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## Review on a prospective study on drug use pattern in pediatric seizures

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### Abstract

**Objectives:** The objective of this study is to evaluate the drug utilization pattern and to observe possible treatment outcomes. **Methods:** A Non-experimental prospective observational study has been carried out in tertiary care hospital for a period of six months. A total number of 181 paediatric inpatients of age 1- 14 years with seizures were included and evaluated. The patient case history was collected based on data collection form designed for the study. **RESULTS:** In our study we observed that female patients are more prevalent. Prevalence of seizures is high among age group 1-5years and low among 11-14 years. Tonic-clonic (51.3%) type of seizures was commonly observed, followed by febrile seizures (19%). Phenytoin is the mostly prescribed drug followed by sodium valproate. Monotherapy is observed mostly. Outcome of the therapy is measured by seizure free period, among which seizure free observed are more 74.1%. The incidence of ADRs in the study group is less (6.6%) and phenytoin is the drug with more number of ADRs. Medication adherence is measured in known epileptic patients (n=67) using MMAS, medium adherence seems to be more (49%). **Conclusion:** This study strongly highlights that the, Clinical pharmacist has a pivot role in conducting drug utilization studies that helps in comparing the ongoing regimen with the standard treatment guidelines so as to promote the stupendousity of rational use of drugs and to minimize or control the incidence of ADRs.

**Keywords:** Drug utilization, seizure, anti-epileptics, Morisky's scale.

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### Introduction

Epilepsy is the most common neurological disorder observed in paediatrics which has to be diagnosed to choose a proper antiepileptic and has to be used for appropriate duration with proper monitoring as they are potential [1,2]. Untreated paediatric epilepsy may result in MR and deaths and hence the cause of epilepsy and type of epilepsy and AED for it has to be properly selected for better outcome [3,4]. There are many AED's available now in market and are broadly categorized as conventional AED's and newer AED's [2]. Based on risk

to benefit ratio and economic status of a country, type of seizure AED's are selected, also as they have many side effects due to their potential action and however children are at risk, dosing, frequency, duration are to be properly opted [2,3,4]. Phenytoin and valproate are most frequently selected AED's in India. Adherence play a major role for a beneficial outcome, hence it has to be monitored. For better adherence, cost effective therapy and to minimize drug interaction and side effects mono therapy is to be chosen [4, 5]. This is a prospective study on drug utilization pattern and outcomes of AEDs in paediatric seizures in a tertiary care hospital. Drug utilization pattern, can increase understanding the rational drug use in paediatric seizures and its outcomes [6,7,8].

**Materials and Method**

**Study Material**

A Non-experimental prospective observational study has been carried out in tertiary care hospital for a period of six months. The study material consists of data collection form approved by ethical committee of the institution, and strict confidentiality was assured for all collected data.

**Data Collection and analysis**

The data is retrieved from the prescription and the patient’s medical records by explaining the study protocol and receiving an informed consent from the patients care taker. It includes the details like patient demographics (age and gender), type and aetiology of seizures, past medical and medication history, Co-morbidities. Detailed history was taken regarding the time and duration of attack, symptoms and factors which may trigger seizures, total number of seizure episodes, AED data (i.e. type of prescription and dosage regimen), tests performed, ADR data, medication adherence data and admission status (admitted because of epileptic seizures, ADR related to AED or other reason). The epileptic seizures were classified according to the International Classification Of Epileptic Seizures and possible aetiologies were documented. Apart from the classification (International Classification Of Epileptic Seizures) refractory seizers were also included. The patients were assessed for medication adherence behaviour by using Morisky’s medication adherence scale. All patients included in the study are followed up in OP reviews/ through phone calls, at least twice during the study period for outcome (seizure free period, ADR). From the data, results were drawn using suitable statistical methods.

**Inclusion Criteria**

The study population was limited to:

- Age group: 1-14 years.
- In patients with seizures of both sexes, who are prescribed with anti epileptic drug during their hospital stay.
- Patients who are willing to co-operate.

**Exclusion Criteria**

- Old cases of seizures who are attending to Outpatient department.
- Patients who are not willing to participate in the study.

**Results**

Total numbers of patients admitted with seizures from 1st June 2022 to Nov 2022 were 181.

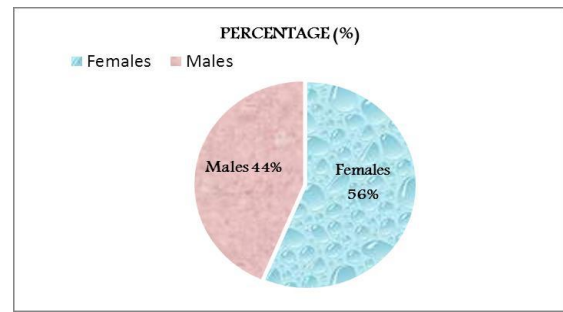


Chart.1: Gender Wise Distribution of Study Population  
Out of 181 cases, 79 cases (44%) were males, 102 cases (56%) were females. Females were found to be in high number compared with males.

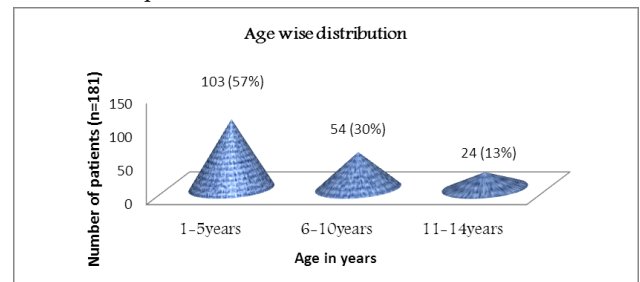


Chart.2: Age Wise Distribution of Study Population  
The highest incidence of seizures was found in the age group 1-5 years and least in the age group 11-14 years, Based on “age wise distribution”, 1-5 years were found to be 103 (57%), 6-10 years were 54 (30%), 11-14 years were 24 (13%).

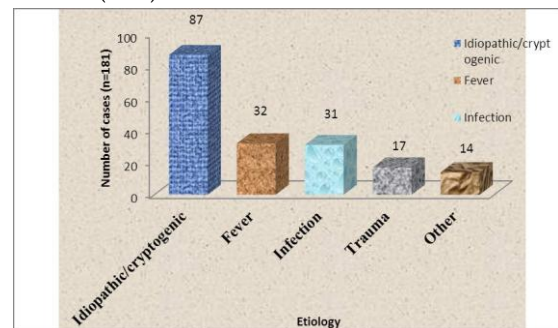


Chart. 3 Various Etiologies Observed  
From this chart it is evident that the most common aetiology observed is idiopathic/cryptogenic cause followed by fever.

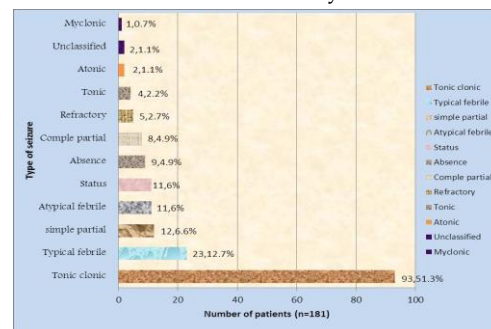


Chart. 4 distribution of study population based on the type of seizure

From this chart it is evident that tonic clonic seizures are the most commonly seen seizure type in children followed by febrile seizures and rarely seen is myoclonic seizures.

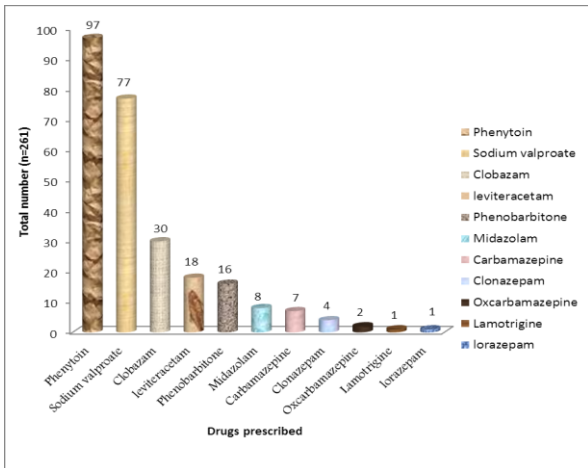


Chart.5 Anti-Epileptic Drug Distribution

From this chart it was found that phenytoin, sodium valproate and clobazam were commonly prescribed AED's in children. The least prescribed drug is lamotrigine and lorazepam. Irrespective of type of seizure, Diazepam is commonly prescribed drug for the emergency management of seizures.

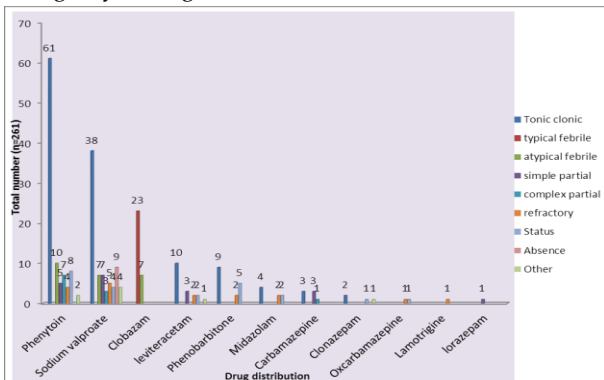


Chart.6 Distribution of Drugs In Relation To Seizure Type

From this chart it is found that, for tonic-clonic seizures, phenytoin is commonly prescribed followed by sodium valproate, leviteracetam, and phenobarbitone is given alone or in combination with other drugs. For typical febrile seizures the only drug prescribed is clobazam. For simple partial seizures valproate is the most commonly prescribed AED and for complex phenytoin is commonly prescribed. For refractory seizures multiple drug regimen is preferred among which the broad spectrum AED valproate followed by phenytoin are most common.

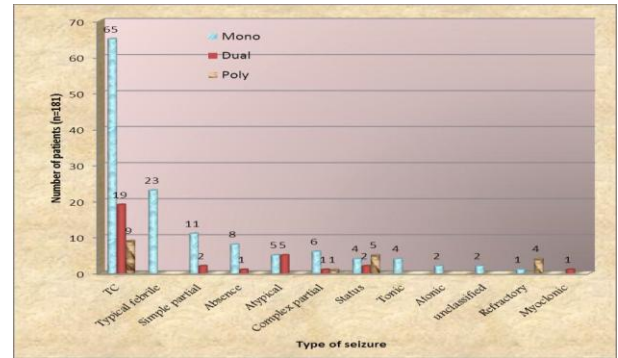


Chart.7 Choice of Therapy for Different Types of Seizure From this table it was found that out of 181 patients, 131 (72%) were on monotherapy and 50 (28%) were on Combination therapy of which 31 (17%) were on dual therapy, 19 (11%) were on polytherapy (>2 AED's). It was found that monotherapy is commonly preferred for Tonic clonic seizures 65 (69%) followed by febrile seizures. Combination therapy was preferred commonly for tonic clonic seizures followed by Status epilepticus.

Table. 1 Change in Drug Therapy

Initial drug	Changed to Drug	Total number of patients (n= 16)
Phenytoin	Sodium valproate	11
Carbamazepine	Sodium valproate	3
Carbamazepine, Phenytoin	Sodium valproate	2

Of 16 patients in whom the drug therapy has been changed, the Sodium valproate has been the drug of choice irrespective of the prior therapy (Phenytoin, Carbamazepine). The broad spectrum AED, Sodium valproate has been selected as it was found to be more efficacious than other drugs that are given to achieve required therapeutic outcome.

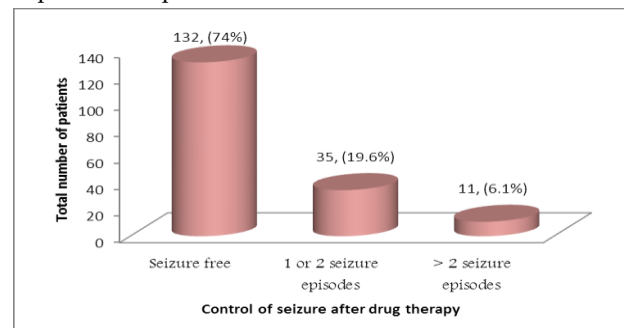


Chart.8 Efficacy Of Drug Therapy

Among the 181 in-patients who have come for follow up to Paediatric OP are considered as the study of interest among which 3 were found to be dead because of other co-morbid conditions and in the remaining 178 patients-

- ⊙ patients with Seizure free period- 132 (74.14%)
- ⊙ patients with 12 seizure episodes of seizures - 35 (19.66%)
- ⊙ patients with >2 seizure episodes seizures 11 (6.17%)

### OBSERVED ADVERSE DRUG REACTION

The incidence of ADRs in the considered study group is less (i.e, 6.6%) and is observed only in 12 patients. A combination of ADRs were also observed in few patients (5 patients developed 3 ADRs each and 2 patients developed 2 ADRs each). ADRs due to Phenytoin were observed in greater number of patients i.e. 6 (Ataxia, lethargy, Gum hypertrophy, Rash, leukopenia, Reactive lymphadenopathy) of which one has developed Phenytoin toxicity. ADRs due to Sodium valproate were observed in 5 patients (Jaundice, rash, haematological-related ADR thrombocytopenia). Carbamazepine induced hepatotoxicity was experienced by one patient. As the ADRs incidence is low with the regimen given the required outcome has not been altered.

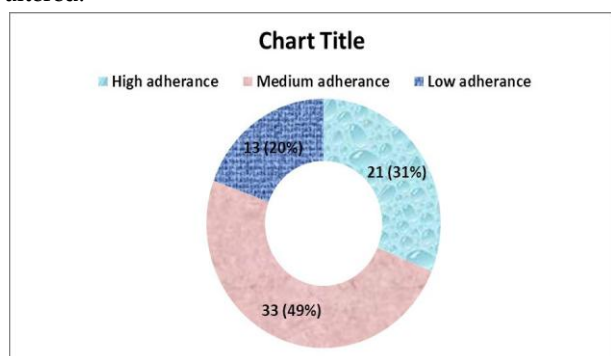


Chart. 9 Medication Adherence

Majority (49%) of patients with a history of seizures were seen profoundly in the category of medium adherence zone which can be made better by educating them regarding the importance of adherence. Of the remaining 31% of patients fall into the High adherence zone and 20% into low adherence zone.

### Discussion

There are 181 people altogether in this non-experimental prospective observational study that was done over a 6-month period between June 1 and November 1, 2022, with more female subjects than male ones. Numerous studies have identified a sizable difference in gender variation, although the cause of this is not well understood. According to several additional research, the prevalence of seizures is shown to be highest in children aged 1 to 5 and lowest in those aged 11 to 14.

Tonic-clonic seizures were the most common kind (51.3%), followed by typical febrile seizures (12.7%). Guidelines and other research indicate that tonic-clonic seizures are the most typical kind. According to aetiology, fever, infection, trauma, and other causes follow idiopathic/cryptogenic causes in terms of frequency of instances, however this varies from research to study.

In contrast to other south Indian studies, where it was underused despite being less expensive, phenytoin was the most often recommended medication in our research. In certain research on the patterns of drug use carried out in India, phenytoin was also the medicine most commonly recommended. Phenytoin is the medicine that is most frequently recommended in India and other nations, followed by valproic acid.

Numerous studies have shown that 72% of patients get monotherapy, while 28% of patients receive combination therapy, with dual therapy accounting for 17% of patients and polytherapy for 11%. A single treatment strategy is preferred, according to some research, because polytherapy exposes patients to unneeded risks such drug allergies, drug interactions, noncompliance, and financial strain. Sodium valproate has been the medicine of choice for 16 individuals whose drug therapy has changed, regardless of their prior therapy (Phenytoin, Carbamazepine). Since it was shown to be more effective than other AEDs provided to accomplish the desired therapeutic goal, sodium valproate has been chosen. Seizure free duration, which is evaluated by follow-up in OPD and by contacting them via phone calls, is used to gauge the effectiveness of the therapy. Of those observed, 74.1% are seizure free, 19.66 are observed with 1-2 occurrences of seizures, and 6.1% are observed with more than 2 episodes.

Only 12 patients (6.6%) in the study group under consideration experienced adverse medication reactions, which is lower than the rate recorded in other research. Phenytoin and sodium valproate were the drugs most frequently associated with adverse drug reactions. Ataxia, lethargy, reactive lymphadenopathy, rash, jaundice, and hepatotoxicity are some of the ADRs that have been reported. Using Morisky's medication adherence scale (MMAS), medication adherence is assessed in 67 known epileptic patients, of whom 31% have good adherence to their medications, 49% have medium adherence, and 13% have low adherence. Here, patients with moderate adherence appear to be more prevalent, and the cause of this was shown to be poor

socioeconomic level and a lack of knowledge on the importance of compliance.

### Conclusion

In this study, we found a significant prevalence of seizures in children aged 1 to 5 years, with tonic-clonic seizures being the most common kind. In this tertiary care hospital, phenytoin is a commonly used and prescribed medicine, and it is also the cause of the majority of adverse drug reactions (ADRs), followed by valproic acid. ADRs are seldom ever seen. Since monotherapy is often observed, effective, and has strong compliance, it is favoured and advised. Regardless of the therapeutic type, such as monotherapy or combination therapy, monitoring is necessary to stop ADRs. When the prescription anti-epileptic does not produce the intended results in certain individuals, sodium valproate, a broad-spectrum anti-epileptic, is substituted and is successful.

The Morisky medication adherence scale reveals that individuals with moderate adherence are more prevalent. After extensive follow-ups, it was discovered that patients with seizure-free status outnumbered those with 1-2 episodes and more than 2 episodes of seizures. As a result, the therapy was determined to be successful. The effectiveness of the treatment was determined to be due to the explanation and counselling of the significance of drug adherence. Clinical pharmacists play a key role in performing medication usage studies that assist in comparing the current treatment plan with the recommended course of action in order to encourage the optimal judicious use of pharmaceuticals and to reduce or decrease the incidence of adverse drug reactions (ADRs). Long-term research can strengthen the validity of the study.

### References

1. Harrison, PRINCIPLES OF INTERNAL MEDICINE(17th edition): Chapter 363: Seizures and Epilepsy; Daniel H. Lowenstein; McGraw Hill Companies, New York, Chicago, London, et al, 2008; (Volume-2): 2498-2510.
2. Joseph T. Dipiro, Pharmacotherapy-A pathophysiological approach (7th edition): Chapter 58: Epilepsy; SUSAN J. ROGERS; McGraw Hill, 2008; 927-951.
3. Dr. Neetha nayak, Guidelines for diagnosis and management of childhood epilepsy; IAP expert committee guidelines, 681-686, Vol 4.

4. Miinal Kanthi Roy et. al, Indian guidelines on epilepsy; IAP expert committee guidelines, Chapter, 116, pg, 528-532.
5. Morisky DE, Green LW, Levine DM. —Concurrent and predictive validity of a self-reported measure of medication adherence. *Med Care.*, 1986 Jan; 24(1): 67-74.
6. G.Parthasarathi, Karin Nyfort- Hansen, Milap C Nahata, A Text book of Clinical Pharmacy Practice essential concepts and skills: Drug Utilization Review/Evaluation. Orient Longman private limited, 2004; 362-374.
7. Navarro, Robert; Academy of Managed Care pharmacy Chapter 8: Drug Utilization Review Strategies. In *Managed Care Pharmacy Practice*, published, 2008; 215 – 229.
8. Shiv Chandra Singh, A., Yu, A., Chang, B., Li, H., Rosenzweig, A. and Roh, J.D., 2021. Exercise Training Attenuates Activin Type II Receptor Signaling in the Aged Heart. *Circulation*, 144(Suppl\_1), pp.A14259-A14259.
9. Rusva A. Mistry et al, Drug utilization pattern of antiseizure drugs and their adverse effects in the pediatric population, in a tertiary care hospital attached to a medical college; *International Journal of Basic & Clinical Pharmacology*; 02 February 2014; 3(2).
10. Juny Sebastian et al. Assessment of antiepileptic drugs usage in a South Indian tertiary care teaching hospital; *Neurology Asia*, 2013; 18(2): 159 – 165.
11. Swetha Munoli et al, Antiepileptic Drugs Utilization Pattern & Their Adverse Drug Reactions In A Teaching Hospital In South India; *Asian Journal of Biochemical and Pharmaceutical Research*, 2013; 1(3).
12. Sachchidanand Pathak et al, Prescribing Patterns Of Anti-Epileptic Drug In Different Age Group In India; *Journal of Drug Discovery and Therapeutics*, 2013; 1(7): 69-75.
13. Sandeep A et.al, Study of Drug utilization and effectiveness and outcome of antiepileptics used in pediatric ward of Teritary care hospital in Tamil Nadu, India; *International Journal for Pharmaceutical for Research Scholars*, V-2, I-4, 2013.
14. Singh, A., Kumar, A. and Kalaiselvi, P., 2018. Aegeline, targets LOX1, the receptor for oxidized LDL to mitigate hypercholesterolemia: a new perspective in its

- anti-atherosclerotic action. *Free Radical Biology and Medicine*, 128, p.S41.
15. Mallik Angalakuditi et al, A descriptive analysis of drug treatment patterns and burden of illness for pediatric patients diagnosed with partial-onset seizures in the USA; *Pediatric Health, Medicine and Therapeutics*, 2011; 2: 75–84.
  16. ABHISEK PAL et al, Drug Utilization Pattern Of Antiepileptic Drugs: A Pharmacoepidemiologic And Pharmacovigilance Study In A Tertiary Teaching Hospital In India; *Asian Journal Of Pharmaceutical And Clinical Research*, 2011; 4-1.
  17. Singh, A., Gowtham, S., Chakrapani, L.N., Ashokkumar, S., Kumar, S.K., Prema, V., Bhavani, R.D., Mohan, T. and Sathyamoorthy, Y.K., 2018. Aegeline vs Statin in the treatment of Hypercholesterolemia: A comprehensive study in rat model of liver steatosis. *Functional Foods in Health and Disease*, 8(1), pp.1-16.
  18. Shobhana Mathur et al, Utilization pattern of antiepileptic drugs and their adverse effects, in a teaching hospital; *Asian Journal of Pharmaceutical and Clinical Research*, January-March 2010; 3(1).
  19. Hasan S S et al, Antiepileptic drug utilisation and seizure outcome among paediatric patients in a Malaysian public hospital, 2010; 51(1): 23.
  20. Singh, A., 2022. Hyperlipidemia in cardiovascular health and digestion. In *Nutrition and Functional Foods in Boosting Digestion, Metabolism and Immune Health* (pp. 141-150). Academic Press.
  21. Ivan Bielen et al, Age-Related Pattern of the Antiepileptic Drug Utilization in Active Epilepsy: A Population-Based Survey, July 10, 2008; 2: 659–663.
  22. Y. Hanssens et al, Drug utilization pattern of anti-epileptic drugs: a pharmacoepidemiologic study; *Journal of Clinical Pharmacy and Therapeutics*, 2002; 27: 357–364.
  23. S D Lhatoo et. al, The dynamics of drug treatment in epilepsy: an observational study in an unselected population based cohort with newly diagnosed epilepsy followed up prospectively over 11–14 years; *Neurol Neurosurg Psychiatry*, 2001; 71: 632–637.
  24. Shih- Hui Lim et.al, Pattern of antiepileptic drug usage in a tertiary referral hospital in Singapore, *Department of Neurology*, 1997; 2: 77-85.