

## Original Research Article

# Profile of epilepsy in a tertiary care public sector hospital of western India

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## ABSTRACT

**Background:** Epilepsy is characterised by recurrent seizures due to a chronic underlying process. Its prevalence in India is 6.24/1000 population. The study aims to evaluate the commonest types of and clinical characteristics of epilepsy, and pharmacological management in these patients. Furthermore to assess, whether these variables are in agreement with other local and international studies?

**Methods:** This cross-sectional observational study was carried out in an epilepsy clinic of a public sector hospital in India for a period of nine months. The study analysed medical records of patients during the study period. Simple descriptive statistical tests (Mean and Standard deviation) were used to describe the numerical values of the sample while qualitative data were presented by frequency distribution.

**Results:** A total 297 patients were enrolled, after informed consent. The male: female ratio was 1.94. The age ranged between six months and 12 years (mean±SD =6.2±2.9). Majority of patients had generalised tonic-clonic seizure (71.71%), followed by complex partial seizure (12.79%). 70.03% of our patients had idiopathic epilepsy. The commonest causes for symptomatic epilepsy were hypoxic ischaemic insult and CNS infections. Mental retardation and cerebral palsy were common comorbidities. Sodium valproate was the most commonly prescribed drug and 75.08% patients were on monotherapy.

**Conclusions:** Seizure types, aetiology, drug therapy, comorbidities and outcome in a tertiary care hospital in India are similar to previous local and international studies. Preventable causes of epilepsy share a significant portion in the aetiology of the disease. Sodium valproate was seen to have more promising results in paediatric patients for generalized tonic clonic seizure.

**Keywords:** Seizures, Epilepsy, Monotherapy, Sodium valproate

## INTRODUCTION

An epileptic seizure is a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain. Epilepsy is a disorder of the brain characterized by an enduring predisposition to generate epileptic seizures, and by the neurobiological, cognitive, psychological, and social consequences of this condition. The definition of epilepsy requires the occurrence of at least one epileptic seizure.<sup>1</sup>

The operational clinical definition of epilepsy is defined by any of the following conditions.<sup>2</sup>

1. At least two unprovoked (or reflex) seizures occurring >24 hours apart.
2. One unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years.
3. Diagnosis of an epilepsy syndrome.

Epilepsy is considered to be resolved for individuals who had an age-dependent epilepsy syndrome but are now past the applicable age or those who have remained seizure-free for the last 10 years, with no seizure medicines for the last 5 years.<sup>1</sup> The prevalence rate of epilepsy in India is 6.24/1000 population.<sup>3</sup>

### Objective

This retrospective descriptive study was planned to address the commonest types of seizures, EEG and neuroimaging studies results, and frequently used Antiepileptic drugs in patients presented to a tertiary care hospital in India. Furthermore to assess, whether these variables are in agreement with other local and international studies?

### METHODS

The study protocol was submitted to the Institutional Ethics Committee (I.E.C.) for approval and permission sought from Head of Paediatrics department to collect the data in a case record form from the Epilepsy clinic, Department of Paediatrics, Civil Hospital, Ahmedabad after an informed consent for a period of nine months (September 2015 to May 2016). The operational definition of epilepsy was used to select the patients.<sup>2</sup> Patients of both gender and age less than 12 years were included in the study. Patients: (1) Who were not willing to participate in the study. (2) With provoked seizures due to hypoglycaemia, hyperglycaemia and hypernatremia. (3) Presenting with provoked seizures and those with 1st seizure whose follow up did not show any subsequent seizures; were excluded from the study.

A detailed history regarding the epileptic attack was noted. Significant and relevant past history, personal history, and family history was asked. The relevant investigations like, MRI, electroencephalogram (EEG) and computed automated tomography (CAT) scan was also included, if available. Seizures are classified according to ILAE, 1981 classification. All the information collected was recorded in a pre-validated and pre-tested case record form. Data was analysed for age, sex, socio-economic status, type of seizures, aetiology, comorbidity, findings of imaging modalities, and use of antiepileptic drugs. Data was entered in Microsoft Excel 2010 and analysed. Simple descriptive statistical tests (Mean and Standard deviation) were used to describe the numerical values of the sample while qualitative data were presented by frequency distribution.

### RESULTS

This study included records of 297 patients with epilepsy. Their ages ranged between six month and 12 years (mean  $\pm$ SD =6.2 $\pm$ 2.9).196 (66%) of the study population were males and 101 (34%) were females. Mean age of males was 6.5 years and mean age of females was 5.5 years. The majority of patients had generalised tonic-clonic

seizure (71.71%), followed by complex partial seizures (12.79%) (Table 1).

**Table 1: Distribution of epilepsy types in paediatric patients at a tertiary care hospital in India.**

Seizure type	Frequency	%
<b>Partial (focal, local seizure)</b>		
Simple partial seizure	9	3.03
Complex partial seizure	38	12.79
<b>Generalized (convulsive or non-convulsive) seizure</b>		
Absence	20	6.73
Myoclonic seizure	1	0.33
Tonic-clonic seizure	213	71.71
Atonic seizure	2	0.67
<b>Other</b>		
Unclassified seizure	11	3.70
Multiple seizure types	3	1.01
<b>Total</b>	<b>297</b>	<b>100</b>

All patients had true epilepsies, 70.03% had idiopathic aetiology, 10.43% with hypoxic ischaemic insult was the second and 8.08% with CNS infection was the third commonest cause. Other causes of epilepsy are shown in Table 2.

**Table 2: Aetiology of epilepsy in paediatric patients at a tertiary care hospital in India.**

Aetiology	Frequency	%
<b>Idiopathic</b>	208	70.03
<b>Hypoxic ischaemic insult</b>	31	10.43
<b>CNS infection</b>	24	8.08
<b>Cerebral palsy</b>	12	4.04
<b>Space occupying lesions</b>	11	3.70
<b>Trauma</b>	5	1.68
<b>Hydrocephalus</b>	3	1.01
<b>End stage renal disease</b>	2	0.67
<b>Congenital Rubella syndrome</b>	1	0.33
<b>Total</b>	<b>297</b>	<b>100</b>

A total 81.48% of our patients had no co-morbid medical or neurological disorders. Mental retardation was the commonest in 6.73% patients; followed by cerebral palsy in 6.06%.

Amongst the co-morbidities, twenty patients (6.73%) were mentally challenged; 14 males (70%) and six females (30%). Their ages ranged between two and twelve years (mean $\pm$ SD =7 $\pm$ 2.4). 17 of them (85%) had generalized tonic-clonic seizure and three had complex partial seizure.

Microcephaly was seen in twenty two patients (7.40%); 11 were males (50%) and 11 were females (50%). Their age ranged between one and eleven years (mean $\pm$ SD

=6.2±2.6). 19 patients (86.36%) had general tonic-clonic seizure and three (13.60%) had complex partial seizures. One had mental retardation with cerebral palsy and one had polycystic kidney disease.

**Table 3: Distribution of co-morbidities in paediatric patients at a tertiary care hospital in India.**

Co-morbidity	Frequency	%
None	242	81.48
Mental retardation	11	3.70
Mental retardation with cerebral palsy (MRCP)	9	3.03
Cerebral palsy	9	3.03
Eye disease	8	2.69
Protein energy malnutrition	8	2.69
Hearing impairment	3	1.01
Congenital Rubella syndrome	2	0.67
End stage renal disease	2	0.67
Hemiparesis	1	0.33
Migraine	1	0.33
Neurodegenerative disease	1	0.33
Total	297	100

Majority of the patients (59.34%) were found to be anaemic (Hb <10 gm%) and 8 had protein energy malnutrition thereby reflecting the poor nutritional status of these patients. One patient (0.33%) was diagnosed and treated as status epilepticus.

Neuroimaging data of the patients was evaluated. 215 patients had no available data. Among the eighty two patients (27.60%) who had brain CT and/or MRI and/or CECT; 27 (9.09%) were normal. Post ischaemic insult was the most common radiological finding, followed by infective ischaemic insult and focal cortical dysplasia.

EEG data was available in 212 patients; 24 (8.08%) had normal records while 164 (77.35%) had epileptiform discharges. Epileptiform EEG discharges were generalized in 148 patients, localized to the right side in six and left sided in ten patients. 24 (8.08%) patients had non-specific EEG changes.

Multiple seizure type was seen in three patients (1.01%); two were females and one male, age range was four to six years, duration of illness was between age one and five years. Only two of them had controlled seizures, none had normal EEG, none had any comorbidity. Two of them were on polytherapy. One had perinatal insult, one had postnatal insult and the aetiology was idiopathic in one patient.

Developmental delay was seen in sixty nine patients (23.23%); 48 were males (69.56%) and 21 females (30.43%). Their age ranged between one and eleven years (mean±SD = 6.2±2.8). Fifty four of them (78.26%) had generalized tonic-clonic seizure, ten had complex partial seizure, three had simple partial seizure, one had atypical

absence seizure and one had unclassified type. Eleven of these had cerebral palsy, two had squint, two had refractory error, one had migraine, one had neurodegenerative disease, one had hydrocephalus, one had protein energy malnutrition, one had congenital cataract and one had congenital rubella syndrome. EEG data was available in 39 patients. One was normal, 36 showed epileptiform discharge and two showed nonspecific changes. Three patients had a history of previous hospitalization and 19 patients were on polytherapy.

Only ten patients (3.36%) had documented family history, all of these patients had first degree relatives with epilepsy.

Two hundred and twenty three patients were on monotherapy (75.08%) and 74 (24.91%) were using more than one antiepileptic drug. The most frequently used antiepileptic drug was sodium valproate in 239 patients either alone or in combination, followed by carbamazepine in 59, clobazam in 29, phenytoin in 16, levetiracetam in six, oxcarbazepine in five, phenobarbitone in five, topiramate in three, vigabatrin in three, baclofen in two, haloperidol in one and respridone in one (Table 4).

**Table 4: Drugs used in paediatric patients of epilepsy at a tertiary care hospital in India.**

Drug	Frequency	%
Sodium valproate	183	61.61
Carbamazepine	33	11.11
Phenytoin sodium	2	0.67
Clobazam	2	0.67
Vigabatrin	1	0.33
Diazepam	1	0.33
Phenobarbitone	1	0.33
Multi-drug therapy	74	24.91
Total	297	100

## DISCUSSION

Epilepsy is one of the causes for school drop outs and decreased social development in children in India. This study was carried to refresh the data presented by other similar studies done in the paediatrics population of India in the past. All though this study was not carried out to comment upon the gender difference but more male patients had attended the hospital. 196 (66%) of the study population were males and 101 (34%) were females. Similar studies in industrialized countries indicate that males are more frequently affected than females.<sup>4</sup> Most of the patients had generalized tonic clonic seizure (72%). This is in agreement with studies from the Bangladesh which had found generalized seizures to be more common than partial seizure; it also matched about twenty other epidemiological studies on epilepsy from different parts of India which included both rural and

urban studies.<sup>4,6</sup> On contrary few studies reported partial seizures to be more common in children.<sup>7-9</sup> Seventy percentages of our patients had idiopathic epilepsy. Hypoxic ischaemic insult, CNS infection, cerebral palsy and space occupying lesions were the commonest causes for symptomatic epilepsy. Other studies also reported the most common aetiology as idiopathic.<sup>6,10,11</sup> Early childhood brain damage such as in cerebral palsy was recorded in some studies while others recorded congenital malformation of CNS to be the most common cause for symptomatic epilepsy.<sup>5,12</sup> Studies in Brazil show perinatal brain damage as the most common cause along with other studies.<sup>13,14</sup> Studies conducted in Uruguay along with other studies recorded family history to be the leading cause of symptomatic epilepsy.<sup>6,13</sup> CNS infection was also considered the main cause in many studies.<sup>10,13,15</sup> Other causes of epilepsy in children are moderate or severe head trauma, metabolic diseases and genetic diseases.<sup>12,13</sup>

Twenty patients (6.73%) were diagnosed with mental retardation in our study. This is lower than Rantanen's study on children with epilepsy that reported that Cognitive function was mildly retarded in 22%, and moderately to severely retard in 28%.<sup>16</sup> Five of the mentally retarded patients were using polytherapy. Studies have indicated that valproate exerts little detrimental impact on cognitive function.<sup>17</sup> Studies have shown that carbamazepine has a cognitive profile that is worse than levetiracetam but better than phenytoin.<sup>18,19</sup> Few studies reported that carbamazepine treated children performed worse than valproate treated children on memory tasks.<sup>20</sup> However another study reported that the cognitive profiles of valproate and carbamazepine were similar.<sup>21</sup> There is an overall view that antiepileptic drugs can compromise cognitive functioning. The risk of cognitive side effects increases with polytherapy.<sup>22,23</sup>

Of the 212 EEG records; 24 (8.08%) had normal records, 24 (8.08%) had non-specific EEG changes while 164 (77.35%) had epileptiform discharges. These results are in agreement with other studies.<sup>8</sup> 75.09% of patients were on monotherapy. The most frequently used antiepileptic drug was sodium valproate either alone or in combination, followed by carbamazepine, phenytoin sodium, clobazam, vigabatrin, diazepam and phenobarbitone. This is in agreement with other studies.<sup>24,25</sup> Almost all patients were compliant with medications. 24.91% were on polytherapy which is in agreement with Cockrel who reported that about 50-70% of newly diagnosed patients with epilepsy become controlled with monotherapy and 30% need polytherapy who become refractory to monotherapy.<sup>26</sup> Majority of the patients were prescribed drugs by their generic name while a few (11%) patients were prescribed using brand names like eptoin, frisium, gardinil, subril, oleptal, oxetal and zenexa. Standard treatment protocol was adopted and all patients were prescribed drugs rationally.<sup>19</sup> According to some studies, valproate is the drug of choice for tonic-clonic seizures and myoclonic

seizures while carbamazepine, valproate and oxcarbazepine are the first line drugs for complex partial seizures. There are a significant number of aetiological factors for epilepsy in developing countries, and many of them are preventable. Intracranial infections are of particular importance in this respect. Also some form of genetic counselling should be made available at least in areas where a specific hereditary predisposition to epilepsy has been established. Strict traffic laws and public awareness are urgent needs in many developing countries that would slow the rapid increase in the number of head injuries caused by road accidents and the resultant post-traumatic epilepsy. The treatment and services provided in government funded Indian institutions for epilepsy has been found up to date and match the current standard of practice around the world. Early diagnosis of epilepsy and referral to the higher centres for management can improve the control of seizures and outcome in these patients.

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