ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

*International Journal of Medical Science and Innovative Research (IJMSIR)*
*IJMSIR : A Medical Publication Hub*
*Available Online at: www.ijmsir.com*
*Volume – 6, Issue – 1, January – 2021 , Page No. : 21 - 38*

# Clinicoetiological factors and outcome of status epilepticus in children between the ages of 6 months to 12 years

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**Citation this Article:** Dr. Stefy Sunny Jacob, Dr. Rathu Shanthakuma R, Dr. Prasanth Varghese,"Clinicoetiological factors and outcome of status epilepticus in children between the ages of 6 months to 12 years", IJMSIR- January - 2021, Vol – 6, Issue - 1, P. No. 21 – 38.

**Type of Publication:** Original Research Article

**Conflicts of Interest:** Nil

**Abstract**

**Background:** Status epilepticus (SE), the most common neuro-logical emergency in childhood is associated with a substantial morbidity. Longer duration was associated with long term morbidity and mortality. Highest incidence of SE is reported in children below 2 years of age. There is an association between limited medical services, delay in transfer of children to a tertiary center and infections with higher mortality in children from developing countries. This study provides an overview of the Clinicoetiological factors affecting SE in children between 6 months to 12 years of age and their impact on the outcome of these children, in a tertiary center of a developing country.

**Methodology:** All children between the ages of 6months to 12 years admitted to PICU with status epilepticus (SE) were included. Routine investigations, EEG and neuroimaging were done for children with SE. Data were collected by using prepared questionnaire. Follow up was done at 6 months. Outcome was analyzed in-terms-of mortality recurrence and QOLCE-55 score. Statistical analysis was done using Pearson's chi square test and Fischer's T-test.

**Results:** 85 children were admitted with SE. 17(20%) had refractory SE. Median age was 24 months. 61% were females. Median duration of seizures was 25mins. GTCS was the most common type of seizures (79%). Most common etiology was acute symptomatic etiology (65%). Predictors of mortality included, age > 2 years (p=0.003), seizure duration (p=0.000), lag time to treatment (p=0.000), GCS <8 at 24hours (0.000), neuroimaging abnormality (p=0.029), and presence of complications like respiratory (p=0.00) and/or cardiac (p=0.000) compromise. Mortality rate was 10.6% (n=9).

**Conclusions:** Longer duration of seizures and longer lag time to treatment are associated with higher mortality. Hence, termination of SE at the earliest,

prompt management of respiratory or circulatory impairments and improving the overall health care to prevent neuro-infections are important steps to improve outcome.

**Keywords:** Children, Status Epilepticus, Clinicoetiological Factors, Outcome, QOLCE-55 Score, Mortality.

**Introduction**

A seizure is a transient occurrence of signs and/or symptoms resulting from abnormal excessive or synchronous neuronal activity in the brain. Epilepsy is a disorder of the brain characterized by an enduring predisposition to generate seizures. The clinical diagnosis of epilepsy usually requires at least one unprovoked seizure with either a second seizure or enough EEG and clinical information to convincingly demonstrate an enduring predisposition to develop recurrences. Status epilepticus is defined as continuous seizure activity or recurrent seizure activity, without regaining of consciousness, lasting for more than 5 minutes. The incidence of status epilepticus ranges from 10 to 60 in 1, 00,000.[1] Status epilepticus is often referred to as the 'maximum expression of epilepsy'. It is also a severe expression of an acute brain insult or systemic disturbance, which leads to hyper-excitation of nervous tissue. Thus we see that SE is a major neurological and medical emergency requiring early and prompt treatment to prevent significant brain damage and possible mortality. In the general population, both the very young and the elderly represent the groups which are at most risk of developing SE.

SE may be due to various causes. Mortality rates for convulsive SE varies from 7.6% to 39% in population based studies. Population based studies done in California[2] and Richmond[3] have suggested that ethnicity is an important determinant of SE where non-white population had three fold increase in incidence of SE. Amongst children, highest incidence of SE is reported in children below 2 years of age, possibly due to high propensity for acute symptomatic causes of the immature brain[4]. A Few studies on epidemiology of SE have suggested an association between limited medical services, trauma during birth and infections with higher incidence of epilepsy in children from developing countries[5]. The distribution of etiology for status epilepticus is age dependent in children; febrile or acute symptomatic cause is most common in younger children below 2 years of age; whereas remote symptomatic causes predominate in children above 2 years of age[6]. Past history of seizures and neurological insult was more common in children with SE aged above 2 years than those below 2 years. Mortality with SE is higher in children below 2 years of age vastly accounted for high prevalence of acute symptomatic etiology[7]. The sequel of SE (motor deficits, behavioral problems) reported in children above 3 years of age is mere 6%; a sharp contrast to the 30% reported in children under 3 years of age[8]. However, most of this data is from developed countries. Etiology of SE and delay in management may influence outcome[9]. Very little is known about the outcome of children with SE in developing countries. The purpose of this study was to evaluate the etiology, clinical course and short term outcome of CSE in children.

Medical stabilization focuses on providing support of airway, breathing, and circulatory functions while identifying medical complications and seizure precipitants. Medical management should proceed with subsequent testing once stabilization of airway, breathing, and circulation occurs. This may require intubation with mechanical ventilation to support

pulmonary function and vasopressors and fluid resuscitation to support circulation[10]. Neurologically, seizure management involves providing definitive treatment of both clinical and electrographic seizure activity while simultaneously performing an investigation aimed at identifying the cause of the seizure. The Neurocritical Care Society's guideline provides a timed treatment outline for this critical time period[11]. Steps to be completed in the "immediate" (initial five minute) time frame include non-invasive airway positioning, assessment of adequacy of ventilation and perfusion by checking vital signs, establishing a means of peripheral intravenous access, checking a RBS, and checking a set of baseline triage labs.

Health-related quality of life (HRQoL) continues to be an important clinical outcome in individuals with a chronic disease, such as pediatric epilepsy. The ability to identify and accurately assess HRQoL is a priority for both patients and clinicians in their efforts to maintain or improve HRQoL across time. Although the definition of HRQoL may differ across studies, there is widespread agreement that it is the "subjective and objective impact of dysfunction associated with an illness or injury, medical treatment, and health care policy," and that HRQoL should include all components of the World Health Organization (WHO) definition of health as a "state of complete physical, mental, and social well-being." In children with epilepsy, HRQoL is lower than in both healthy children and children with other neurological disorders. HRQoL has been measured among children with epilepsy in several different ways, with a common measure being the Quality of Life in Childhood Epilepsy Questionnaire (QOLCE) [12]. The QOLCE-55 is a 55-item, disease-specific, parent-reported measure of HRQoL for children with epilepsy with items assessing cognitive, emotional, social, and physical functioning. Despite the additional resources required to collect patient-reported outcomes, the benefits of doing so are vast: the use of HRQoL instruments has been shown to increase patient-physician communication, improve patient satisfaction, increase detection of psychosocial morbidities, and improve patient outcomes over time. There are very few studies related to the clinical profile and the short term outcome of children with status epilepticus in Kerala. This study aims at throwing light to the various Clinicoetiological factors of status epilepticus and the short term outcome in children in Kerala.

**Aim & Objectives**

- To study the various Clinicoetiological factors of status epilepticus affecting children between the ages of 6 months to 12 years.
- To study the outcome of children between the ages of 6 months to 12 years who were found to have status epilepticus
- To study the effect of the various Clinicoetiological factors on the observed outcome.

**Research Methodology**

**Study Design**: prospective observational study

**Setting:** Pediatric ICU, Jubilee Mission Medical College & Research Institute, Thrissur

**Study Period:** 18 months (December 2018 – June 2020).

**Sample Size:** $N = \left(\frac{Z^2_{(1-\alpha/2)}\, pq}{d^2}\right)$ = 63. Based on statistical calculations minimum required sample size was 63.

**Inclusion Criteria:** All children between the ages of 6 months to 12 years, admitted to PICU with status epilepticus

**Exclusion Criteria**

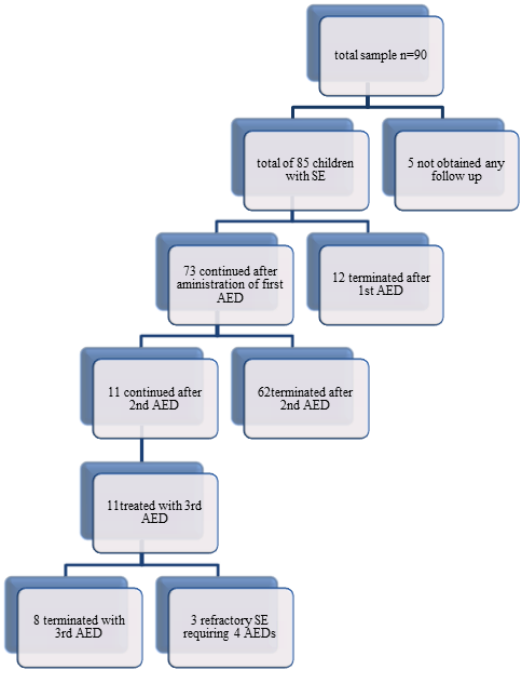
1. Patients with Myoclonic jerks.
2. Patients with Infantile spasm.
3. Patients less than 6 months of age or more than 12 years of age.
4. Patients who do not give the consent or participate in follow up.
5. People who are referred against medical advice.

**Methods of Data Collection**

- Data was collected by using a prepared questionnaire, by interview of parents, history taking, physical examinations, routine blood work-up, monitoring for development of complications
- Details pertaining to the various Clinicoetiological factors of SE were collected and documented in the predesigned questionnaire.
- Recurrence of seizures during the study period was studied and their association with the Clinicoetiological factors were analyzed and documented.
- Death due to status epilepticus and its factors were studied
- Follow up of the patient was done at various intervals:
  - At 1 hour post SE
  - At 24 hours post SE
  - At 6 months after the event.
- QOLCE-55 scoring of children with acute symptomatic etiology was analyzed at follow up at 6months.

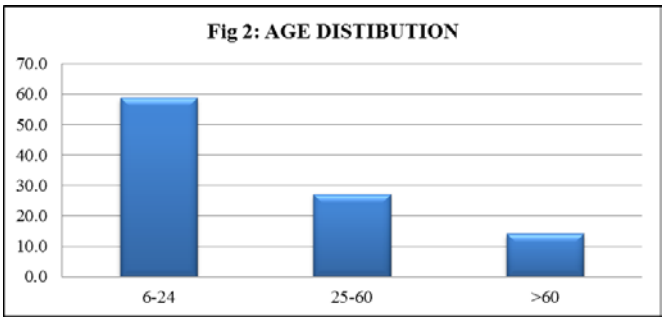
**Data Analysis, Results and Discussion**

The minimum required sample size for the study based on statistical calculations on a primary study was 63. A total sample of 90 samples were collected during the study period. A brief distribution of the sample size is shown in figure 1.




Status epilepticus is a common pediatric emergency that requires prompt recognition and management. The global burden of epilepsy is estimated to be 33 million children, of whom 80% are living in resource poor countries. These countries have a wide treatment gap without access to efficacious anticonvulsant therapy. Status epilepticus is associated with high mortality and morbidity rates in resource poor developing countries [7]. There have been numerous studies conducted in developed countries assessing the etiology, outcome and management of status epilepticus but there is a paucity of data in India. Standard treatment guidelines are variable with limited access to intensive care facilities. Delays in the transfer of patients with impending CSE result in a higher incidence of refractory status epilepticus. The primary objective of this study was to document the clinical profile, etiology, management and outcome in children admitted to a tertiary hospital PICU with SE.

Understanding the clinical profile and factors predicting morbidity and mortality in children with status epilepticus helps to modulate the management and improve prognosis. Of the 85 children who presented with status epilepticus in the age range of 6 months to 12 years, 50 children (58.8%) were in the age group less than 2 years. The median age was 24 months.(Figure 2) Increased prevalence in younger age group has been reported in various studies. 61.2% (52) of the study population were females. This was in contrast to male predominance noted in a study conducted by Mrithunjay Kumar et al in a tertiary hospital in Bihar, India [13].




The most common type of seizure among the study population was generalized tonic-Clonic seizures (79%). GTCS is also found to be the most common type of seizures worldwide both in children and adults. Most of the children admitted with SE had seizures lasting for 15 to 30 mins (63.5%), Median duration being 25 mins. According to the ILAE, the seizures lasting for durations longer than time point T2 is said to have long term complications [14]. Out of the total study population 3 children (3.5%) required almost 4 AEDs to control their ongoing seizure activity. 62 (73%) children required only 2 AEDs to control their ongoing seizures. Use of more drugs to control the ongoing status indicates its severity and this was noted to have a significant impact on the outcome of these children. In-spite of adequate therapeutic measures 17 (20%) children went on to have refractory status epilepticus. In these patients, the seizures lasted for more than 30mins duration. Different studies have reported the prevalence of refractory SE to range from 11-43%. The differences among studies can be attributed to variability in the demographic characteristics of the study population and lack of consensus on standard definition for refractory status epilepticus. Risk factors for Refractory SE such as demographic characters, seizure type, fever association, prior neurological state, lag time for receiving first AED were analyzed and statistical significance was noted in age distribution ($p=0.048$), seizure duration ($p<0.001$), lag time ($p<0.001$), poor GCS at 1$^{st}$ hour ($p=0.032$), GCS at 24 hours ($p<0.001$), significant past history ($p=0.016$), and positive finding on imaging ($p=0.001$). Progression to refractory seizures, were noted to be more in children with ASE than with RSE.(table1) Barzegar et al also noted significantly high incidence of RSE with acute symptomatic etiology [15].

Table 1: association between the Clinicoetiological factors and progression to refractory status epilepticus.

| Clinicoetiological factors | No. of children (n=85) | Progression to refractory status epilepticus | P value (chi square value) |
|---|---|---|---|
| AGE | | | |
| 6-24 months | 50 | 6(12%) | 0.048 |
| 25-60 months | 23 | 6(26%) | |
| >60 months | 12 | 5(41%) | |
| SEX | | | |
| Male | 33 | 10(31.3%) | 0.059 |
| Female | 52 | 7 (35.%) | |
| SEIZURE DURATION | | | |
| 5mins-15mins | 14 | 0(0%) | <0.001 |
| 15mins -30mins | 54 | 0(0%) | |
| >30mins | 17 | 17 (100%) | |
| TYPE OF SEIZURES | | | |
| GTCS | 67 | 12 (17.9%) | 0.353 |
| focal seizures | 18 | 5 (27.8%) | |
| LAG TIME TILL FIRST AED | | | |
| 5mins-10mins | 28 | 0(0%) | <0.001 |
| 10mins-15mins | 43 | 8 (18.6%) | |
| >15mins | 14 | 9(63.3%) | |
| GCS AT 1 HOUR | | | |
| <8 | 71 | 17(23.9%) | 0.032 |
| >8 | 14 | 0 (0%) | |
| GCS AT 24 HOURS | | | |
| <8 | 15 | 14(93.3%) | <0.001 |
| >8 | 70 | 3(4.3%) | |
| OUT-OF HOSPITAL ONSET | | | |
| Yes | 57 | 11(19.3%) | 0.817 |
| No | 28 | 6 (21.4%) | |
| PREHOSPITAL CARE | | | |
| Present | 41 | 10(24.4%) | 0.329 |
| Absent | 44 | 7 (15.9%) | |
| | | | |

| | | | |
|---|---|---|---|
| HISTORY OF NEONATAL SEIZURES | | | |
| Yes | 19 | 6 (31.6%) | 0.135 |
| No | 66 | 11 (16.7%) | |
| HISTORY OF DEVELOPMENTAL DELAY | | | |
| Yes | 29 | 8 (27.6%) | 0.208 |
| No | 56 | 9 (16.1%) | |
| PAST HISTORY OF SEIZURES | | | |
| Yes | 38 | 12 (31.6%) | 0.016 |
| No | 47 | 5 (10.6%) | |
| FAMILY HISTORY OF SEIZURES | | | |
| Yes | 22 | 4 (18.6%) | 0.537 |
| No | 63 | 13 (10.2%) | |
| ABNORMAL EEG | | | |
| Yes | 33 | 8 (24.2%) | 0.436 |
| No | 52 | 9 (17.3%) | |
| IMAGING FINDINGS | | | |
| Present | 35 | 13 (37.1%) | 0.001 |
| Absent | 50 | 4 (8%) | |

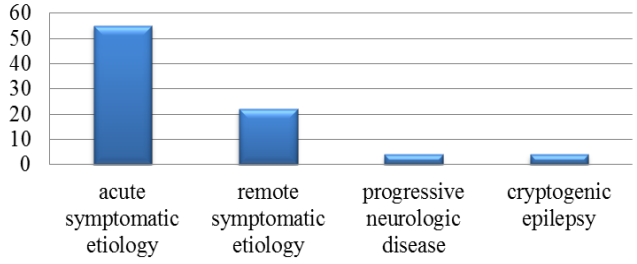
In the present study out-of–hospital onset was noted in 67% (57) of the children. There was significant lag time till treatment noted among this group. 41(48.2%) children had received prehospital care and were referred to a tertiary center from a local hospital with limited facilities. In a study by Fernandez et al. [16], in 64 patients 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 [17] at a tertiary care hospital in New Delhi, 60% had received prehospital treatment. Indumathi et al [18] in their study showed that inappropriate prehospital treatment was a significant predictor of mortality with an odds ratio of 7.82. Treatment of SE needs to be initiated as early as 5 to 10 minutes. The longer the seizure episode the more chances of it going into refractoriness and development of complications. The median lag time in the study population was 10 mins. Children with lag time more than 10mins were noted to progress to refractory seizures or to develop complications like requirement of ventilator support and cardiac compromise. Hence the need for early initiation of AEDs and prehospital treatment is emphasized. Longer duration of stay in PICU was attributed to poor GCS and was proportional poor prognosis. In the present study 2.4 % (2) had spent 4 days in PICU and had grave prognosis. 51 children (60%) in the study population spent 2 days in the PICU. The median duration of PICU stay was 2 days.

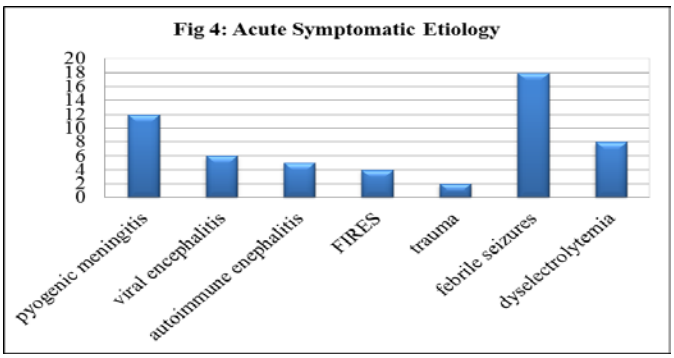
In the present study, 23 (27.1%) children in the study had history of perinatal insult, 19 (22.4%) children had h/o neonatal seizures, and 29 (34%) were children with developmental delay. Considering all the above aspects it was noted that, 47 patients (55%) presented with SE as the first episode of seizure while 38 (45%) had prior

history of seizures. The presence of a positive past history, however, had no effect on the outcome measures like recurrence of seizures, mortality or poor QOLCE score. At the same time it was observed that a child with positive past h/o of seizures was more prone to progression to refractory status epilepticus (p=0.016). Among all the children with positive past history, 76% were on AEDs prior to the onset of the current episode of SE. Studies report that between 62% - 88% of children with first episode of seizure, present with convulsive status epilepticus [19]. The predominance in 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.

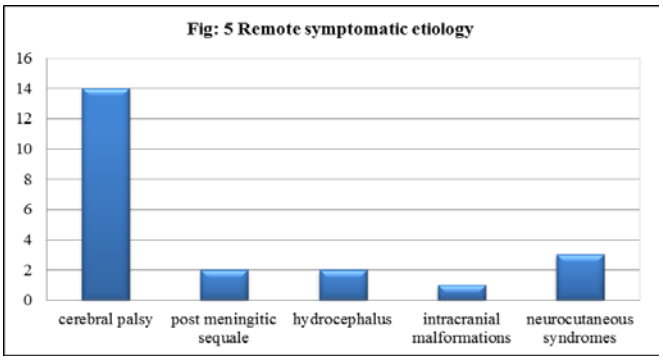
It is noted from various studies that, younger age is more vulnerable for acute etiologies including febrile seizures. Acute etiologies usually have diffuse involvement which could describe the preponderance of generalized seizures. Studies from developed countries report higher incidence of febrile seizures to be the case of CSE in children. In present study, acute symptomatic etiology was the cause in 55 (64.7%) patients. Among the various causes of ASE, febrile seizures accounted for about 32.7% (18 children) of cases. Most common cause of seizures was noted to be CNS infections be it viral or bacterial. This accounted for 36.7% of all the causes. In a study by Madhu et al [19] in south India, Acute symptomatic etiology was the cause of SE in 46 (59.2%) children. Neuro-infection (29.8%) and febrile seizures (11.5%) were the most common acute symptomatic causes. KC Sadik, MD, Devendra Mishra, MD et al, [20] in their study on the Clinicoetiological factors of status epilepticus found similar results to that of the present study. Fifty children (28 males) with CSE were enrolled in their study, of which central nervous system (CNS) infection was the most common etiology. (Figure: 3,4,5) Barzegar M et al [15] in their study conducted in Iran, among 132 children with SE found that acute symptomatic etiology was a risk factor responsible for developing RSE in the patient. Whereas in a study conducted among infant admitted with SE in a tertiary hospital in Philippines by Basant Rai et al [21] it was noted that the most common underlying cause of SE was seizure disorder (29.89%), followed by bacterial meningitis (13.8%), and cerebral palsy (10.3%). Encephalitis was the most common etiology of acute symptomatic SE. Similar inferences could be made in the present study as well. In our study other causes of SE included remote symptomatic etiology (26%) progressive etiology (4.7%) and cryptogenic epilepsy (4.7%). The difference in etiological spectrum of SE in children between developed countries and developing countries could be as a result of high incidence of neuro-infection in the developing nations. Acute symptomatic etiology (other than febrile seizures) was the most common cause of SE in children less than 5 years and remote symptomatic etiology was common in children aged >5 years. This may be because of high proportion of children with prior seizures in older age group. This was explained by Madhu et al [13] in their study.

**Fig 3: CAUSE OF THE STATUS EPILEPTICUS**






In their study, Madhu et al [13] stated that 50 children (58.8%) in the study population had no neuro-imaging finding; this was irrespective of the duration of seizures, age sex or other factors. Neuroimaging was significant only in children with remote symptomatic etiology or progressive neurologic disorders. In our study only 33 (39%) children had EEG abnormalities. This could be attributed to the fact that most common cause of SE in the study population was acute symptomatic etiology, mainly febrile status epilepticus. Among the various factors for remote symptomatic etiology, cerebral palsy was found to be the most common cause (64%). It was also noted that SE due to remote symptomatic etiology was more common in the older children (age more than 2 year. In-spite of adequate measures, 21 (25%) children in the study population developed respiratory complications and required ventilator support whereas cardiac compromise was noted in 13% (11 children) of the population.




Outcome of children with status epilepticus, in the present study was expressed in terms of progression into refractory status epilepticus, recurrence of seizures during the study period, mortality due to SE, QOLCE in children with ASE and parental opinion of child's condition in children with RSE at the end of 6 months following the SE. Of the total number of children in the study, recurrence of seizures during the study period was noted in 25 children (29.4%). The recurrence was in the form of another seizure of smaller duration. Risk of recurrence among the study population was analyzed and none were found to be statistically significant. Among the 25 children with developmental delay 8 (32%) of then had recurrence during the study period. Recurrence was noted in 6 (31.6%) of the 19 children with a positive family history. 30 - 40 % of children among various age groups were found to have recurrence of seizures during the study period. Recurrence was more common among the female children (35%). Recurrence was maximal in those children who had seizures for 15 – 30 mins duration (31.5%). Recurrence was more common in children with focal seizures (50%) this may be attributed to the fact that focal seizures are usually associated with an underlying structural abnormality. Patients who had a lag time of 10-15 minutes to administration of first AED had more recurrence of seizures (41.5%) than those with lesser lag time. Majority of children had an improved GCS at 24 hours. In the present study it was noted that 50% of children with GCS <8 at 24 hours had recurrence of seizures during the 6 months of follow up. Out-of-hospital onset of seizures, and prehospital care did not have any impact on the recurrence during the study period. 47% of children with neonatal seizures were found to have recurrence during the study period. Children with seizures due to

remote symptomatic etiology had more recurrence during the study period (42%). Presence of EEG abnormality was not coinciding with the occurrence of recurrence in the study population. Among the complications assessed, 50% of children who had cardiac compromise during the status epilepticus were noted to have recurrence during the follow-up period.

Mortality rate in present study was 10.6%. Mortality rate in children with CSE ranged from 14- 33% in Indian studies while studies from developed countries report mortality of 9-11%. The risk factors for mortality that were significant in this study included longer duration of status, type of seizures, lag-time till first AED, poor GCS at 24 hours, out-of-hospital onset of SE, history of neonatal seizures, requirement of ventilator support and circulatory impairment. (Table 2) Maximum mortality was noted in children more than 5 years of age (33.3%), and this was found to be statistically significant (p=0.003). This corroborated with the study conducted by Madhu et al [13] in the Indian population. Mortality was noted to be more among the male children than the females in the study population. Children with seizure duration of more than 30mins had a high index of mortality (p<0.001). In the present study, out of 17 children who had seizures more than 30mins, death occurred in 9 (52.6%) children which were statistically significant. It was also observed that mortality was higher among children with GTCS type of seizures. As it is evident from past experiences, delay in treatment of status epilepticus can lead to significant mortality. In the present study the lag time to treatment more than 10 minutes had significant mortality. There were 14 children with lag time of more than 15mins of which 7 children (50%) mortality with a p value of <0.001. A poor GCS at one hour after the SE had no impact on the outcome whereas a GCS <8 at 24 hours post admission proved deleterious to the outcome of these children. Out of the total 85 children 15 of them had GCS <8 at 24 hours, of whom 9 (60%) children expired (p<0.001). In this study, children who had onset of seizures before reaching the tertiary care center were found to have a bad outcome. 57 children had out-of-hospital onset of seizures of which 6 (10.7%) children expired due to the SE. It was observed that, presence of complications like ventilator requirement and cardiac compromise, were directly proportional to mortality. Ventilator requirement was noted in 21 children 9 (42%) of whom expired (p<0.001). Similarly cardiac dysfunction was observed in 9 children (81%) (p<0.001). Indumathi et al [18] in their study done in South India showed that cardiac dysfunction was a significant predictor of mortality. All the above findings point towards the grater relevance of timely identification and treatment of seizures. Upon evaluation of various parameters in history, including history of neonatal seizures, developmental delay, past history of seizures, and family history of seizures did not show any significant impact on the outcome. Though not statistically significant; mortality was noted to be maximal in children with acute symptomatic etiology as the cause of seizures. Abnormalities in EEG or abnormal imaging findings were not an indicator of mortality. Significant mortality was observed among children with positive findings on neuroimaging (p=0.029). In an 8 year review done by Yavini et al in South Africa, [23] in was noted that on multivariable regression, the predictors of poor outcome included the use of more than 3 antiepileptic drugs in PICU, duration of mechanical ventilation for more than 3 days and abnormal neuroimaging findings. Similar risk factors were found in other studies. Prior neurological status of children in the study population did not have

significant effect on mortality. Gulati et al [17] and Kumar et al [23] reported high mortality in children less than 3 years with CSE. Children with prior neurological abnormality had poor outcome in studies by Kwong et al, Kravlj anac et al and Thandavarayan et al. [24,25,26]

Table 2: Association between the Clinicoetiological factors and mortality in the study population

| Clinicoetiological factors | No. of children (n=85) | MORTALITY | P value (chi square value) |
|---|---|---|---|
| AGE | | | |
| 6-24 months | 50 | 1(2.0%) | 0.003 |
| 25-60 months | 23 | 4(17.4%) | |
| >60 months | 12 | 4(33.3%) | |
| SEX | | | |
| Male | 33 | 5 (%) | 0.276 |
| Female | 52 | 4 (7.7%) | |
| SEIZURE DURATION | | | |
| 5mins-15mins | 14 | 0(0%) | 0.000 |
| 15mins -30mins | 54 | 0(0%) | |
| >30mins | 17 | 9(52.9%) | |
| TYPE OF SEIZURES | | | |
| GTCS | 67 | 7 (10.4%) | 0.935 |
| Focal seizures | 18 | 2 (11.1%) | |
| LAG TIME TILL FIRST AED | | | |
| 5mins-10mins | 28 | 0 (0%) | 0.000 |
| 10mins-15mins | 43 | 2 (4.7%) | |
| >15mins | 14 | 7 (50%) | |
| GCS AT 1 HOUR | | | |
| <8 | 71 | 9(12.7%) | 0.159 |
| >8 | 14 | 0(0%) | |
| GCS AT 24 HOURS | | | |
| <8 | 15 | 9(60%) | 0.000 |
| >8 | 70 | 0(0.0%) | |
| OUT-OF HOSPITAL ONSET | | | |
| Yes | 57 | 6 (10.7%) | 0.979 |
| No | 28 | 3 (10.3%) | |
| PREHOSPITAL CARE | | | |
| Present | 41 | 5 (12.2%) | 0.642 |

| | | | |
|---|---|---|---|
| Absent | 44 | 4 (9.1%) | |
| HISTORY OF NEONATAL SEIZURES | | | |
| Yes | 19 | 2 (10.5%) | 0.992 |
| No | 66 | 7 (10.6 %) | |
| HISTORY OF DEVELOPMENTAL DELAY | | | |
| Yes | 29 | 4 (13.8%) | 0.490 |
| No | 56 | 5(8.9%) | |
| PAST HISTORY OF SEIZURES | | | |
| Yes | 38 | 5 (13.2%) | 0.479 |
| No | 47 | 4 (8.5%) | |
| FAMILY HISTORY OF SEIZURES | | | |
| Yes | 22 | 3 (13.6%) | 0.589 |
| No | 63 | 6 (9.5%) | |
| CAUSE OF THE SEIZURE | | | |
| Acute symptomatic etiology | 55 | 4 (%) | 0.456 |
| Remote symptomatic etiology | 22 | 3(%) | |
| Progressive diseases | 4 | 1(%) | |
| Cryptogenic epilepsy | 4 | 1(%) | |
| ABNORMAL EEG | | | |
| Yes | 33 | 5 (15.2%) | 0.300 |
| No | 52 | 4(7.7%) | |
| IMAGING FINDINGS | | | |
| Present | 35 | 7 (20%) | 0.029 |
| Absent | 50 | 2(4%) | |
| VENTILATOR REQUIREMENT | | | |
| Yes | 21 | 9(42.9%) | 0.000 |
| No | 64 | 0(0%) | |
| CARDIAC COMPROMISE | | | |
| Present | 11 | 9 (81%) | 0.000 |
| Absent | 74 | 0(0%) | |

Epilepsy is one of the most common chronic neurologic conditions in children, and it is associated with increased risk for poor health-related quality of life. In various studies, Quality of life was noted top be affected by seizure frequency, maternal education, type of epilepsy, and type of anti-epileptics in Indian children with epilepsy. Cognition, emotional functions and concentration are most commonly affected due to epilepsy [27]. The purpose of the study was to also explore the status of Quality of Life (QOL) in epileptic children by using QOLCE-55 questionnaire. This assessment was employed in children who didn't have any pre-existing neurologic deficit i.e. those with SE due to acute symptomatic etiology. In recent years the goal of epilepsy treatment has been not only control of epileptic seizures, but also improvement of QOL. At present although many scales can be used to assess the patients with epilepsy, only a few are epilepsy specific scales questionnaires. We have used QOLCE-55 version scale and it is already proven that this scale having good internal consistency and reliability so we have used this version to assess the quality of life of epileptic children. Epilepsy is a chronic and serious neurological disorder with multifaceted uncertainties and stigmatization which have significant negative role in the QOL of those afflicted by the disorder.

There is a mixed opinion regarding the impact of the type of epilepsy on the QOL. At 6 months after their episode of SE QOLCE <55 was noted in 60% children more than 5 years of age and this was found to be statistically significant (p=0.016). (Table 3) Other age groups had less number of children with poor QOLCE score. 20% of the male children had poor QOL whereas; only 12.9% of females had low QOLCE score. Though not statistically significant; children with longer duration of seizures (33.3%) were found to have low QOL at the end of 6 months pot-SE.in the present study, it was noted that the type of seizure did not have an impact on the QOLCE score of the study population. But in a study by Nagesh et al [28] conducted in a tertiary hospital at Thelengana it was found that patients with GTCS had poor quality of life in family relationships, social life and ability to work. It is evident that they felt that their standard of living is low with poor relationship with friends and had poor self-esteem. The parameters like duration of SE lag time to treatment, out-of-hospital onset or availability of prehospital care did not show any significant impact on the QOLCE score of these children at 6 months follow-up. Recurrence of seizures during the study period however had significant impact on the QOL. Presence of abnormalities in EEG and/or neuro imaging, or presence of complications during the hospital stay did not have any impact on the QOL of these children. In a study conducted by Heider et al in Pakistan,[29] it was noted that, the good score was mostly seen in 4-8 years (40%) of age while the poor score was seen in 12-16 years age group. Age of the patients (p= 0.825) and development of a child (p=0.109) did not affect the QOLCE score significantly this corroborated with the findings of our study. Heider et al [29] showed that children with co-morbidities, family history of epilepsy and female children of older age group (12-16 years) had poor QOL. Types of seizures and development of the child did not significantly alter the QOLCE score. Vandhana et al [28] in their study in northern India also noted that demographic factors like parental education, socio-economic status and clinical factors like frequency of seizure or type of seizure did not significantly affect the QOL of epileptic children.

Table 3: Association between Clinicoetiological factors and the QOLCE score in the study population.

| Clinicoetiological factors | No. of children (n=51) | QOLCE score <55 | P value (chi square value) |
|---|---|---|---|
| AGE | | | |
| 6-24 months | 35 | 4(11.4%) | 0.016 |
| 25-60 months | 11 | 1(9.1%) | |
| >60 months | 5 | 3(60.0%) | |
| SEX | | | |
| Male | 20 | 4 (20.0%) | 0.381 |
| Female | 31 | 4(12.9%) | |
| SEIZURE DURATION | | | |
| 5mins-15mins | 13 | 1(7.7%) | 0.499 |
| 15mins -30mins | 35 | 6(17.1%) | |
| >30mins | 3 | 1(33.3%) | |
| TYPE OF SEIZURES | | | |
| GTCS | 40 | 6(15.2%) | 0.557 |
| Focal seizures | 11 | 2 (18.0%) | |
| LAG TIME TILL FIRST AED | | | |
| 5mins-10mins | 21 | 2 (9.5%) | 0.479 |
| 10mins-15mins | 27 | 5(18.5%) | |
| >15mins | 3 | 1 (33.3%) | |
| GCS AT 1 HOUR | | | |
| <8 | 38 | 7(18.4%) | 0.662 |
| >8 | 13 | 1(7.7%) | |
| GCS AT 24 HOURS | | | |
| <8 | 1 | 0(%) | 1.000 |
| >8 | 50 | 8(16%) | |
| OUT-OF HOSPITAL ONSET | | | |
| Yes | 32 | 3(9.4%) | 0.131 |
| No | 19 | 5(26.3%) | |
| PREHOSPITAL CARE | | | |
| Present | 24 | 2 (8.6%) | 0.165 |
| Absent | 27 | 6 (22.2%) | |
| | | | |

| | | | |
|---|---|---|---|
| HISTORY OF NEONATAL SEIZURES | | | |
| Yes | 7 | 1 (14.3%) | 0.713 |
| No | 44 | 7 (15.9 %) | |
| PAST HISTORY OF SEIZURES | | | |
| Yes | 10 | 1 (10%) | 0.581 |
| No | 41 | 7 (17%) | |
| FAMILY HISTORY OF SEIZURES | | | |
| Yes | 13 | 2 (15.4%) | 0.972 |
| No | 38 | 6 (15.8%) | |
| ABNORMAL EEG | | | |
| Yes | 14 | 4(28.6%) | 0.132 |
| No | 37 | 4(10.8%) | |
| IMAGING FINDINGS | | | |
| Present | 6 | 3(50%) | 0.014 |
| Absent | 45 | 5(11.1%) | |
| VENTILATOR REQUIREMENT | | | |
| Yes | 4 | 1(25%) | 0.506 |
| No | 47 | 7(14.9%) | |
| CARDIAC COMPROMISE | | | |
| Present | 2 | 0 (0%) | 0.708 |
| Absent | 49 | 8(16.3%) | |

Outcome in children with pre-existing neurologic deficit could not be assessed with the QOLCE scoring system. The outcome such children was analyzed based on the opinion of parents at the end of the follow-up period. The parents expressed their opinions based on their personal observations in regard to the over-all functioning of their children. Association of various clinic-etiological factors with the outcome, were studied. It was observed that the demographic parameters like age, or sex of the child were not statistically significant. Worsening of functional disability was noted to me more in the age group of 2 years to 5 years (71%). Children with SE lasting for 15-30mins (68%) were noted to have more worsening of functional disability than the other categories. Unlike other parameters in the study; children with focal seizures (100%) were found to have more worsening than those with GTCS. This could be attributed to the fact that majority of the children who presented with focal seizures where those who had pre-existing neurologic disorder. Parameters such as lag time, out-of-hospital onset, or prehospital treatment did not have any impact on the outcome. Statistical significance could not be observed in any of the Clinicoetiological parameters studied. In-spite of India being a resource poor setting, the mortality rate due to SE in our study was similar to that noted in developed countries. This clearly indicates that adequate awareness is present

among the population regarding SE and the need for immediate medical intervention.

**Conclusion and Recommendations**

Convulsive status epilepticus in children is associated with significant mortality and morbidity. Longer duration of status is associated with higher mortality. Hence, termination of seizure activity at the earliest, prudent management of associated co-morbidities like respiratory or circulatory impairment in these children would result in improved outcome.

Improving the overall health care and implementation of vaccination strategies to prevent neuro-infections are important steps to prevent occurrence of CSE in childhood. The magnitude of the treatment gap for convulsive status epilepticus (CSE) in resource-poor countries is unknown. Hospital-based cohort studies from developing countries revealed that the management of CSE was usually suboptimal due to lack of advanced diagnostic and treatment facilities, significant delay in patient's presentation at hospital, lag time to treatment with AEDs and shortages of essential antiepileptic drugs (AEDs). However, there were no significant differences in the proportion of refractory status epilepticus, short-term mortalities, and morbidities of CSE between the developed and the developing countries.

This leads us to recommend that:

1. Apt and timely recognition and intervention of status epilepticus is at-most essential for better outcome of these children.
2. Immediate medical attention must be sought if seizures are noted to last for more than 5 mins
3. Regularity of medication is key to avoiding recurrence of seizures.
4. Multimodal interventions involving the pediatrician and pediatric neurologist must be initiated early in the course of the illness.

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