

Drug Utilization Study of Anti-Epileptic Drugs in Pediatric Population at Tertiary Care Hospital

Keshav Bansal¹, Dhaval Bhatt², Viswanadhula S L V Bhargav³, Pranav PUNASANVALA⁴

¹PG Resident, Department of Pediatrics, Government Medical College, Kota, Rajasthan

²Assistant Professor, Department of Pediatrics, Government Medical College, Bhavnagar, Gujarat

³PG Resident, Department of Pediatrics, Government Medical College, Bhavnagar, Gujarat

⁴Associate Professor, Department of Pediatrics, Government Medical College, Bhavnagar, Gujarat

Received: 18-07-2022 / Revised: 05-08-2022 / Accepted: 29-08-2022

Corresponding author: Dr Pranav PUNASANVALA

Conflict of interest: Nil

Abstract

Background: Epilepsy is a chronic neurological disorder that requires therapy over prolonged period of time to keep patient seizure free. Although patients respond with Monotherapy, refractory epileptic patients require Polytherapy. Drug utilization studies provide insight to rational drug prescribing.

Aim and Objective: To study prescription and drug utilization pattern of antiepileptic drugs in pediatric patients with epilepsy in a tertiary care hospital.

Materials and Methods: It is a retrospective study based on data collected from medical records and prescriptions of all epileptic pediatric patients. The data were collected in study pro forma and analyzed.

Results: Total of 162 patient's details was collected retrospectively from the hospital outpatient department and inpatient department. In the present study, out of 162 patients, 102 (62.96%) patients were under 6 years of age (46 males and 56 females) and 60 (37.03%) patients were above 6 years of age (22 males and 38 females). Among all the patients, the most common type of epilepsy diagnosed in all the age groups was generalized tonic-clonic seizure (GTCS) contributing to 69.13%. The present study data of 162 patients' revealed that the majority of the patients were receiving monotherapy with various drugs contributing it to 61.11%. About 38.88% of our study patients received polytherapy. Sodium Valproate (38.27%) was the most commonly prescribed drug as monotherapy and levetiracetam + sodium valproate (29.62%) for polytherapy.

Conclusion: Our study on drug utilization in pediatric epilepsy in a tertiary care hospital showed that the higher incidence of epilepsy is noted in females. GTCS was the most common type of epilepsy diagnosed and majority of the patients were prescribed with monotherapy with both conventional and newer antiepileptic drugs. Sodium Valproate was the most commonly prescribed drug as monotherapy and Levetiracetam and Sodium Valproate combination was most commonly used in polytherapy.

Keywords: Anti-epileptic drugs, Seizures, Prescription pattern, Pediatrics

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Introduction

The World Health Organization (WHO) defines drug utilization research as “the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social, and economic consequences” [1]. Thus, inherent in the definition, such studies provide logical background for determining the rationality of drug use as well as providing evidence-based guidance for making policy decisions at various levels of healthcare. Drug utilization research studies conducted in the inpatient settings are effective tools that help in evaluating the drug prescribing trends, efficiency, and cost effectiveness of hospital formularies. There is always a variation in drug utilization among different countries and even among health institutions within a country and sometimes within the same institute at different point of time probably because of changing disease trends over a period of time [2].

A seizure is a transient occurrence of signs and/or symptoms resulting from abnormal excessive or synchronous neuronal activity in the brain. The International Classification of Epileptic Seizures divides epileptic seizures into 2 large categories: In focal (partial) seizures, the first clinical and electroencephalographic (EEG) changes suggest initial activation of a system of neurons limited to part of one cerebral hemisphere; in generalized seizures, the first clinical and EEG changes indicate synchronous involvement of all of both hemispheres.

Approximately 30% of patients who have a first afebrile seizure have later epilepsy; the risk is about 20% if neurologic exam, EEG, and neuroimaging are normal. Febrile seizures are a special category. Acute symptomatic seizures occur secondary to an acute problem affecting brain excitability such as electrolyte imbalance or meningitis. Most children with these types of seizures do well, but sometimes such seizures signify major structural, inflammatory, or metabolic

disorders of the brain, such as meningitis, encephalitis, acute stroke, or brain tumor; the prognosis depends on the underlying disorder, including its reversibility or treatability and the likelihood of developing epilepsy from it. Unprovoked seizure is not an acute symptomatic seizure. Remote symptomatic seizure is thought to be secondary to a distant brain injury such as an old stroke [3].

Epilepsy is a disorder of the brain characterized by an enduring predisposition to generate seizures and by the neurobiologic, cognitive, psychological, and social consequences of this condition. The clinical diagnosis of epilepsy usually requires the occurrence of at least 1 unprovoked epileptic seizure with either a second such seizure or enough EEG and clinical information to convincingly demonstrate an enduring predisposition to develop recurrences. For epidemiologic purposes epilepsy is considered to be present when ≥ 2 unprovoked seizures occur in a time frame of >24 hr.

Approximately 4-10% of children experience at least 1 seizure in the first 16 yr of life. The cumulative lifetime incidence of epilepsy is 3% and more than half of the cases start in childhood. The annual prevalence is 0.5-1%. Thus, the occurrence of a single seizure or of febrile seizures does not necessarily imply the diagnosis of epilepsy. Seizure disorder is a general term that is usually used to include any one of several disorders including epilepsy, febrile seizures, and possibly single seizures and seizures secondary to metabolic, infectious, or other etiologies (e.g., hypocalcemia, meningitis) [4].

An epileptic syndrome is a disorder that manifests one or more specific seizure types and has a specific age of onset and a specific prognosis. Several types of epileptic syndromes can be distinguished. This classification has to be distinguished from the classification of epileptic seizures that refers to single events rather than to

clinical syndromes. In general, seizure type is the primary determinant of the type of medications the patient is likely to respond to, and the epilepsy syndrome determines the type of prognosis one could expect.

An epileptic encephalopathy is an epilepsy syndrome in which the severe EEG abnormality is thought to result in cognitive and other impairments in the patient. Idiopathic epilepsy is an epilepsy syndrome that is genetic or presumed genetic and in which there is no underlying disorder affecting development or other neurologic function (e.g., petit mal epilepsy).

Symptomatic epilepsy is an epilepsy syndrome caused by an underlying brain disorder (e.g., epilepsy secondary to tuberous sclerosis). Cryptogenic epilepsy (also termed presumed symptomatic epilepsy) is an epilepsy syndrome in which there is a presumed underlying brain disorder causing the epilepsy and affecting neurologic function, but the underlying disorder is not known [4].

Materials and Methods

It is a retrospective study based on data collected from medical records and prescriptions of all epileptic pediatric patients. The data were collected in study pro forma and analyzed. Study pro forma included basic demographic details of patient, diagnosis, and detailed clinical and treatment history including number of drugs prescribed, dosage form, and frequency.

Statistical Analysis

The data were analyzed using SPSS software.

Results

The data were collected and analyzed from the medical records. Total of 162 patient's details were collected retrospectively from the hospital outpatient department and inpatient department.

Socio-demographic Details

In the present study, out of 162 patients, 102 (62.96%) patients were under 6 years of age (46 males and 56 females) and 60 (37.03%) patients were above 6 years of age (22 males and 38 females). [Table 1]

Table 1: Socio-demographic details

Age	Males	Females	Total
<6 years	46	56	102
>6 years to 12 Years	22	33	60
Total	68	94	162

Types of Epilepsy

Among all the patients, the most common type of epilepsy diagnosed in all the age groups was generalized tonic-clonic seizure (GTCS) contributing to 69.13%, 10.49% as complex partial seizure, 5.55% as simple partial seizure, 12.34% as secondary seizure due to trauma and infections. [Table 2]

Table 2: Types of Seizure

Type of Seizure	Total Number (n=162)	Percentage (%)
Generalized tonic clonic seizures (GTCS)	112	69.19%
Complex partial seizures	17	10.49%
Simple partial seizures	9	5.55%
Secondary seizures to trauma and infections	20	12.34%
Other types	4	2.46%

Commonly Prescribed Drugs

The most commonly prescribed drugs with all the age groups are Levetiracetam, Sodium Valproate, Phenytoin, and Oxcarbamazepine.

Comparison of Monotherapy and Polytherapy

The present study data of 162 patients's revealed that the majority of the patients were receiving monotherapy with various drugs contributing it to 61.11%. About 38.88% of our study patients received polytherapy with two or more drugs. [Table 3]

Table 3: Monotherapy versus Polytherapy

Drug	Total Number (n=162)	Percentage (%)
Monotherapy	99	61.11%
Polytherapy	63	38.88%

Sodium Valproate (38.27%) was the most commonly prescribed drug as monotherapy, followed by levetiracetam (16.06%), phenytoin (3.70%) and oxcarbamazepine (3.08%). The drugs prescribed for polytherapy are levetiracetam + sodium valproate (29.62%), sodium valproate + oxcarbamazepine (3.70%), or levetiracetam + oxcarbamazepine (3.08%). [Table 4 and 5]

Table 4: Monotherapy

Drug	Total Number	Percentage (%)
Levetiracetam	26	16.06%
Sodium Valproate	62	38.27%
Oxcarbamazepine	5	3.08%
Phenytoin	6	3.70%

Table 5: Polytherapy

Drug	Total Number	Percentage (%)
Levetiracetam + Sodium Valproate	48	29.62%
Sodium Valproate + Oxcarbamazepine	6	3.70%
Levetiracetam + Oxcarbamazepine	5	3.08%
Other combinations	4	2.46%

Discussion

In the present study, the demographic data showed that female patients were most affected with epilepsy compared to males and it was opposite to the study done by Kuriakose *et al* [5]. Most children were less than 6 years of age.

GTCS (69.13%) was most commonly diagnosed in both sexes, followed by secondary seizure to trauma and infections (12.34%), complex partial seizures (10.49%), simple partial seizure (5.55%), which is comparable to the other study conducted by Pathak *et al* [6].

The approach to the epilepsy treatment is to make the patient seizure free, or to reduce the rate of recurrence and severity

of the episodes. In our study, the conventional drugs such as sodium valproate, phenytoin, and oxcarbamazepine along with newer anti epileptic's such as levetiracetam found to be prescribed. In the current study, 61.11% of patients were receiving monotherapy which was very similar to the study conducted by Rishe *et al*, which revealed 78.6% patients received mono-therapy and from another study carried out by Lim *et al*, found that 62.7% patients were kept on mono-therapy [7,8]. The majority of the patients have been prescribed with monotherapy as to minimize the risk of adverse drug reactions, drug interactions, dose related toxicity, compliance of the

patients, and to avoid economic burden [9].

Sodium Valproate (38.27%) constituted as most commonly prescribed drug as monotherapy, followed by Levetiracetam (16.06%), and oxcarbamazepine (3.08%) which is similar to the study done by Lekshmi *et al* [10]. Polytherapy prescriptions have few drawbacks such as risk of adverse drug reactions, noncompliance of the patients to the drugs, in some the quality of life will also be affected but it is unavoidable in certain group of patients who are not responding well to monotherapy [11]. Levetiracetam and sodium valproate (29.62%) were most commonly prescribed drugs for polytherapy, followed by other combinations as shown in table 5.

Conclusion

The present study on drug utilization in pediatric epilepsy in a tertiary care hospital showed that the higher incidence of epilepsy is noted in females. GTCS was the most common type of epilepsy diagnosed and majority of the patients were prescribed with monotherapy with both conventional and newer antiepileptic drugs. Sodium Valproate was the most commonly prescribed drug as monotherapy and Levetiracetam and Sodium Valproate combination was most commonly used in polytherapy.

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