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### RESEARCH ARTICLE

#### CLINICAL SPECTRUM AND ETIOLOGY OF CHILDHOOD STATUS EPILEPTICUS IN A TEACHING HOSPITAL, KASHMIR, INDIA

Syed Muzamil Mehraj<sup>1</sup>, Shafat Ahmad Tak<sup>2</sup> and Suhail Ahmad Naik<sup>3</sup>

1. Post Graduate 3<sup>rd</sup> Year Resident, Department of Pediatrics Government Medical College Srinagar Kashmir India.
2. Professor, Department of Pediatrics Government Medical College Srinagar Kashmir India.
3. Department of Pediatrics Government Medical College Srinagar Kashmir India.

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#### Abstract

**Objective:** The study aimed to ascertain clinical spectrum and different etiologies of convulsive status epilepticus in children. Methods: Hospital based prospective observational study performed in department of Pediatrics in Children Hospital Government Medical College Srinagar Kashmir India from October 2020 to September 2022. Data were recorded with the help of a pre-formed proforma.

**Results:** In this study, 184 cases of status epilepticus were included. The infants (less than 1-year) account for 23.9% of the total cases (n=184) and 67.4% children were in the age group < 5 years. The total number of cases in the age group >10 yrs was only 6.5%. Out of 184 children, male children were 102 (55.4%) and female children were 82 (44.6%). We found that 81.5% of the cases of CSE reached Emergency Room (ER) within 30-60 minutes after seizure initiation and 18.5% reached after 60 minutes. The most common etiology associated with status epilepticus was remote causes like post HIE or cerebral palsy, seen in 25.54% cases, followed by acute CNS infection in 18.45 cases (pyogenic meningitis 10.3%, viral encephalitis 4.9%, and tubercular meningitis 3.26%).

**Conclusion:** The outcome was better for patients who had less seizure duration and received early effective standard treatment protocol within a given time frame. The patients who had prolonged seizures or first treatment had a poor outcome. Our study reveals that though we have successfully decreased the infant mortality rate, still there is large scope for decreasing morbidity by improving the neonatal care services across Kashmir and the intact Neonate intact Nation should be our mission and passion. Furthermore, it seems very imperative that all patients of CSE should receive early effective standard treatment at doorsteps to decrease the associated morbidity and mortality.

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#### Introduction:-

Status epilepticus (SE) is a neurological emergency and is defined as seizure continuous in character for more than five minutes or multiple seizures occurring consecutively during which patients were unable to regain consciousness over a period of 30 minutes [1]. The five-minute window corresponds with the time at which urgent treatment should

**Corresponding Author:- Suhail Ahmad Naik**

Address:- Department of Pediatrics Government Medical College Srinagar Kashmir India.

be initiated. At least one study has found that a convulsive seizure lasting more than 5 minutes has a high risk of lasting 30 minutes or more [2].

There are two broad categories of SE: convulsive status epilepticus (CSE) and non-convulsive status epilepticus (non-CSE). The identification of non-CSE from behavioral signs is difficult and electroencephalography (EEG) is often a crucial diagnostic tool [3]. In CSE early institution of treatment is essential to avoid irreversible brain injury through both metabolic decompensation or systemic complication like respiratory depression which further exacerbates the cerebral metabolic injury through anoxia, and subsequently, profound hypotension [4].

The Non-CSE is not considered a medical emergency since patients do not lose consciousness (there may be impairment in consciousness), don't convulse clinically and usually return to normal within minutes of its resolution (either spontaneously or in response to treatment). Some classifications have considered these seizures to be sustained seizures in comatose patients, whether the ictal discharges seen on EEG were accompanied by subtle convulsive activity, such as tonic eye deviation or rhythmic twitching of part of an extremity [5].

There are four phases of status epilepticus. They are classified based on duration as follows: [6-9]

1. Early phase or premonitory status: in which the convulsion continues for more than 5 minutes. At this stage, the first-line treatments (benzodiazepines) are used to control these seizures either prior to arrival at the hospital, by the patient's parents or paramedics, or at a hospital in the emergency department.
2. Established status epilepticus: in which the seizure activity continues for more than 10 and up to 30 minutes with the loss of consciousness between seizures. In this stage second line treatments such as intravenous phenytoin, phenobarbital or levetiracetam are used to try and terminate it. This phase of status epilepticus may be termed benzodiazepine-resistant status epilepticus.
3. Refractory status epilepticus: in which the seizure activity (convulsion) lasts for more than 30 minutes or has failed at least one dose of the benzodiazepine and a dose of second-line intravenous AED, or both.
4. The former etiology of status epilepticus has been classified by the International League Against Epilepsy into five divisions: acute symptomatic, remote symptomatic, idiopathic epilepsy-related, cryptogenic epilepsy-related and unclassified [10].
5. In 2006, the North London Convulsive Status Epilepticus in Childhood Surveillance Study (NLSTEPSS) classified the etiology into 7 groups: prolonged febrile seizure, acute symptomatic, remote symptomatic, remote with acute causes, idiopathic epilepsy-related, cryptogenic epilepsy-related and unclassified [11].

**Table I:-** Etiology of status epilepticus.

Etiology	Definition	Causes
Prolonged febrile seizure	CSE that occurred in normal children who had no history of central nervous system (CNS) infection and aged between 6 months and 5 years with a temperature at least 38.0°C	Febrile seizure
Acute symptomatic	CSE that occurred in otherwise healthy children who had neurological insult within the past week	Meningitis Viral CNS Infection Head injury
		Hypoxia
Remote symptomatic	CSE reported in children who had a pre-existing CNS abnormality for more than 1 week	Tuberous sclerosis Encephalopathy
Remote with acute causes	CSE that occurred in children within a week from febrile illness or acute neurological insult and associated with a history of previous neurological abnormalities	Cerebral palsy Hydrocephalus
Idiopathic epilepsy-related	CSE that occurred in children who had a history of idiopathic epilepsy with no symptomatic causes for these seizures	Idiopathic epilepsy
Cryptogenic epilepsy-related	CSE that occurred in children who had a history of cryptogenic epilepsy with no symptomatic causes for these seizures	Cryptogenic epilepsy

Unclassified	All other SE	-----
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The incidence of CSE in children ranges from 10 to 38 in 100,000 per year. [12]. The higher incidence of CSE is seen in children aged less than 4 years with a peak in first year of life. [13] SE may occur in the setting of underlying, premorbid epilepsy or as the first manifestation of epilepsy [14]. SE may also be an acute symptom of medical or neurologic disease. The more common examples of the latter include [14,15]:

1. Central nervous system infections: encephalitis, meningitis,
2. Acute hypoxic-ischemic insult
3. Metabolic disease (e.g., hypoglycemia, inborn error of metabolism)
4. Electrolyte imbalance
5. Systemic diseases like renal failure, hepatic failure
6. Demyelination
7. Isolated CNS vasculitis
8. Isolated CNS lymphoma
9. Traumatic brain injury
10. Drugs, intoxication, poisoning
11. Cerebrovascular event

#### **Study justification:**

Children with CSE are at high

risk of mortality and morbidity. As this is a medical emergency, the management of CSE must be rapid, effective, and safe.

Consequently, there is a risk that the treatment of CSE may be associated with iatrogenic complications, including potentially serious adverse side effects. Even though much research has been carried out to assess the effectiveness and safety in adult patients, less research has been done to evaluate this in infants, children, and young people. This study was undertaken as an attempt to describe the clinical spectrum and etiological profile of convulsive status epilepticus (CSE) presenting to a tertiary care hospital.

#### **Aims and objectives:-**

To clinically spectrum, etiology of childhood status epilepticus in a teaching hospital in the age group 1 month to 18 years.

#### **Inclusion criteria:**

All children aged between 1 month to 18 years who at presentation or during the hospital stay had status epilepticus - defined as continuous seizure activity or recurrent seizure activity without regaining consciousness lasting for >30 min.

#### **Exclusion criteria:**

All the patients in whom the information regarding seizure duration was incomplete or unclear, poisoning, traumatic brain injury, and electrical or non-convulsive status epilepticus.

#### **Sample size:**

Totally 184 cases who presented with status epilepticus in our pediatric emergency during the study period were included in study.

#### **Method:-**

This was a hospital based prospective observational study performed in department of Pediatrics in Children Hospital Government Medical College Srinagar Kashmir India from October 2020 to September 2022. Ethical approval for this study was obtained from the hospital ethics committee. During this period a total number of 184 cases who were presented to the emergency with status epilepticus were included in study. All children aged between 1 month to 18 years who at presentation or during the hospital stay had convulsive status epilepticus - defined as continuous seizure activity for more than 5 minutes or recurrent seizure activity without regaining the consciousness in between.

#### **Procedure:-**

Every sick child who was presenting to emergency department with CSE had been assessed and triaged on arrival and a rapid cardiopulmonary assessment was made with immediate monitoring of heart rate, blood pressure, SPO<sub>2</sub>, signs of

shock, pupil size and reaction to light. Before starting IV resuscitation, a blood sample was taken for baseline investigations. Then the cases were managed according to the protocol followed in our emergency room/pediatric intensive care unit. After early management and stabilization of patient a detailed history was obtained including duration of seizure, distance from the hospital where the fits started, mode of transport, any prehospital and or treatment during transportation, precipitating factors, prior seizures/SE, drug history and compliance, any chronic medical or neurological illness, developmental milestones, and prior neurological status. Demographic and baseline data was recorded with the help of a preformed proforma. Variables included age, sex, type of status epilepticus, cause, duration of convulsions, duration of unconsciousness, precipitating factors, EEG, and number of anti-epileptic drugs required to control the seizures, history of convulsions and fever, any complications occurred and ultimate survival or death. Baseline investigations were also carried out including complete blood count, blood glucose levels, serum electrolytes, serum calcium and magnesium, blood urea and creatinine, urinalysis, comprehensive CSF analysis, MRI and EEG were performed.

Operational definition of status epilepticus used in this study was that a seizure continuous in character for more than five minutes or multiple seizures occurring consecutively during which patients were unable to regain consciousness over a period of 30 minutes.

Data thus collected was subjected to statistical analysis with the help of computer software SPSS version 23. Chi square test was applied and p value less than or equal to 0.005 was considered significant. The relationship of various demographic, clinical characteristics and etiology with outcome was evaluated employing the Chi-square test, Fischer's exact test for categorical data, and independent t-test for continuous data with normal distribution.

**Table 2:-** Age distribution.

Age in years	No of cases	Percent
< 1	44	23.9
1-5	80	43.5
6-10	48	26.1
> 10	12	6.5
Total	184	100
Mean: 4.9 years,		
Range: 2 months-15 years		
S.D: 41.241		

In this study, Status epilepticus in children < 1 year account for 23.9% (44 cases) of the total cases (n=184). 67.4% (124 cases) of the total cases were children < 5 years. Number of cases in the age group of >10 yrs was only 12 cases (6.5%). The mean age of the patient in the present study was 4.9 yrs. The youngest age being 2 months. The maximum age being 15 years.

**Table 3:-** Sex distribution.

SEX	TOTAL NO. OF CASES (n=184)	PERCENTAGE
MALE	102	55.4
FEMALE	82	44.6

Out of 184 children, Male children were 102 (55.4%) and female children were 82 (44.6%).

**Table 4:-** Prehospital therapy.

Prehospital therapy	No of cases	Percentage
Given	48	26.1%
Not given	136	73.9%
Total	184	100%

Prehospital therapy with AED was given to 48 patients (26%). The remaining 136 (74%) did not receive prehospital therapy with AED, though 30 of them had been referred. Out of 48 children who had received prehospital therapy only 32 had proper prehospital

therapy. 16 children had received improper medication or drug dosage. 32 children had received injection diazepam, 12 children had received phenytoin and 4 children received phenobarbitone as Prehospital therapy AED.

**Table 5:-** Duration of seizure at the time of arrival

Duration of seizure in min	No of cases n=184	Percentage
30-60min	150	81.5%
>60min	34	18.5%
Mean: 78.12 min Range: 30 min-10hrs. SD: 104.938		

The above table shows that 81.5% (150) of cases reached to ER within 30-60 min duration of seizure and 18.5% (34) reached with seizure more than 60 min. Minimum duration was 30 min and maximum duration was 10 hrs.

**Table 6:-** Seizure type.

Type of seizure	No of cases	Percentage
GTCS	154	83.7
FOCAL	26	14.1
MULTIFOCAL	04	2.2
TOTAL	184	100

The above table shows that the commonest seizure among CSE was GTCS-83.7% (184 cases) followed by Focal seizure for about 14% (26 cases). Four cases (2.2%) were multifocal.

**Table 7:-** Seizure episode.

Seizure episode	No of cases (n=184)	Percentage
First episode of seizure as CSE	56	30.4%
Previous episode of seizure	128	69.6%

The above table shows that 56 cases (30.4%) had first episode of seizure and 128 cases (69.6%) had previous history of seizure.

**Table 8:-** Fever association.

H/O FEVER	No of cases	Percentage
Present	105	57.1
Absent	79	42.9
Total	184	100

The above table shows that 57.1% cases presented with fever and 42.9% cases were afebrile.

**Table 9:-** Demographic, clinical, and etiological spectrum.

CHARACTERISTICS		
Median age in years	4.9 years	
Less than 5 years	120	67.4%
Male	102	55.4%
History of fever before onset	105	57.1%
First episode of seizure as CSE	56	30.4%
Prior history of seizure	128	69.6%
Drug noncompliance	10	5.4%
Patients received pre-referral treatment	48	26.1%
DURATION OF STATUS EPILEPTICUS		
< 30 Minutes	0	0.0%
30-60 Minutes	150	81.5%
>60 Minutes	34	18.5%
SEIZURE TYPE		
Generalized	154	83.7%
Focal	26	14.1%

Multifocal	04	2.2%
Acute symptomatic CSE		
Febrile status epilepticus	34	18.5%
Viral encephalitis	9	4.9%
Pyogenic meningitis	19	10.3%
Tubercular meningitis	6	3.26%
Acute demyelinating encephalomyelitis ADEM	2	1.08%
Drug noncompliance	10	5.4%
Hypertensive encephalopathy	1	0.54%
Stroke	2	1.08%
Intracranial hemorrhage	4	2.17%
Systemic illness/metabolic/dyselectrolymia	6	3.26%
Remote symptomatic		
Cerebral palsy /Post HIE	47	25.54%
Neurocutaneous syndromes	4	2.17%
CNS Tumor	6	3.26%
Progressive neurological disorder	4	2.17%
Idiopathic/ Cryptogenic	30	16.3%

### Discussion:-

Status epilepticus is associated with significant morbidity and mortality. It requires a prompt, effective protocol-based treatment in a given time frame with recommended drugs.

In this study, 184 cases of status epilepticus were included within the given study period. The mean age of the patient in the present study was 4.9 years. The youngest age was 2 months and the eldest was 15 years. The infants (less than 1-year) account for 23.9% of the total cases (n=184) and 67.4% children were in the age group < 5 years. The total number of cases in the age group >10 yrs was only 6.5%. Out of 184 children, male children were 102 (55.4%) and female children were 82 (44.6%). The high prevalence of CSE in the younger age group has been found by various studies in the past (Chin et al.<sup>16</sup>, Kumar M et al.<sup>17</sup> and Bergamo Setal.<sup>18</sup>

In our study we found CSE is more common in the age group less than 5 years with mean age of 4.9 years. Of this finding our study was very much consistent with Sachin Admunthe et al.<sup>19</sup>, Maytal Jetal.<sup>20</sup> and RK Singh et al.<sup>21</sup> The predominance in the younger age group and for them to present as status during the first episode has been theorized to be due to the underdeveloped mechanisms for control of seizure activity and disruption of these mechanisms with minimal abnormalities in neuronal function in younger children. Also, younger age is more vulnerable to febrile status epilepticus.

Our study findings revealed that out of 184 cases who had presented with CSE, around 42.4% were referred from other rural care health centers. Most of the referred patients (57.6%) reached tertiary care hospital without any pre-referral treatment. The pre-referral treatment was given to only 48 patients (26.1%), the remaining 136 (73.9%) didn't receive any prehospital therapy, even though some of them have been referred from rural health care delivery system.

Out of 48 children who have received prehospital therapy, only 32 had been given standard protocol-based therapy.

In a study conducted by Fernandez et al.<sup>22</sup>, out of 64 patients of CSE with out-of-hospital seizure onset, only 24 patients (37.5%) received AED prior to hospital arrival. In an Indian study by Gulati et al.<sup>23</sup> at a tertiary care hospital in New Delhi, 60% had received prehospital treatment. Treatment of SE needs to be initiated as early as 5 to 10 minutes. The longer the seizure episode the more chance of it going into refractoriness and development of complications. The lag time for receiving the first AED was more than 60 minutes in 23 patients (26.4%) and only one among them responded to first-line AED. Hence the need for early initiation of AEDs and prehospital treatment is emphasized.

In our study we found that 81.5% of the cases of CSE reached ER within 30-60 minutes after seizure initiation and 18.5% reached after 60 minutes. This delayed presentation was associated with seizure refractiveness to drugs and adverse outcome.

K. Eriksson et al.<sup>24</sup> in their study have also concluded that there is an association between treatment delay and seizure refractiveness. This association between seizure refractiveness to standard treatment became significant after 30 minutes CSE, when this was analyzed as a single variable ( $p=0.003$ )

In our study we found that the most common type of seizures in CSE were GTCS, seen in 154 cases (83.7%) followed by focal seizure in around 12% (26 cases). Further our study revealed that CSE was first seizure presentation in 35% of cases, and 65% had a previous history of seizures or seizure disorder. Out of 184 cases, 57.1% (105) cases had fever on presentation. The study by Garzon et al.<sup>25</sup> also depicted that 40.6% of cases of CSE didn't have a previous history of seizures. Similar findings were revealed by Mah JK et al.<sup>26</sup>. In their study they found 43% cases didn't have previous history of seizures.

The most common etiology associated with status epilepticus was remote causes like post HIE or cerebral palsy, seen in 25.54% cases, followed by acute CNS infection in 18.45 cases (pyogenic meningitis 10.3%, viral encephalitis 4.9%, and tubercular meningitis 3.26%). The tropical infections like malaria, dengue, Japanese encephalitis, West Nile encephalitis, are not endemic in Kashmir, therefore we didn't report a single case of them. Hui Acetal.'s study<sup>27</sup> shows that acute CNS infection was a predictor of poor outcomes. Murthy J Metal.<sup>28</sup> study shows CNS infection accounts for a significant number of cases.

In our study we found that febrile status epilepticus was presenting episode in 18.5% cases. Studies from developed countries report a higher incidence of febrile seizures to be the cause of CSE in children<sup>29</sup>. The difference in the etiological spectrum of SE in children between developed countries and developing countries could be a result of the high incidence of neuro-infection in developing nations. Acute symptomatic etiology (other than febrile seizures) was the most common cause of CSE in children less than 5 years of age and remote symptomatic etiology was common in children greater than 5 years. This may be because of a high proportion of children with prior seizures in the older age group.

### Conclusion:-

Among 184 total cases in our study, there were 23.9% infants who presented to emergency department as convulsive status epilepticus CSE. The highest number of patients around of less than 5 years, therefore CSE is an important reason for under 5 mortality and morbidity in developing nations. The mean age of the patient in the present study was 4.9 yrs.

The outcome was better for patients who had less seizure duration and received early effective standard treatment protocol within a given time frame. The patients who had prolonged seizures or first treatment had a poor outcome. Further acute CNS infection, remote causes, noncompliance of AED, IEM, were other etiologies responsible for the CSE. In our study we found that the large number of cases had cerebral palsy a remote cause of CSE in around 25.54% cases. Our study reveals that though we have successfully decreased the infant mortality rate, still there is large scope for decreasing morbidity by improving the neonatal care services across Kashmir and the intact Neonate intact Nation should be our mission and passion. Furthermore, it seems very imperative that all patients of CSE should receive early effective standard treatment at doorsteps to decrease the associated morbidity and mortality.

### Limitations:

First, it is a hospital-based single-center study.

### References:-

1. Al-Mufti, F; Claassen, J (Oct 2014). "Neurocritical Care: Status Epilepticus Review". Critical Care Clinics. 30 (4): 751-764.
2. Shinnar S, Berg AT, Moshe SL, Shinnar R. How long do new-onset seizures in children last? Ann Neurol 2001; 49:659.
3. Walker M, et al., Nonconvulsive status epilepticus: Epilepsy Research Foundation workshop reports. Epileptic Disorders, 2005. 7(3):p.253-296.

4. Chin R, et al., Incidence, cause, and short-term outcome of convulsive status epilepticus in childhood: prospective population- based study. *TheLancet*, 2006. 368(9531): p. 222-229.
5. Treiman DM. Electroclinical features of status epilepticus. *J Clin Neurophysiol* 1995; 12:343.
6. Clark P and Prout T, Status epilepticus: a clinical and pathologicalstudy in epilepsy [part 1]. *American Journal of Psychiatry*, 1903. **60**(2):p.291-306.
7. Clark P and Prout T, Status epilepticus: a clinical and pathologicalstudyinepilepsy[part2].*AmericanJournalofPsychiatry*,1904 **60**(4):p.645-698-7.
8. Clark P and Prout T, Status epilepticus: A clinical and pathological study in epilepsy [part 3]. *American Journal of Psychiatry*, 1904. 61(1): p. 81-108-3.
9. Shorvon S and Ferlisi M. The treatment of super-refractory status epilepticus: a critical review of available therapies and a clinical treatment protocol. *Brain*, 2011. 134 (part 10): p. 2802-18.
10. Coeytaux, A., et al., Incidence of status epilepticus in French- speaking Switzerland (EPISTAR). *Neurology*, 2000. 55(5): p. 693-697
11. Hesdorffer, D., et al., Incidence of status epilepticus in Rochester, Minnesota, 1965-1984. *Neurology*, 1998. 50(3): p. 735-741.
12. Sillanpää M and Shinnar S, Status epilepticus in a population-based cohort with childhood-onset epilepsy in Finland. *Annals of neurology*, 2002. 52(3): p. 303-310.
13. Berg A, et al., Status epilepticus after the initial diagnosis of epilepsy in children. *Neurology*, 2004. 63(6): p. 1027-1034.
14. Singh RK, Stephens S, Berl MM, et al. Prospective study of new-onset seizures presenting as status epilepticus in childhood. *Neurology* 2010; 74:636.
15. Watemala N, Segal G. A suggested approach to the etiologic evaluation of status epilepticus in children: what to seek after the usual causes has been ruled out. *J Child Neurol* 2010; 25:203.
16. ChinR,etal.,Incidence,cause,andshort-termoutcomeofconvulsive status epilepticus in childhood: prospective population-based study.*TheLancet*,2006.**368**(9531):p.222-229.
17. KumarM,KumariR,NarainNP.ClinicalProfileofStatusepilepticus(SE) in Children in a Tertiary Care Hospital in Bihar. *J Clin DiagnRes: JCDR*.2014;8(7):14-7
18. Bergamo S, Parata F, Nosadini M, Boniver C, Toldo I, Suppiej A, etal. Children with convulsive epileptic seizures presenting to PaduaPediatric emergency department: the first retrospective population-based descriptive study in an Italian Health District. *J Child Neurol*.2015;30(3):289-95
19. SachinAdmthe, Nitin Tikare, L.H. Bidari, Vinayak Revankar Dr.Bidari'sAshwiniInstituteofChildHealth&ResearchCentre,Bijapur.NCPCC2005
20. MaytalJ,Shinner S, Moshe SL, Alvarez LA, Low morbidity andmortalityofSEinchildren, *Pediatrics*,1989Mar;83(3):323-31.
21. R K Singh, S Stephens, M MBERl, T Chang, K Brown, L G Vezina,W D Gaillard. Prospective study of new-onset seizures presenting asstatus epilepticus inchildhood*Neurology*.2010Jan 20(2)
22. FernándezIS,KlehmJ,AnS,JillellaD,KapurK,ZelenerJ,RotenbergA,LoddenkemperT.Comparisonofriskfactorsfor pediatricconvulsive status epilepticus when definedas seizures $\geq$ 5minversus seizures $\geq$ 30min.*Seiz*.2014;23(9):692-8
23. Gulati S, Kalra V, Sridhar MR. Status epilepticus in Indian childreninatertiary carecenter.*Indian JPediatr*.2005 Feb;72(2):105-8.
24. K.Eriksson,Treatmentdelayandtheriskofprolongedstatusepilepticus *Lancet*.2006Jul 15;368(9531):222-9.
25. GarzonE,FernandesRM,SakamotoAC.Analysisofclinicalcharacteristicsandriskfactorsformortalityinhumanstatus epilepticus.*Seizure*.2003Sep;12(6):337-45.doi:10.1016/s1059-1311(02)00324-2.PMID:12915079..
26. MahJk, Mah MW: King Khalid national guard hospital, Jeddah,KingdomofSA.*PediatricSE perspectivePediatricneurol* 1999may
27. :20(5):364-9
28. Hui AC, Joynt GM, Li H, Wrong KS, SE in Hong Kong Chineseetiologyoutcomeandpredictorsofdeathandmorbidity.*Seizure*.2003oct;12(7):478-82.
29. MurthyJM,YangalaR.Nizamsinstituteofmedicalsience,Hydrabad,*Seizure*.1999may;8 (3):162-5
30. Bergamo S, Parata F, Nosadini M, Boniver C, Toldo I, Suppiej A, etal. Children with convulsive epileptic seizures presenting to PaduaPediatric emergency department: the first retrospective population-based descriptive study in an Italian Health District. *J Child Neurol*.2015;30(3):289-95.