



## Original Research Article

# CLINICAL PROFILE AND OUTCOME OF THE CHILDREN PRESENTING IN ALTERED SENSORIUM WITH OR WITHOUT SEIZURES IN PEDIATRIC EMERGENCY DEPARTMENT OF ADVANCED PEDIATRIC CENTER, PGIMER CHANDIGARH

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## ABSTRACT

**Background:** Altered sensorium with or without seizures is a frequent and challenging presentation in pediatric emergency departments. The etiological spectrum is wide, ranging from benign conditions to life-threatening illnesses, necessitating prompt evaluation and management. The objective is to evaluate the clinical profile, etiological spectrum, treatment requirements, and outcomes of children presenting with altered sensorium with or without seizures in the emergency department of the Advanced Pediatric Centre, PGIMER, Chandigarh.

**Materials and Methods:** This retrospective record-based observational study included children aged 1 month to 13 years presenting with altered sensorium (GCS <15, drowsiness, or confusion) between January 2022 and June 2022. Neonates and children with psychiatric illnesses were excluded. Demographic, clinical, etiological, treatment, and outcome data were analyzed using Microsoft Excel 2010 and Epi Info software.

**Results:** Of 6,945 children visiting the emergency department during the study period, 666 (9.6%) presented with altered sensorium; complete clinical records were available for 595 children. The majority were males (60%), and 57% belonged to the 1–5-year age group. Seizures were present in 82.1% of cases, while 17.8% had altered sensorium without seizures. Isolated CNS involvement was noted in 90.9% of patients. The most common etiologies were breakthrough seizures (30%), febrile seizures (15.5%), and meningitis (16.3%), including tubercular meningitis (32 cases). Other causes included encephalitis (5.3%), hydrocephalus (4.3%), neurometabolic disorders, acute liver failure, hypertensive encephalopathy, intracranial hemorrhage/infarct, and toxic/metabolic causes. Status epilepticus occurred in 5% of children. Mechanical ventilation was required in 4.2%, and inotropic support in 4%. Overall, 65.7% required admission. Among admitted patients, 58.6% were discharged from the emergency, 12.3% were shifted to specialty units, 6.3% left against medical advice, and 5.2% died.

**Conclusion:** Altered sensorium with seizures is a common pediatric emergency, particularly in children aged 1–5 years. Breakthrough seizures were the most frequent cause overall, while CNS infections were the leading cause among admitted children. Early recognition and prompt management are critical to improving outcomes, especially in potentially preventable and treatable conditions such as CNS infections.

**Keywords:** Altered sensorium; Seizures; Pediatric emergency; Central nervous system infections; Meningitis; Status epilepticus; Outcome.

## INTRODUCTION

Altered mental status is a common and often challenging pediatric presentation in the emergency department.<sup>[1]</sup> It accounts for 10-15% of all hospital admissions (B3). Presentations vary widely among different age groups, and the differential diagnosis is broad. Children can present in altered mental status with or without seizures. Seizures are the common pediatric neurological disorder which accounts for about 2% of visits to children's hospital EDs.<sup>[2-4]</sup> The incidence is highest in children of age less than 3 years.<sup>[5]</sup> In most cases, febrile seizures are the foremost common type seen in the pediatric population and account for a majority of seizures in younger children of age below 5 years.<sup>[6]</sup> Where children presenting in altered mental state certainly requires an emergent management, there is also a need to evaluate the underlying cause for definitive short term and long-term management.

**Aims and Objectives:** To evaluate the clinical profile, etiological spectrum, treatment requirements, and outcomes of children presenting with altered sensorium with or without seizures in a emergency department of APC PGIMER CHANDIGARH.

## MATERIALS AND METHODS

**Study design:** This was a retrospective record based observational study. The subjects of the study were children of age group from 1 month to 13 years admitted in emergency department of APC PGIMER from Jan 2022 – June 2022.

**Study setting:** This study was conducted in emergency department of APC PGIMER which is a 22 bedded high-volume tertiary level pediatric emergency department (ED). The median (IQR) daily attendance and admission rate is 58 and 22 patients, respectively. The median (IQR) number of boarders and BOR is 48 (40-58). The median (IQR) LOS was 42.7 (23-71.4) hours.<sup>[7]</sup>

**Collection of data:** Total patients visited in emergency department over the given period were 6945. Total patients as per inclusion criteria enrolled in the study were 666. The records of patients with CNS symptoms were collected from data which was collected at the time of admission and stored in HIS of Emergency department and further supplemented by case files of admitted patients. Out of this, the clinical record was available for 595 children.

The following information was obtained from medical records of each patient; age (1 month to 13

years), sex, seizures, associated symptoms, systems involved (CNS only vs multisystem), significant past history, family history, diagnosis, treatment received in ER (whether inotropes required or not, antiepileptics etc).

### Inclusion Criteria-

We included all patients who visited our emergency with altered sensorium which was defined as;

- GCS less than 15
- Drowsy
- Confused

### Exclusion Criteria

- Neonates
- Those with psychiatric conditions

### Outcome variables:

- Number of children admitted and kept in observation only
- Outcome in admitted children: LAMA/mortality/discharged from emergency or shifted to Advanced pediatric center units (infectious diseases unit/Ped. neurology/pulmonology/allergy immunology/genetics and metabolic/endocrinology)

**Statistical Analysis:** Data was entered, compiled and analyzed using Microsoft Excel 2010. Statistical software EPI-info was used for analyzing the data.

## RESULTS

During this period of study total children of age group 1 month to 13 years visited in ED were 6945. Out of which total 3222 children were admitted in ED with various ailments. Out total children visited, 666 were enrolled in this study. Among them 397 (60%) were males and 269 (40%) were females. 77 (11.7%) children were less than one year old while majority of children i.e. 379 (57%) were between 1-5 year age group. Between 6-10 year age group we had 159 (23.8%) children while only 51 (7.7%) children were above 10 years. Demographically, it was observed that majority of children were from Punjab with number 266 (39.9%) followed by Haryana with 161 (24.1%). 78 (11.7%) were from Chandigarh and 74 (11.1%) from Himachal Pradesh. 19 (2.6%) children were from other areas which included Jammu and Kashmir, Bihar, Rajasthan, Orissa and Delhi. From total 666 children, 438 (65.7%) patients were admitted while 228 (34.2%) patients do not require admission and were kept in observation and sent home after stabilization.

**Table 1**

Physiological dysfunction	Frequency	Percent
Nil	541	90.9
GIT	13	2.1
Cardiorespiratory	14	2.3
Renal dysfunction	13	2.1
Hepatic dysfunction	14	2.3

Clinical record was available in 595 children of the sample, 489 (82.1%) children presented with seizures while 106 (17.8%) had altered sensorium without seizures. Most of the children presented with more than one symptom. Seizure and fever were the most frequently observed symptoms. In 541 (90.9%) patients after history and physical examination only CNS system was involved while in 54 (9.0%) patients apart from CNS system other physiological system dysfunction was also there.

Past history was reviewed in all the patients and it was found that 315 (52.9%) patients had no underlying comorbidity/past history. 182 (30%) children had past history of CNS related illness. Of

which 58 patients were diagnosed cases of epilepsy, 36 patients had previous history of seizures (detailed information not available), 25 were known case of febrile seizures, 35 cases were of GDD/cerebral palsy, other CNS causes included congenital hydrocephalous, west syndrome, Tubercular meningitis, Moya Moya disease, ICSOL. 36 (6.0%) children had past history other than CNS cause i.e. renal, hepatic, endocrine, bleeding diathesis, downs syndrome and others. Of others 5 cases had nonspecific past history of vaccination, HLH, cystic fibrosis. In 58 (9.7%) cases, past history could not be traced.

**Table 2: Significant Past History/Comorbidity**

Past illness/comorbidity	Frequency	Percent
Nil	315	52.9
Epilepsy	58	9.7
Seizure disorder	36	6.0
GDD/ CP	35	5.8
Febrile seizure	25	4.2
Cong hydrocephalus	12	2.0
CKD	8	1.3
Nephrotic syndrome	6	1.0
Hepatic dysfunction	8	1.3
Postmeningitic hydrocephalus	5	0.8
West syndrome	4	0.6
Leukemia/ lymphoma	3	0.5
Down syndrome	3	0.5
TBM	3	0.5
DM	2	0.3
Moya moya disease	2	0.3
MMC	2	0.3
ICSOL	4	0.6
Bleeding diathesis	1	0.1
Others	5	0.8
Not found	58	9.7

In the final diagnoses 179 (30.0) were breakthrough seizure, 54 (9.0) were 1st episode of seizure, 20 patients were with seizure disorder (cause not specified), 92 patients with febrile seizures, 97 children had meningitis, of which 32 were tubercular meningitis. 32 children had encephalitis, 26 were with hydrocephalus of different etiologies of which majority were congenital hydrocephalous

followed by tubercular meningitis. 8 cases had intracranial hemorrhage/infarct. 6 children had ventriculitis, 2 were with neurocysticercosis, 10 patients with neurometabolic disorder, 5 had cerebral venous thrombosis, 9 patients with acute liver failure and 8 patients with hypertensive encephalopathy and 65 patients in others category as shown in following table.

**Table 3**

Final Diagnosis	Frequency	Percent
Breakthrough Seizure	179	30.0
1st episode of seizure	54	9.0
Febrile seizure	92	3.1
Meningitis	97 Tubercular meningitis - 32	16.3 (24.3% among admitted)
Encephalitis	32	5.3
	Autoimmune Encephalitis - 7	
	Meningoencephalitis (infectious) - 24	
	Rabies encephalitis - 1	
Hydrocephalus	26	4.3
	TBM - 8	
	Congenital - 16	
	Post meningitis - 2	
Intracranial Infarct (stroke)	3	0.5
Intracranial Hemorrhage	5	0.8
Ventriculitis	6	1.0
Neurocysticercosis	2	0.3
Neurometabolic disorder	10	1.6
Acute liver failure	9	1.5

Hypertensive encephalopathy	8	1.3
Disseminated viral illness	10	1.6
CSV T	5	0.8
Others (Propranolol Poisoning/H2O2 Poisoning/Snake Bite/ICSOL/Rabies/CAH Crisis/Ketotic Hypoglycemia/Trauma/HUS/Post DPT Encephalopathy/Shunt malfunction/ Hyponatremia/hypocalcemia/severe DKA)	65	10.9

Of the total children, 25 require intubation in the emergency. In 24 patients we had to use inotropes for

management of shock. 30 children were managed on the lines of status epilepticus.

**Table 4**

Status epilepticus	Frequency	Percent
No	565	94.9
Yes	30	5.0

Of the total 595 children visited in our emergency, 399 children got admitted while 206 did not require admission and were kept in observation and sent home after stabilization. Of the total admitted patients 234 were discharged from emergency while

42 patients left against medical advice. 31 patients died in the emergency and 82 patients were shifted to different units of Advance Pediatric Centre of PGIMER as shown in following table.

**Table 5**

Outcome	Frequency	Percent
Discharged from Emergency	234	39.3
Discharged From Observation	206	34.6
LAMA	42	6.3
Died	31	5.2
Shifted to APC wards (ID/Neuro/Endo/Onco/PICU/AI/ Pulmo)	82	12.3

## DISCUSSION

Altered mental status is a common presentation in emergency department in both pediatric and adult age group. Children presenting usually have wide range of underlying etiologies. More often the underlying cause is neurological. Seizure is a common association. Severity may vary from 1 episode of shorter duration seizure activity requiring just observation to cardiorespiratory failure requiring resuscitation.

**Clinical presentation:** In the present observational study, it was observed that 9.58 % presented in emergency department with altered sensorium with or without seizures. In an adult study by Kanich W et al (2002) altered sensorium may be found in 4%–10% of Emergency Department patients.<sup>[8]</sup> In a study by Adhikari S et al (2013) 12.7% children above 6 months of age presented with seizures as a presenting complaint.<sup>[9]</sup>

**Demographical presentation:** In our study majority of children i.e. 57 % belonged to age group of 1-5 years. It was consistent with study done by Bhavya v. et al (2019) in which maximum cases were in the age group of 2-5 years (59%).<sup>[10]</sup> It was observed that majority of the children were from northern and western states of India, mostly from Punjab which accounts for 39.9 %.

Out of total sample, 65.7% required admission treatment and evaluation and 34.2% were just kept in observation and discharged.

**Diagnosis:** In the present study, it was seen that 47.1% patients had associated past illness, out of which

majority had epilepsy. Children also had past history of illness involving other than neurological system which was not directly related to present illness. Most common etiology found out was breakthrough seizure (30%) secondary to past neurological cause. Most of these cases did not required admission and were discharged after keeping in observation for less than 12 hrs. Among admitted patients, most common cause observed was meningitis, which was 24.3 % of all the admitted children. In a study done by Bhavya v. et al (2019), most common cause of children presenting with seizure was found to be meningitis (58%).

**Outcome:** In terms of severity, around 4 % children require cardiorespiratory support in the form of intubation and ionotropic support. Only 5% children landed into status epilepticus.

Among the admitted 399 children, 234 (58.6%) were discharged from emergency and 31 children (5.2%) died. Mortality was seen in children with more than one system involvement i.e. in cases with acute liver failure, CKD with hypertensive encephalopathy, disseminated viral illness and propranolol poisoning. In a study by Bhavya v. et al (2019), mortality rate was 13.8 % among the children presenting with altered sensorium. In a study by Adhikari S et al (2013), mortality rate was 4.4 % among the children presenting with seizures.

## CONCLUSION

Altered mental status and seizure is common presentation among children requiring hospital

admission. Most common presentation was seen in age group of 1-5 years of age. Wide range of underlying etiologies were seen. Among all common cause was found out to be break through seizure. Children with chronic neurological illness requires long term follow up and monitoring. Since the CNS infection being the commonest cause among the admitted children, it is necessary to timely recognise the cause e.g. in tubercular meningitis and also need to emphasise on vaccine preventable CNS infection.

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