After education (n = 90)		
	0	1	2	0	1	2
DVD viewed	37	10	3	50	0	0
DVD not viewed	31	6	3	40	0	0
Total	68	16	6	90	0	0