

IMPACT OF BARRIERS TO MEDICATION ADHERENCE IN CHILDREN WITH EPILEPSY WITH AN EMPHASIS OF SEVERITY ASSESSMENT

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Abstract-

Background: Epilepsy is one of the common occurring diseases, the annual incidence rate of epilepsy in children aged 1–14 years was 70.4/100,000 children. Adherence to antiepileptic drugs is crucial in achieving seizure control, hence it is essential to rule out the barriers causing nonadherence; there is lack of information on adherence to antiepileptic drugs and the barriers that affect this among children.

Aim: To measure impact of barriers to medication adherence in children with epilepsy with an emphasis of severity assessment.

Methodology: The present study is a prospective cross-sectional study carried out for 6months of period (Nov 2021- May 2022) in 124 paediatric inpatients. Patients included in this study were children with age1-12years of both genders, children with history of seizures and are under the therapy with at least one antiepileptic drug in the last 1year. Data was collected from the structured data collection proforma, severity was assessed by using GASE scale and medication adherence and barriers were measured by PEMSQ scale.

Results: The incidence of Epilepsy in paediatric was found to be (46.69%) among this 124 paediatric satisfy the inclusion criteria. Among 124 paediatrics males (52.42%) were more compared to females (47.58%) and mostly in the age of 2-4 years (45.16%) the sociodemographic of patient caretaker was high in primary education (46.77%), from rural region (48.38%) with income of lower middle class (89.5%). GTCS type of seizures is mostly common (74.19%) and the commonly prescribed antiepileptic drug was sodium valproate. Severity was assessed and reveals that somewhat severe cases were more(50.80%). There was a significant difference shown between sociodemographic parameters and PEMSQ scale measured.

Conclusion: There was no significant difference in the assessment of Global assessment severity scale and PEMSQ score. There was proper adherence to antiepileptic medication in the study except for “I have transportation available to bring my child for follow up” children caregivers disagree the statement, for which the most commonly endorsed barrier was It is difficult to get from the pharmacy”. Hence there was insignificant impact on adherence to antiepileptic medication.

Keywords: Epilepsy, Medication adherence, Barriers, Antiepileptic drug

INTRODUCTION

Epilepsy is a group of disorders of the central nervous system which are characterized by cerebral dysrhythmia manifesting as brief episodes of seizures, loss of consciousness with or without characteristic body movements sensory or psychiatric phenomena. These episodes are unpredictable and frequencies are highly variable, epilepsy has focal origin in the brain, manifestation depends on the site of focus regions into the discharges spread and postictal depression of these regions ¹. As per a recent study, 70 million people have epilepsy worldwide and nearly 90% of them are found in developing regions. The study also estimated a median prevalence of 1.54% (0.48-4.96%) for rural and 1.03% (0.28-3.8%) for urban studies in developing countries. A person's experience during a seizure will depend on the affected brain area and how widely and quickly the electrical activity in the brain spreads from that initial area which includes partial, generalized, and secondary generalized seizures. The causes of epilepsy may be due to primary which has no obvious cause accounts for 60% of the population with epilepsy and secondary epilepsy which has particular cause due to prenatal or perinatal injuries, congenital anomalies etc.. Clinical manifestations like Vomiting, Unilateral deviation of eyes, Nausea, Pallor, Convulsive status epilepticus, Incontinence of urine and or faeces, Cyanosis, Mydriasis, Hypersalivation Visual hallucinations, Hemi facial spasms, Headache. The following diagnostic techniques can be useful to diagnose epilepsy. A detailed medical history obtained from the patient and family will describe the type of seizure, manifestations, cause, duration and previous and current treatments. EEG to determine the location and type of seizure. Magnetic Resonance Imaging (MRI) scan can detect any structural changes in the brain –Computerised Tomography.^{2,3,4,5}

MANAGEMENT:**NONPHARMACOTHERAPY:**

Surgical management ,Vagal nerve stimulation (VNS) ,Ketogenic diet ,Aerobic exercise Transcranial magnetic stimulation , Acupuncture

It is important to manage epilepsy due to its physiological, psychological and mortality due to status epilepticus or sudden unexplained death in epilepsy (SUDEP).

PHARMACOLOGICAL TREATMENT:

- The use of anti-epileptic drugs (AEDs) is the standard medical treatment for epilepsy and it is effective in controlling seizures in about two-thirds of people with epilepsy. According to the British National Formulary (BNF) (2017), drugs used to control epilepsy include Oxcarbazepine, primidone, clobazam, retigabine, phenytoin, topiramate, valporic acid, vigabatrin, carbamazepine, ethosuximide, phenobarbital, and levetiracetam.

- All drugs have shortcomings such as a narrow therapeutic index, adverse effects and drug interactions. Therapeutic combinations that is sometimes inevitable due to a lack of response to frontline therapeutic agents may increase the risk of adverse effect; therefore, therapeutic drug monitoring is essential.^{2,3,4,5}

MEDICATION ADHERENCE: It is defined as the degree to which the person's behaviour corresponds with the agreed recommendations from a health care provider. We assess factors that affect adherence to medication and given score accordingly 1- Strongly disagree, 2-Disagree, 3-Neither agree nor disagree, 4-Agree, 5-Strongly agree⁶.

BARRIERS:

Barriers to adherence are modifiable variables that demonstrate consistent associations with nonadherence and suboptimal clinical outcomes in pediatric populations. The Barriers subscale of the Pediatric Epilepsy Medication Self-Management Questionnaire (PEMSQ) was used to assess treatment barriers that interfere with AED adherence. We assess factors that affect to barriers to treatment and given score accordingly 1- Never, 2-Seldom, 3-Sometimes, 4-Often, 5-Always⁶.

GASE SCALE:

The global assessment of severity of epilepsy (GASE) is a 7-point global rating scale. To assess the overall severity of epilepsy in children We assessed GASE scale to know the frequency, intensity, injuries during seizure, severity of the post ictal period, side effects of antiepileptic drugs, amount of antiepileptic drugs, interference of epilepsy drug with daily care activities. 1- Not at all severe, 2- A little severe, 3-Somewhat severe, 4-Moderately severe, 5-Quite severe, 6- Very severe, 7- Extremely severe⁷.

AIM: To measure impact of barriers to medication adherence in children with epilepsy with an emphasis of severity assessment.

OBJECTIVES:

PRIMARY OBJECTIVES: The objective of this study is to assess the medication adherence, and it's barriers in pediatric patient with epilepsy.

SECONDARY OBJECTIVES:

To estimate prevalence of epilepsy in pediatrics, To categorise different types of seizures.

To assess severity of epilepsy in pediatrics, To study prescribing pattern in epilepsy.

MATERIALS AND METHODOLOGY

METHODOLOGY: Place of the study: The present study was conducted in Viswabharathi super speciality hospital, Gayatri Estate, Kurnool, Andhra Pradesh, India.

Study period: The study was conducted for six months and started in the month of November 2021 and ended in May, 2022 (6 months).

Study population : A total of 124 patients were taken in the study.

Study design : This is a Prospective Cross sectional Study.

Method of study : The Study here is a cross sectional Prospective Study and the subjects taken are patients who are admitted in the Pediatric department, who are diagnosed with epilepsy and on treatment with Anti-epileptic drugs. The children's are recruited mainly based on the inclusion and exclusion criteria of the Study. Informed consent was taken from parent or patient representatives. The data that will be collected from the patients representative which includes demographics of the patients; Past medical history (disease status) and medication history (Anti-epileptic drugs with generic name, dose, frequency, route of administration); Allergies of the patient; personal history and habits. The data received from case sheet it also includes the diagnosis with specific type of epilepsy and the treatment analysis of the patient.

The medication adherence and It's barriers are measured by "Pediatric Epilepsy Medication Self Management Questionnaire"(PEMSQ), in which having the 27 items (questionnaire) regarding the adherence of epilepsy in children and the severity is measured by "The Global Assessment of Severity of Epilepsy" (GASE) Scale. A 7 item questionnaire which describes the frequency and intensity of epilepsy. Assessment of Severity of Epilepsy" (GASE) Scale. A 7 item questionnaire which describes the frequency and intensity of epilepsy.

Sampling : A total of 124 epileptic patients were taken into the study ; patients were selected based on their inclusion and exclusion criteria of the study .

PATIENT ELIGIBILITY CRITERIA :**INCLUSION CRITERIA :**

- Children with age 1-12 years of both genders.
- Children has previous history of seizures
- Children who are under the therapy with atleast one anti- epileptic drugs since 1 year.

- Children experienced seizures by/due to discontinuing medication.

EXCLUSION CRITERIA :

- Children with age <1 years and greater than 12 years.
- Children with other co morbidities.
- Children who doesn't willing to participate.
- Children with epilepsy under critical illness

MATERIALS : Instruments:

- Data collection proforma
- Paediatric Epilepsy Medication Self- Management Questionnaire (PEMSQ)
- Global Assessment of severity of Epilepsy Scale (GASE Scale)

DATA ANALYSIS: The statistical analysis was carried out by Microsoft excel for base line data like prevalence and incidence, age and gender distribution, sociodemographic details, types of seizures and treatment analysis. The reliability of Paediatric Epilepsy Medication Self- Management Questionnaire (PEMSQ) was assessed by Cronbach's alpha coefficient in SPSS version 23.0. ANOVA and paired t- test were compared for Final mean scores of Paediatric Epilepsy Medication Self- Management Questionnaire (PEMSQ) with Sociodemographics and number of antiepileptics used.

RESULTS:**Prevalence and Incidence of Epilepsy:**

Among 484 children attended to pediatrics department, the prevalence was estimated to be 256 (52.89%) , in these 124 (25.61%) patients has epilepsy history since one year which were included in our study and the remaining patients doesn't meet the study criteria. Incidence was estimated to be 228(47.11%) with newly diagnosis of epilepsy.

Table 2. Prevalence and Incidence of Epilepsy.

	No of cases	Percentage
Prevalence	256	52.89 %
Incidence	228	47.11 %
Grand total	484	100 %

DEMOGRAPHICS OF PEDIATRIC EPILEPSY PATIENTS:

Gender distribution: In our study out of 124 pediatric patients males 65 (58%) were more compared to 59 (42%) females as shown in table 3

Table 3: Gender distribution.

Gender	No .of patients(n=124)	Percentage
Male	65	52.42 %
Female	59	47.58 %
Grand total	124	100 %

Age distribution:

Among 124 pediatric inpatients 2-4 years grouped patients were more in the study followed by 5-8 years and 9-12 years of age grouped patients . The mean age was found to be 5.45 ± 3.07 years.

Table 4. Age distribution Personal history of Patient care taker:

Age groups	No of patients (n=124)	Percentage
2-4	56	45.16%
5-8	47	37.90%
9-12	21	16.93%
Grand total	124	100%

In total 124 patient care takers, number of primary educates were more when compared to illeterates, graduates. Patient care takers of lower middle class were more when compared to other classes. Primary educates (46.77%) \geq Illeterates(37.09%) \geq Secondary educates(12.90%). Semi urbans (49.19%) \geq Rural(41.12%) \geq Urbans(9.67%). Lower middle class people was (89.51%) \geq upper middle class(10.48%).

Education: In our study out of 124 patient care takers(n=124),primary educates (46.77%) \geq illeterates (37.09%) \geq secondary educates (12.90%) \geq diploma and above (3.22%) as shown in table 5.

Table 5. Education details of patient care takers

Education	No .of patients(n=124)	Percentage (%)
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Illiterates	46	37.09
Primary	58	46.77
Secondary	16	12.90
Diploma and above	4	3.22

Region :

In our study out of 124 patient care takers (n=124), rural patient care takers (48.38%) > urban patient care takers (40.32%) > semi urban patient care takers (11.29%) as shown in table 6.

Table 6 . Region details of patient care takers.

Region	No .of patient’s care takers (n=124)	Percentage (%)
Rural	60	48.38
Semi urban	14	11.29
Urban	50	40.32

Income: In our study out of 124 patient care takers (n=124), lower middle class patient care takers(89.51%) > upper middle class patient care takers (10.48%) as shown in table 7.

Table7. Income details of the patient care takers

Income	No .of patients’s care takers (n=124)	Percentage (%)
Lower middle class	111	89.51
Upper middle class	13	10.48

Family history: In our study out of 124 patients (n=124), epilepsy affected children with out family history are 112 (90.32%) and with family history includes 12(9.67%) as shown in table 8

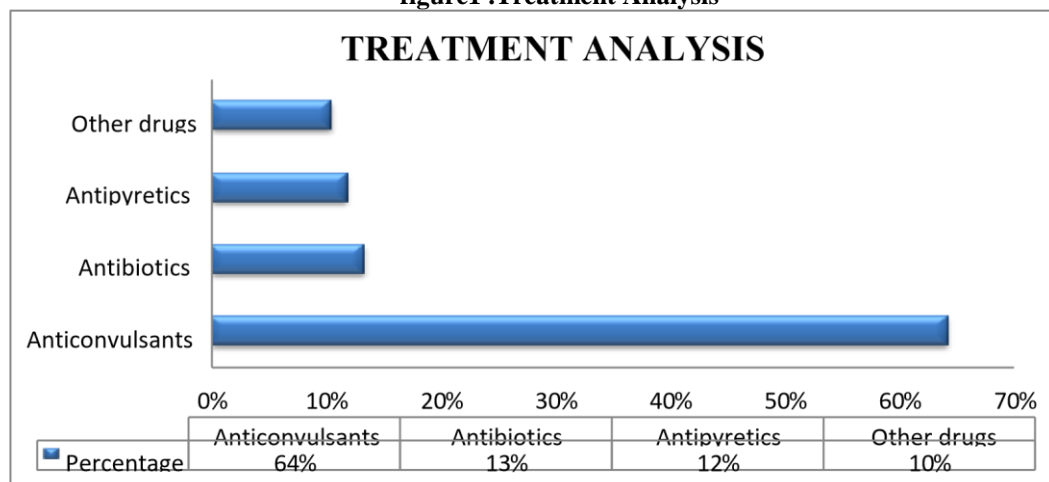
Table 8. Family history

Family history	No. of peditrics	%
Mother	6	4.83
Father	3	2.41
Grand parents	1	0.80
First degree relatives	2	1.61
With out family history	112	90.32
Grand total	124	100

Treatment Analysis:

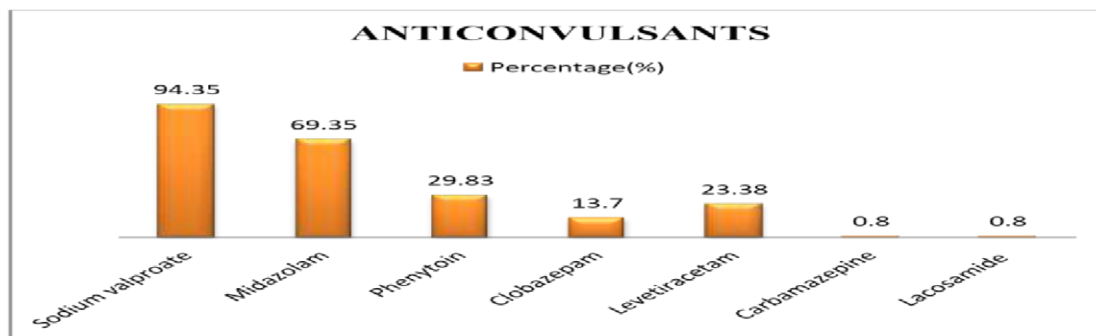
In our study totally 448 drugs were prescribed among 124 patients ,anticonvulsants takes highest percentage when compared to all other classes, anticonvulsants≥ antibiotics≥ antipyretics≥ antisecretory agents ≥ antiemetics ≥ other drugs like used for cough ,cold ,diarrhea and supplements of vitamins, calcium etc ... as shown in figure1 .

figure1 .Treatment Analysis



Anti-convulsants : Valproate was highestly prescribed (94.35%)≥ midazolam(69.35%)≥ phenytoin(29.83%)≥ levitiracetam(23.38%)≥ clobazepam(13.70%)≥ carbamazepine(0.80%) and phenobarbitone (0.80%) as shown in this figure 2 .

Figure 2. Anticonvulsants

**Antibiotics :**

In antibiotic class, ceftriaxone sodium was highest prescribed i.e., (39.51%) ≥ amoxiclav, amikacin (2.41%) ≥ ampicillin (1.61%) ≥ vancomycin, meropenam, cefotaxime (0.80%) as shown in table 9.

Table 9. Antibiotics drug details of the pediatric patients

Antibiotic	No. of patients	Percentage (%)
Ceftriaxone sodium	49	39.51
Amphicillin	2	1.61
Amoxicillin+ Clavulanic acid	3	2.41
Amikacin	3	2.41
Vancomycin	1	0.80
Meropenam	1	0.80
Cefotaxime	1	0.80

Antipyretics and Other class of drugs : Antipyretics (42.74%) > other class of drugs (57.26%)

Table 10. Antipyretics and other class of drugs

Drugs	No. of patients	Percentage (%)
Antipyretics	53	42.74
Pantoprazole	12	9.67
Ondansetron	12	9.67
Ambroxol	5	4.03
Chlorpheniramine	3	2.41
Dexamethasone	1	0.80
Syp. Simethicone + Aluminium hydroxide	1	0.80
Calcium supplement syrup	3	2.41
Baclofen	1	0.80
Metronidazole	1	0.80
Racecadotril	1	0.80
Lactobacillus	1	0.80
Risperidone	1	0.80
Atomoxetine hydrochloride	1	0.80
B complex	1	0.80
Zinc syrup	1	0.80
Multi vitamin syrup	1	0.80
Combither dry syrup	1	0.80

Duration of Anti-convulsants use:

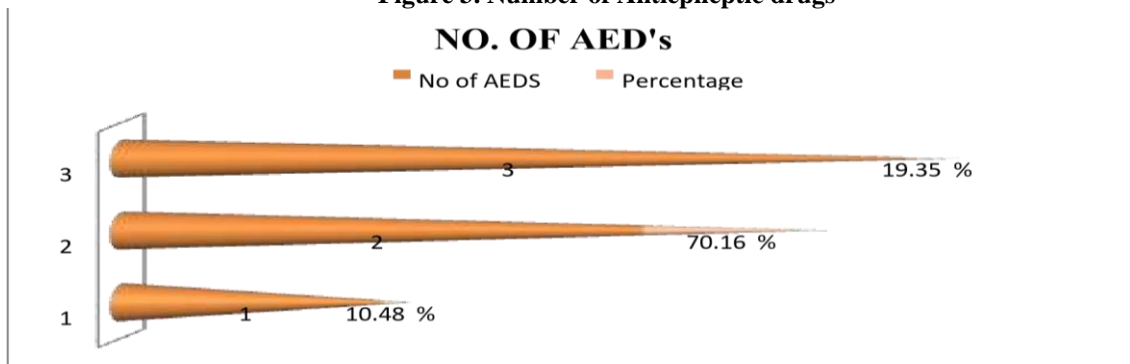
Number of patients with the duration of anticonvulsant use between 1-2 years was higher 91(73.3%) compared with the patients with other age groups as shown in table 11.

Table 11 . Anti-convulsant duration details of Pediatric patients

Duration (Years)	No. of patients (n=124)	Percentage (%)
1-2	91	73.3
3-4	17	13.70
5-6	13	10.48
7-8	3	2.41
Grand Total	124	100%

Number of anti epileptics: 2 Antiepileptics were highest prescribed (70.16%) ≥ 3antiepileptics(19.35%) ≥ 1(10.48%)

Figure 3. Number of Antiepileptic drugs



Types of seizures: 74.19% was generalized seizures when compared to unclassified (25.80%)

GASE SCALE:

Global assessment epilepsy scale was used to assess severity. Some what severe (50.8%) ≥ A little severe (23.3%) ≥ moderately severe (18.5%) ≥ Quite severe(4.83%) ≥ Very severe(2.41%).

Table 12. GASE scale

S.No	GASE score	No. of patients	Percentage(%)
1	Not at all severe	0	0
2	A little severe	29	23.38
3	Somewhat severe	63	50.80
4	Moderately severe	23	18.54
5	Quite severe	6	4.83
6	Very severe	3	2.41
7	Supremely severe	0	0
	Grand total	124	100

Validity of Pediatric Epilepsy Medication Self-Management Questionnaire (PEMSQ) Adherence scale :

Mean	Variance	Std. Deviation	N of Items
30.331	16.191	4.0238	8

Table 13. Case Processing Summary

	N	%
Cases Valid Excluded ^a	124	100.0
Total	0	.0
	124	100.0

a. List wise deletion based on all variables in the procedure.

Table 14. Cronbach’s Alpha details

Cronbach's Alpha	N of Items
0.861	8

Table 15. Adherence scale Item Statistics

ADHERENCE SCALE	MEAN	Std Deviation	N
Will see my child takes medication as prescribed	3.960	.5899	124
Transportation available to bring child to appointment	3.452	.9049	124
Usually follow medical advice prescribed for child /self	3.895	.5956	124
Important for child to receive treatment as directed	3.984	.5556	124
No difficulty in bringing to follow up appointments	3.508	.8788	124
Family members agree with treatment plan	3.879	.6576	124
Child receives medication most of the time	3.806	.6829	124
It is important to assure my child takes meds daily	3.847	.6989	124

Table 16. Barriers scale Cronbach’s Alpha

Cronbach's Alpha	N of Items
0.737	8

Table 17. Barrier scale Item statistics

	Mean	Std. Deviation	N
Dislikes taste of medicine	2.177	1.2366	124
Forget to give medications	1.742	1.0428	124
Medications are difficult to swallow	1.855	1.1873	124
Embarrassed to take medications in front of others	1.395	.8246	124
Child refused to take			

medication	2.105	1.1674	124
Activities interfere with	1.379	0.8124	124
taking medications	1.855	1.0872	124
Ran out of medication Difficult to get medication	2.411	1.4484	124
from pharmacy			

Table 18. Barrier Scale Statistics

Mean	Variance	Std. Deviation	N of Items
14.919	28.205	5.3108	8

Cronbach’s alpha is mostly used when the research being carried out has multiple item measures of a concept .It is usually expressed as a number between 0.00 and 1.0. A value of 0.00 means no consistency in measurement while a value of 1.0 indicates perfect consistency in measurement. The acceptable range is between 0.70 and 0.90. The internal consistency for Pediatric Epilepsy Medication Self-Management Questionnaire (PEMSQ), is measured and its value for adherence Questionnaire obtained is 0.861 and for barriers Questionnaire obtained is 0.737. There were no missing items found.

6.9 Mean scores for number of AED’S and Adherence:

The mean scores of adherence scale were categorized under agreeable (3 to 4) except the least 3.250 which states neither disagree nor agree in patients using 3 antiepileptic drugs as shown in table 23.

Table 19. Mean scores for Antiepileptics and Adherence

Number of AED's	Will see my child takes medications as prescribed	Transportation available to bring child to appointment	Usually follow medical advice prescribed for child/self	Important for child to receive treatment as directed	No difficulty bring child to followup appointment	Family members agree with treatment plan	Child receives medications most of the time	It is important to assure my child takes meds daily
1.0	3.923	3.769	3.923	4.077	3.846	4.077	3.692	4.000
2.0	3.931	3.460	3.874	3.931	3.506	3.816	3.816	3.782
3.0	4.083	3.250	3.958	4.125	3.333	4.000	3.833	4.000
Total	3.960	3.452	3.895	3.984	3.508	3.879	3.806	3.847

In this study population (n=124) the assessment of personal history and PEMSQ scoring for adherence shows significant difference among education (P=0.001<0.05), locality (P=0.001<0.05), income (p=0.001<0.05), and family history (0.001<0.05).

Sociodemographic and Adherence (PEMSQ)

Table 20. Sociodemographics and Adherence by Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 adherence average – EDUCATION	1.981855	.875144	.078590	1.826290	2.137419	25.218	124	0.001
Pair adherence average – 2 INCOME	2.675403							
Pair adherence average – 3 LOCALITY	2.885081							
adherence average – FAMILY H/O	1.901210	.625207	.056145	2.564267	2.786539	47.651	124	0.001
		1.049026	.094205	2.698607	2.786539	47.651	124	0.001
		.584582	.052497	1.797295	2.005124	36.216	124	0.001

GASE Scale and Adherence :

Table 21. GASE scale and Adherence descriptive statistics

Gase scale	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Between-Component Variance
					Lower Bound	Upper Bound			
2.0	29	3.62414	.805574	.149591	3.31771	3.93056	1.000	5.000	
3.0	63	3.89484	.318773	.040162	3.81456	3.97512	3.000	5.000	
4.0	23	3.79457	.392179	.081775	3.62497	3.96416	3.000	5.000	
5.0	6	3.81250	.282290	.115244	3.51626	4.10874	3.375	4.125	
6.0	3	3.70833	.616610	.356000	2.17659	5.24008	3.000	4.125	
Total	124	3.80444	.497974	.044719	3.71592	3.89295	1.000	5.000	
Mod Fixed Effects			.493771	.044342	3.71663	3.89224 3.98425			
Random Effects				.064763	3.62463				.006363

ANOVA Table 22. Adherence mean score vs GASE Scale

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	95.866	5	23.966	1.534	.197
Within Groups	1859.102	119	15.623		
Total	1954.968	124			

The assessment of Global assessment severity scale (GASE) and PEMSQ scoring for adherence shows no significant difference (P=0.197<0.05)

Table 23. Socio demographics and Barriers

	Paired Differences					T	df	Sig. (2tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Barriers average – EDUCATION	.055444	1.128135	.101310	-.145092	.255980	.547	123	.585
Pair 2 Barriers average – INCOME	.748992	.820763	.073707	.603094	.894890	10.162	123	.00

Sociodemographics and Barriers (PEMSQ)

In this study population (n=124) the assessment of personal history and PEMSQ scoring for barriers shows no significant difference

Pair 3 Barriers average – LOCALITY	.958669	1.188393	.106721	.747422	1.169917	8.983	123	.001
Pair 4 Barriers average - FAMILY H/O	-.025202	.754893	.067791	-.159390	.108987	-.372	123	.711

among education (P=0.585<0.05) and family history (0.711<0.05) & shows significant difference among locality (P=0.001<0.05) and income (p=0.001<0.0)

Adherence scale:

Table 24. Adherence in pediatric epilepsy patients

s.no	Adherence to medications	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
1	I will see that my child takes medicine as prescribed	3 (2.41%)	2 (1.61%)	5 (4.03%)	103 (83.06%)	11 (8.87%)
2	I have transportation available to bring my child for follow up	25 (20.16%)	25 (20.16%)	2 (1.61%)	70 (56.45%)	2 (1.61%)
3	I usually follow the treatment plans and medical advice prescribed for myself & my child	2 (1.61%)	3 (2.41%)	10 (8.06%)	101 (81.45%)	8 (6.45%)
4	I feel it is important for my child to receive his treatment as directed	2 (1.61%)	1 (0.80%)	7 (5.64%)	102 (82.25%)	12 (9.67%)
5	I have no difficulty bringing my child for follow up	3 (2.41%)	17 (13.70%)	24 (19.35%)	74 (62.90%)	6 (4.83%)
6	All my family members are in agreement regarding my child's treatment plan	3 (2.41%)	3 (2.41%)	11 (8.87%)	98 (79.03%)	9 (7.25%)
7	My child receives medication most of the time	2 (1.61%)	8 (6.45%)	8 (6.45%)	101 (81.45%)	5 (4.03%)
8	I feel it is important to assure that my child is taking medicines on a daily basis	4 (3.22%)	1 (0.80%)	11 (8.87%)	102 (82.25%)	7 (5.64%)

In our study most of the patients agreed for all the questions on adherence scale except for the 2nd question "I have transportation available to bring my child for follow up" where 50(40.32%) disagree the statement. Hence the highest number of pediatric patients are adherence to their medications.

Barriers scale:

Table 29. Barriers scale in pediatric epilepsy patients.

S.no	Barriers to the treatment	Never (1)	Seldom (2)	Sometimes (3)	Often (4)	Always (5)
1	My child dislikes the taste of medication	52 (41.90%)	8 (6.45%)	51 (41.10%)	11 (8.87%)	2 (1.61%)
2	I forgot to give my child medication	77 (62.09%)	26 (20.96%)	13 (10.48%)	6 (4.83%)	2 (1.61%)

3	The medication is difficult for my child to swallow	78 (62.90%)	7 (5.64%)	26 (20.96%)	10 (8.06%)	3 (2.41%)
4	My child is embarrassed to take medicines in front of others	99 (79.83%)	5 (4.03%)	16 (12.90%)	4 (3.22%)	0 (0%)
5	My child refuses to take his medication	59 (47.58%)	41 (33.06%)	9 (7.25%)	11 (8.87%)	4 (3.22%)
6	My child has other activities that interfere with taking his medication	103 (83.06%)	4 (3.22%)	13 (10.48%)	3 (2.41%)	1 (0.80%)
7	We have ran out of medication	71 (57.25%)	33 (26.61%)	10 (8.06%)	8 (6.45%)	2 (1.61%)
8	It is difficult to get from the pharmacy	58 (46.77%)	8 (6.45%)	22 (17.74%)	25 (20.16%)	11 (8.87%)

In our study the barrier item “My child dislikes the taste of medication” & “The medication is difficult for my child to swallow” seen in 64(51.61%) & 39(31.4%) respectively which is common problem in pediatrics, followed by barrier item “It is difficult to get from the pharmacy” that is 58(46.77%) which is because of lack of availability of transportation for regular follow-up and refilling of prescription for patients from rural and semi urban region.

DISCUSSION:

In our study the prevalence was estimated to be 53.3% (256 out of 484 admissions). Out of 256 prevalence cases 124 cases has a history of epilepsy and antiepileptic usage atleast since one year was included in our study (25.61%). In our study the incidence was estimated to be 46.69% in the study period (226 out of 484 admissions). In our study (n=124) most of the children diagnosed with seizure disorder were males (58.42%) aged between 2 to 12 years and females (42.58%) in accordance with the study sociodemographic and clinical profile of children with epilepsy by Akanksha Rani et al.⁹ that males are more in number when compared to females. In our study 124 children in the age group of 2 to 12 years were recruited and their care takers were interviewed, mostly the affected age was 2 to 4 years i.e., 56(45.16%). The main reason was due to birth defects (low birth weight, developmental delay) that increases the risk of epilepsy in early pediatrics. High personal income people were more than the low personal income people in accordance with the study Sociodemographic factors associated with the first administration of antiseizure medication in patients with focal epilepsy in western china by Qiong Zhu, Yi Guo et al.¹⁰;

In our study lower middle class patient care takers (89.51%) were more than the upper middle class patient care takers (10.48%) contrary to the above study due to low social background. In our study 124 children in the age group of 2 to 12 years were recruited and their care takers were interviewed, mostly the affected age was 2 to 4 years i.e., 56(45.16%). The main reason was due to birth defects (low birth weight, developmental delay) that increases the risk of epilepsy in early pediatrics. Our present study as patient care takers of primary education (46.77%) was higher than illiterates (37.09%), secondary (12.90%), diploma and above (3.22%). This could influence of education on individual perception of their disease condition and adherence to their medications.

Our present study reveals patient caretakers of rural region (48.38%) were more than patient care takers of urban region (40.32%) and semi urbans (11.29%), which when compare to the study conducted by Qiong Zhu et al.¹⁰ in China shows contradictory with more patients from Urban region. In our present study, children with history in first degree relatives mostly child's mother (4.83%) is seen, which shows similar to study by Akanksha Rani et al.⁹; because of genetic transformation which may increase the risk of getting epilepsy to the offspring's.

In our study, treatment analysis was done among the pediatric patients (n=124), anticonvulsants (64%) were majorly prescribed than antibiotics (13%) than antipyretics (12%) and other class of drugs (10%), in anticonvulsants Valproate was the most commonly prescribed anticonvulsant (94.35%) in treating seizures followed by Midazolam (69.35%) and then Phenytoin (29.83%). The reason for wide spread use of Valproate could be because of its easier availability and cheapest cost in developing countries like ours which was contrary to the study Clinodemographic Profile of Children with Seizures in a tertiary Care Hospital A Cross- Sectional Observational Study by Nagendra Chaudhary et al.⁸; where Phenytoin was most commonly prescribed followed by Valproate.

According to our present study, 92 (74.19%) of all children with seizures had Generalised tonic clonic seizures due to birth defects, whereas the remaining 32 (25.80%) had unclassified seizures. Partial seizures were not seen in our present study similar to the study done by Shakya et al.¹⁶ Epilepsy in Children an epidemiological study, at Kathmandu Medical College Teaching Hospital

Kathmandu, Generalised seizures (78%) were 3.54 times common than the partial seizures (22%). The mean and variance accounted for adherence measure was 30.331 ± 4.0238 .

Internal consistency coefficients (e.g., Cronbach's alpha) 0.861 and the mean and variance for barrier measure was 14.919 ± 5.3108 and Internal consistency coefficients (e.g., Cronbach's alpha) 0.737 were moderate to strong for both scales, can be comparable to study conducted by Avani C.

Modi et al¹²; shows Internal consistency coefficients (e.g., Cronbach's alpha) for adherence and barrier measure as 0.87 and 0.76 respectively. Severity was assessed by using GASE scale and Score (0-7) was taken by interviewing Patient care takers, Majority of the Patients falls into the category somewhat severe (50.80%), followed by little severe (23.38%) then moderately severe (18.54%), quite severe (4.83%), very severe (2.41%), with the standard deviation of 0.497 and the assessment of GASE scale for adherence shows no significant difference ($p=0.197 < 0.05$) was higher compared to the study Assessing severity of epilepsy in children.

A study by Kathy N Speechley et al¹; shows moderately severe cases more than the little severe cases. Pediatric Epilepsy Self Management Questionnaire (PEMSQ) was used to assess the impact of barriers to adherence of medication in our study, most of the patients agreed for all questions on adherence scale and shows adherence to the antiepileptics, except for the second question "I have transportation available to bring my child for follow up" where 50 (40.32%) disagree the statement because the patient care takers have to bring the child for follow up but they don't have the proper facilities due to their region and poor economic status. The study also shows significant difference among education, locality, income and family history with adherence ($p < 0.01$). The results were comparable to the study conducted by Ana M Gutierrez-Colina et al⁶. describes running out of medications as common noncompliance.

The most commonly endorsed barriers was "my child dislikes the taste of medication" & "the medication was difficult to swallow" seen in 64 (51.61%) & 39 (31.4%) respectively which was common problem in children with age group of 2-4 years which are 56 (45.16%) high in our study, followed by barrier item "It is difficult to get from the pharmacy" that is 58 (46.77%) can be correlate to adherence, which is because of lack of availability for transportation for regular follow up and refilling of prescription for patients from rural and semi urban region.

The study shows significant difference among locality and income ($p < 0.01$) with barriers. The study results are also comparable with Rachele R Ramsey et al¹⁴ study which states barriers across all time points were "child dislikes the taste" and forgetting to give medication," with 40-52% and 47-73% (respectively) of parents. Routine assessment of adherence and barriers to medications by clinical pharmacist is imperative from toddlerhood to young adulthood gives the better outcome to antiepileptic medication usage and epilepsy. Interacting with children caregivers and providing proper benefits about adherence can also improve health outcomes and developmental stage in children.

CONCLUSION

- In our study the prevalence of epilepsy was estimated to be 52.89 %
- Among 124 children, males were more compare to female and the more number of children was seen in 2 to 4 years of age.
- Sociodemographics reveals patients were high form rural region with education of primary and illiterates with lower middle class income. GTCS was common type of seizures seen in the study.
- Sodium Valproate was commonly prescribed antiepileptic drug in the study for its easy availability.
- Validated Pediatric Epilepsy Medication Self-Management Questionnaire (PEMSQ) for adherence and barriers, the adherence measure show significance difference with Sociodemographics of the study and the barrier measure shows significance difference with locality and children caregiver income.
- There was no significant difference in the assessment of Global assessment severity scale and PEMSQ score.
- There was proper adherence to antiepileptic medication in the study except for "I have transportation available to bring my child for follow up" where 50 (40.32%) children caregivers disagree the statement, for which the most commonly endorsed barrier was "It is difficult to get from the pharmacy". Hence there was insignificant impact on adherence to antiepileptic medication.

LIMITATIONS & FUTURE RECOMMENDATIONS

1. The number of patients included in the study were limited and the study period that we analyze for adherence to antiepileptics was also comparatively less.
2. Other factors like quality of life were not evaluated in our study.
3. In the present study drug related problems were not evaluated, So further studies can be recommended to evaluate drug related problem for antiepileptic drugs
4. The study was limited to one geographical location so the study cannot be generalized.
5. The advanced instruments like MEMS track caps and electronic monitors for measuring adherence can be recommended for the study.
6. As there were fewer studies on barriers involving in medication adherence, hence in future conducting more studies for longer duration and in larger study population at multicentre is recommended. Physicians, pharmacists, nurses, medical assistants, and care managers can all play a part in supporting patient adherence. In a nonjudgmental manner, aall patients how they take their medications and address any barriers to adherence that exists.

ACRONYMS:

CENTRAL NERVOUS SYSTEM : CNS CD: CEREBRALDYSRHYTHMI PID: POST ICTAL DEPRESSION QOL: QUALITY OF LIFE BRI: BIRTH RELATED INJURIES INT: INHIBITORY NEUROTRANSMITTERS ENT: EXCITATORY NEURO TRANSMITTERS GABA:GAMMA AMINO BUTYRICACID HS:HYPERSYNCHRONUS NEAD:NON EPILEPTIC ATTACK DISORDER MRI:MAGNETIC RESONANCE IMAGING VNS: VAGAL NERVE STIMULATION AEDS: ANTI EPILEPTIC DRUGS SUDEP: SUDDEN UNEXPLAINED DEATH IN EPILEPSY BNF: BRITISH NATIONAL FORMULARY PEMSQ:PEDIATRIC EPILEPSY MEDICATION SELF MANAGEMENT QUESTIONNAIRE GASE:GLOBAL ASSESSMENT OF SEVERITY EPILEPSY

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