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STUDY ON ETIOLOGICAL PROFILE OF NEW ONSET SEIZURES IN ADULTS ADMITTED IN SREE BALAJI MEDICAL COLLEGE AND HOSPITAL, CHENNAI

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ABSTRACT

Clinical and etiological spectrum of acute symptomatic seizures in developing countries is different from developed countries. Hence this study was done to know the various etiologies of new onset seizures in adults in this region. 100 Cases of new onset seizures from SreeBalaji medical college and hospital were included in the study. The etiology was determined by appropriate investigations including neuroimaging and cerebrospinal fluid examination. In patients with cerebrovascular diseases, aged under 40 years, cerebral venous thrombosis accounted for 79%. This study illustrates that the etiological spectrum of seizures in this part of the world is different from that described from developed countries and CNS infections account for a significant number of cases.

Keywords
Acute symptomatic seizures; infections, central nervous system;neurocysticercosis and cerebral venous thrombosis.

Introduction

Seizure has been recognized since antiquity and probably as old as man himself. Seizures are common disorders found all over the world and are encountered frequently during medical practice in variety of settings. Etiological spectrum of acute symptomatic seizures in developing countries is different from developed countries. Presently CNS infections like malaria, meningitis, tuberculosis, HIV, neurocysticercosis CVA, tumours, poisoning, metabolic account for significant number of cases in developing countries. 1 since these infections vary from region to region; etiology of seizure may also vary from region to region. Single small enhancing CT lesions (SSECTL) (ring enhancing/disc lesions, 20 mm in size) are an important cause of seizures in India. Initially it was thought that SSECTL were because of tuberculosis, focal encephalitis, microabscesses and cysticercosis but now histopathological studies suggest that in most of the cases SSECTL is because of dying cysticercus larva. 2 so etiology itself changes over time. In Indian subcontinent cerebral venous thrombosis is common in post- puerperal women presents with severe headache, low-grade fever and seizures. 3 Seizures occur in about 40 percent of patients, which is higher when compared to arterial stroke. Focal seizures are more common but they can generalize to a life- threatening status epilepticus.4 Etiology of seizures can be easily made out in most of the older patients. The causes include subdural haematoma, stroke, CNS infections, degenerative disorders like Alzheimer's disease and malignancy which includes malignant gliomas, and brain metastases. 5 In stroke seizures occur more commonly with hemorrhagicstrok e than with ischemic stroke. 6 They also can occur with systemic metabolic conditions like uremia, hyperglycemia, hypoglycemia, hyponatremia and alcohol withdrawal. 5
Seizures can be presenting feature in tubercular meningitis, which is most common type of chronic meningitis in India. More than 60% of patients with intracranial tuberculoma may have seizures. 1 So this study is done to know the various etiologies of new onset seizures in adults in this region. With the advent of modern technologies like CT scan, MRI and CSF serology for infection like viral, tubercular, neurocysticercosis, the diagnosis of seizure has become more accurate and has completely changed the course of management.

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MATERIALS AND METHODS

Source of data:

100 patients admitted with new onset seizures fromSreeBalaji Medical College and Hospital, who fulfilled the inclusion and exclusion criteria as mentioned below. Study began on February 2014 and ended on Septmber 2015.

Methods of collection of data:

Patients presenting with history of seizures were included in the study. Patient and eyewitness were interviewed regarding history, and clinical examination was done as mentioned in proforma. The investigations included haemoglobin level, total count, differential count, ESR, urine routine, blood urea, serum creatinine, blood glucose levels, liver function test and estimation of serum electrolytes like sodium, potassium, and calcium. Special investigations like lumbar puncture, serological tests, CT scan brain, EEG were done in selected cases.

Statistical method and software:

The collected data was analysed using the computer programme Statistical Package for Social Sciences (SPSS 11.0) and Systat 8.0. Microsoft word and Excel have been used to generate graphs tables etc.

Descriptive analysis was used to compute percentage, to calculate Mean and Standard deviation.

Inclusion criteria:

1. Age of patients more than or equal to 15 years.
2. Patients presenting with new onset seizures.

New onset seizure is defined as the first seizure (or the first cluster of seizures with in 24 hour period) ever experienced by the patient.

Exclusion criteria:

Patient with seizure like episodes

- Hyperventilation
- TIA
- Narcolepsy
- Movement disorder like choreoathetosis, tic disorder
- Psychogenic seizure

RESULTS

Number of cases of new onset seizures studied- **100.**

Table 1: Age and sex distribution

Age in years	Male No	Male %	Female No	Female %	Combined No	Combined %
17-20	3	5.5%	7	15.6%	10	10%
21-30	10	18.2%	18	40.0%	28	28%
31-40	11	20.0%	6	13.3%	17	17%
41-50	13	23.6%	6	13.3%	19	19%

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51-60	9	16.4%	5	11.1%	14	14%
61-70	6	10.9%	2	4.4%	8	8%
>70	3	5.5%	1	2.2%	4	4%
Total	**55**	**100.0%**	**45**	**100.0%**	**100**	**100**
Mean □ SD	44.84□ 16.15		35.22□ 15.33		40.51□ 16.42	

In the present study patient's age ranged from 17 years to 80 years, with Mean of 40.51 years. Majority of patients were in the age group of 21-30 years (n = 28, 28%) followed by 41-50 years (n = 19, 19%). **78%** 0f the patients were in the 2nd-5th decade.12% 0f the patients were in the age group of >60 years. Out 100 patients 55 were males and 45 were females.

Figure 1: Distribution of etiologies

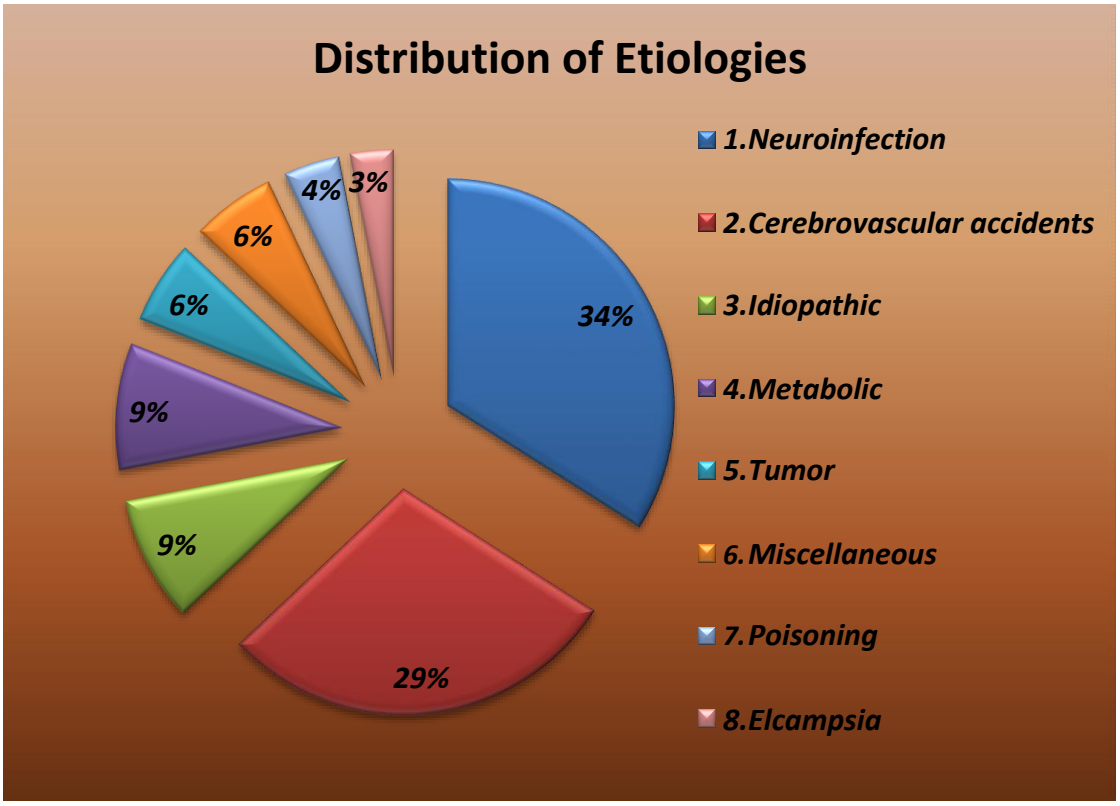

Table 2: Various types of Neurocysticercosis in patients with seizures

Neurocysticercosis (NCC)	Number (n=12)	% Among NCC
SSECTL	5	42

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MHCG	5	42
MREL	2	16

12% of seizures were because of neurocysticercosis (12) of which SSECTL (Single small enhancing CT lesion) were seen in 42%(5) of NCC patients, MHCG (Multiple healed calcified granulomas) in 42% (5) of patients, and MREL (Multiple ring enhancing lesions) in 16% (2) of patients.

Figure 2: Neurocysticercosis in patients with seizures

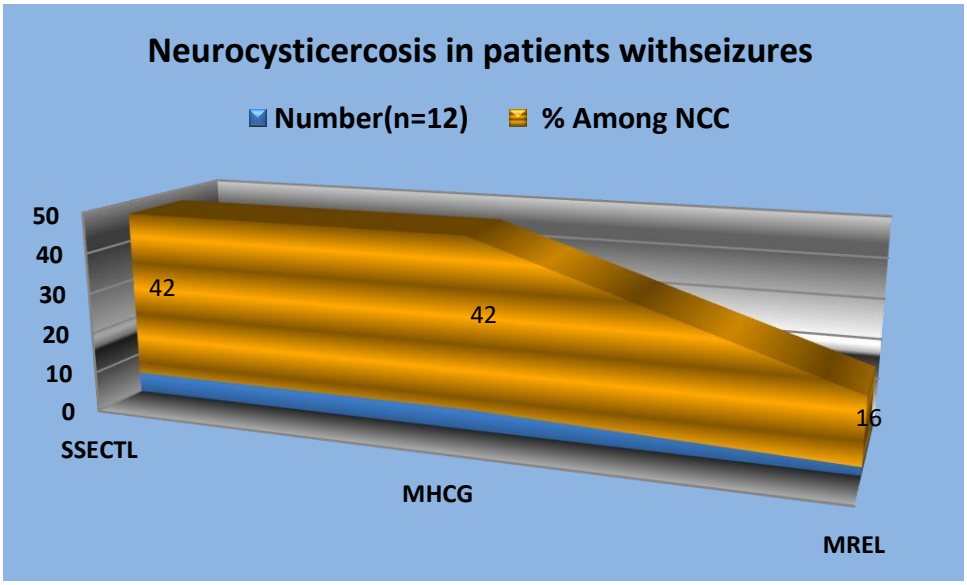

Table 3: Various types of CNS Tuberculosis in patients with seizures

CNS Tuberculosis	Number (n=8)	% among CNS tuberculosis
Meningitis	5	61
Tuberculoma	3	37
Meningoencephalitis	1	12

8% of seizures were because of CNS Tuberculosis (8). **Meningitis** accounted for **61**% (5) followed by Tuberculoma 37% (3).

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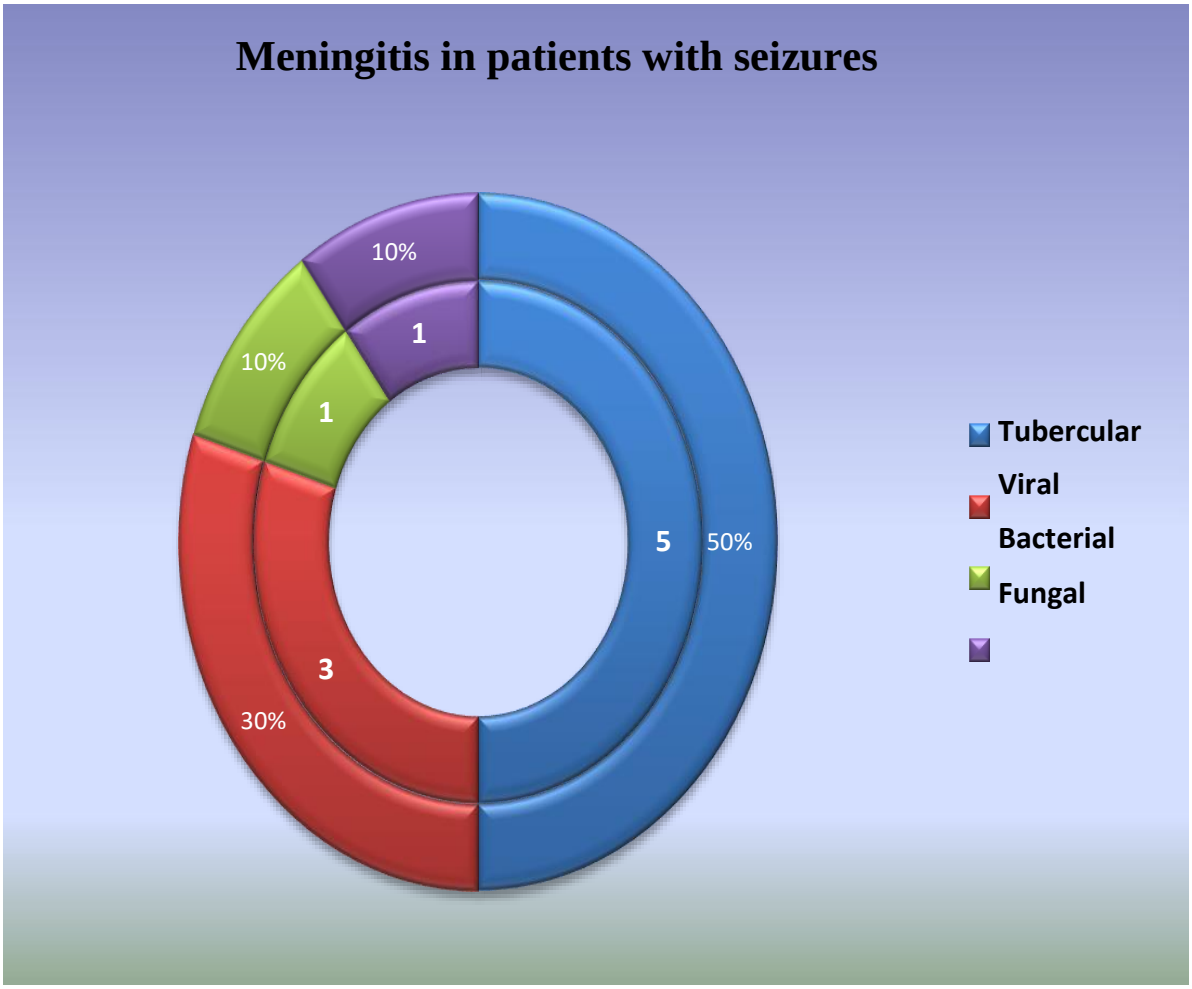
Table 4: Various types of Meningitis in patients with seizures

Meningitis	Number (n=10)	% among meningitis
Tubercular	5	50
Viral	3	30
Bacterial	1	10
Fungal	1	10

Meningitis accounted for 10% (n=10) of seizures. **Tubercular meningitis** is the most common meningitis (n=5, **50%**), followed by viral 30% (3).

Figure 3: Meningitis in patients with seizures



males. 38% of CVA seizures accounted for 20% of seizures in males. 77% of Idiopathic seizures accounted for 12.7% of seizures in males.. 66% of metabolic abnormality accounted for 10.9% of

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seizures in males. 100% of the seizures due to Alcohol withdrawal occurred in males (all occurred in males). andeclampsia 6.7% (3). 100% of the seizures due to Poisoning occurred in females (all occurred in females). Among **CVA** (n=18) Majority of seizures were because of **CVT 61%** (11), followed by infarct 16% (3) and haemorrhage 16% (3). All the seizures due to CVT occurred in females, and all were postpartum. 31% of seizures were pregnancy related.

Figure 4: Etiologies according to sex distribution

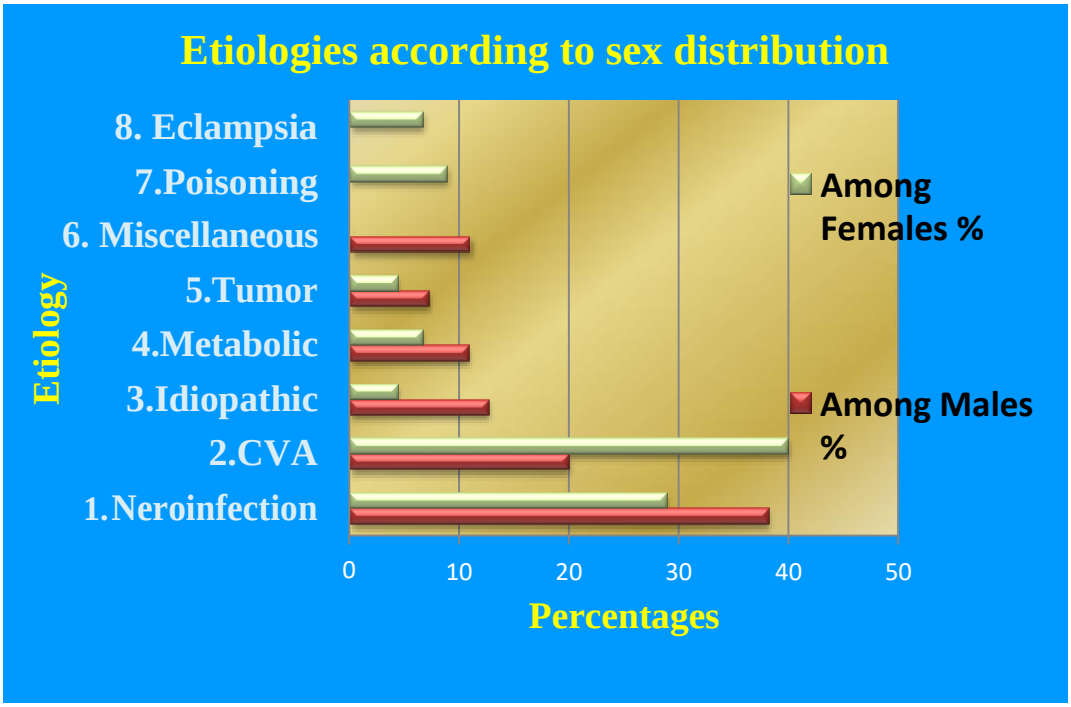
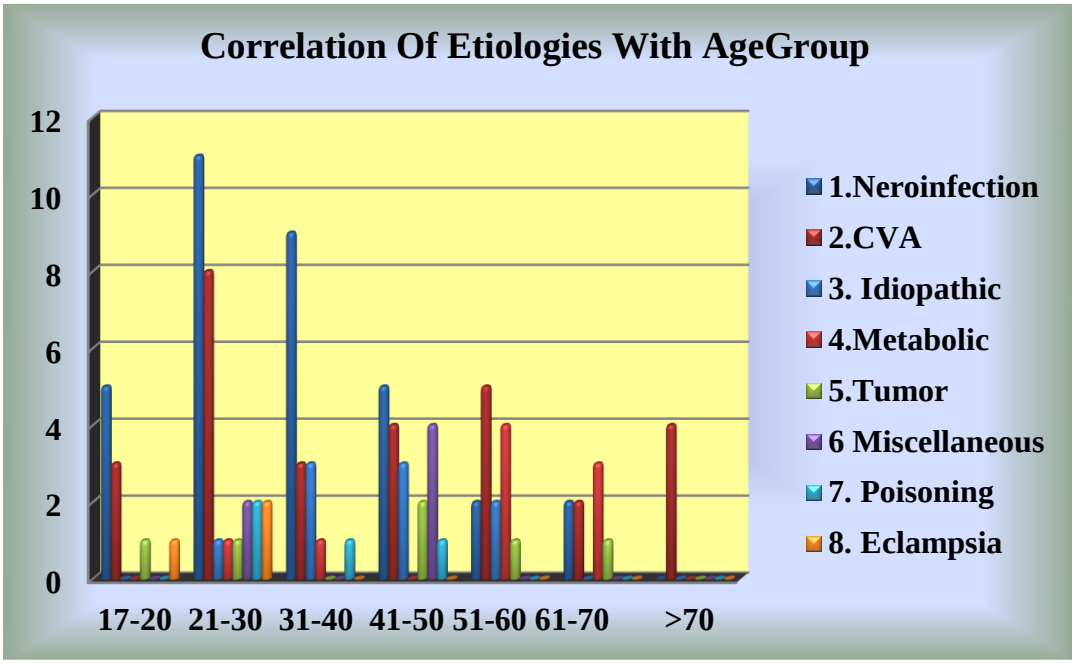


Figure 5: Correlation of etiologies with age group



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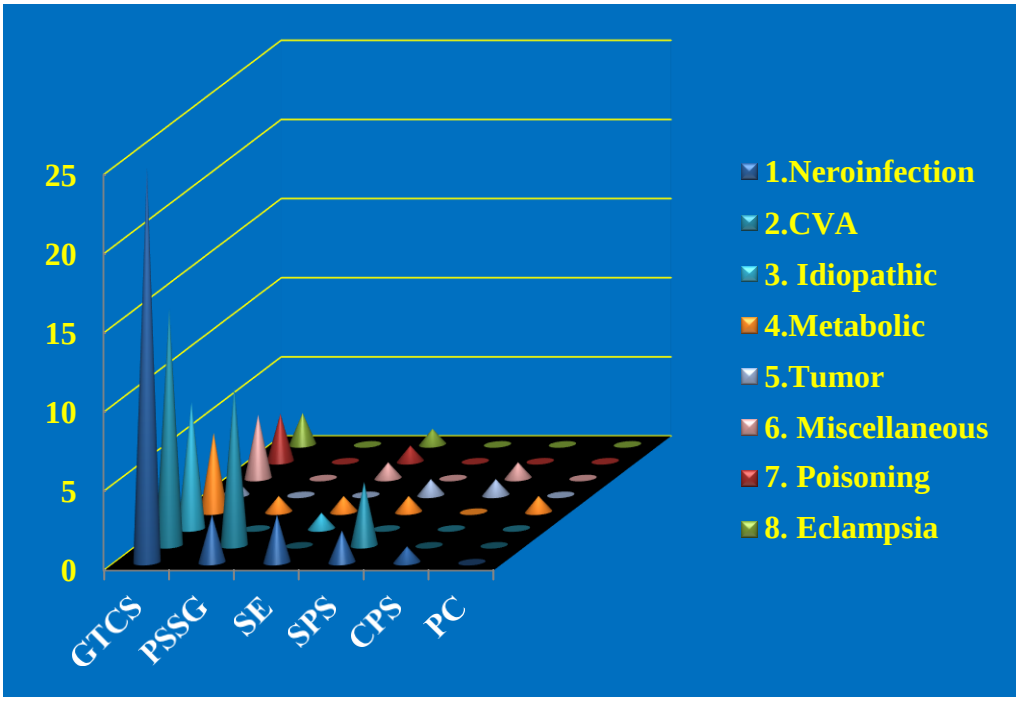
Neuroinfection (40%), followed by CVA (23%) and Idiopathic (13%). 59% of PSSG is caused by CVA. 47% is caused by space occupying lesion. 8% of seizures were SE. M.C cause is neuroinfection (38%). 3% of seizures were CPS. All causes are space occupying lesions. 1 patient had EPC due to Hypocalcaemia.

Most of neuroinfection patients presented with GTCS (73%). 51% of CVA patients presented with GTCS followed by PSSG (34%). 56% of metabolic seizures were GTCS. All patients of poisoning presented with GTCS. 89% of idiopathic seizures were GTCS.

Figure: 6 Association for etiology and type of seizures



DISCUSSION

Seizures are common disorders found all over the world and are encountered frequently during medical practice in variety of settings. Presently CNS infections like malaria, meningitis, tuberculosis, HIV, neurocysticercosis account for significant number of cases in developing countries.7 since these infections vary from region to region; etiology of seizure may also vary from region to region. In Indian subcontinent cerebral venous thrombosis is common in post-puerperal women presents with severe headache, low-grade fever and seizures.3 Single small enhancing CT lesions are frequently reported from India. Etiological spectrum of seizures in developing countries is different from developed countries.[8,9]So this study on "seizures" was done to know the various etiologies of new onset seizures in adults in this region. The present study "Etiological study of new onset seizures" was carried out in the hospital attached to SREE BALAJI MEDICAL COLLEGE. One hundred cases of new onset seizures were selected as per the criteria mentioned in the materials and methods. The observations are compared with the studies done by others on the same subject.[10]

Etiological spectrum depends on age, sex, geography and medical setting.19 Out of 100 patients 55 were males and 45 were females, with male to female ratio of 1.22: 1.0 Majority of males were in 5th decade and females were in 3rd decade. In a study from United Kingdom by

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SANDER14 et al (1990), 25% were below the age of 15 years, 51% in 3rd-4th decade, and 24% above 60 years. Another study from south India (Hyderabad) by NARAYANAN JT and MURTHY JMK70 (2007), 36% were > 60 years, with mean age of 49 years. In the present study (table-1) patient's age ranged from 17 years to 80 years, with Mean of 40.51 years. (Patients more than or equal to 15 years, were included in the study). Majority of patients were in the age group of 21-30 years (n = 28, 28%) followed by 41-50 years (n = 19, 19%).78% 0f the patients were in the age group of 21-60 years. 12% 0f the patients were in the age group of >60 years. In our study majority of patients were younger unlike western studies were many were in older age group. Mean age was lower (41 years) when compared with study by NARAYANAN JT and MURTHY JMK11, probably etiological spectrum varies from region to region. More of CVT patients were seen in our study. No difference in male to female ratio was observed. All studies were slightly male predominate. Neuroinfection is leading cause of seizure which accounted for 34%, followed by Cerebrovascular accidents 29% and metabolic 9%. In 9% of patients cause is idiopathic (cryptogenic). In neuroinfectionNeurocysticercosis accounted for 12% of seizures followed by meningitis 10% and cerebral malaria 6%. Stroke accounted for 16% (Infarct-10, Haemorrhage-6), followed by cerebral venous thrombosis 11%. Neuroinfection occurred in 2% of the patients in SANDER14 et al study, 15% in HAUSER13 et al, 77% in study by MURTHY JMK and RAVI Y1 and 32% in a study by NARAYANAN JT and MURTHY JMK70. In our study etiology is comparable to Indian studies. ingle small enhancing CT lesions (SSECTL) (ring enhancing/disc lesions, 20 mm in size) are an important cause of seizures in India.7 SSECTL accounted for 50% of seizures in study by MURTHY JMK and RAVI Y 1. In our study it occurred only in 5% of cases (table-3). This may be because of regional variation in incidence of neurocysticercosis. CVA occurred in 15% of the patients in SANDER14 et al study, 18% in HAUSER13 et al, 14% in study by MURTHY JMK and RAVI Y1 and 21% in a study by NARAYANAN JT and MURTHY JMK70. In our study CVA occurred in 29%. This is because postpartum CVT were seen in 11% of cases, which is higher even when compared in Indian studies. Alcohol related seizures occurred in 9% of the patients in ANDER14 et al study, 11% in HAUSER13 et al, and 3% in our study. Alcohol related seizures were less common when compared with western studies. Seizures due to poisoning were more common than alcohol withdrawal in present study.

Table 5: Etiological spectrum of seizures in different age group:

HAUSER[13]et al study (1995) (U.S.A).		Our study
15-35 years	Alcohol related	**Neuroinfection (50%)** **CVA (all were CVT)**
35-64 years	Alcohol related Tumour Head	**Neuroinfection (37%)** **Stroke (20%)** **Idiopathic (18%)** **Alcohol related (7%)**

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> 65 years	**Strokes (50%) Metaboli**	**CVA Metabolic Neuroinfection**

Etiological spectrum of seizures in different age group was significantly different in our study, when compared to HAUSER13 et al study. Seizures due to Neuroinfection were leading cause in age group of 15-35 years and 35-64 years in our study, whereas alcohol related seizure in HAUSER13 et al study. Seizures due to CVA occurred in 30% of patient in age group of 15-35 years because all the Cerebrovascular accidents were because of postpartum cerebral venous thrombosis which occurred in 2nd and 3rd decade. 1 case of EpilepsiaPartialis Continua due to hypocalcemia occurred in our study, which was not reported in a retrospective analysis18 of 76 patients with EpilepsiaPartialis Continua, the diagnoses were—idiopathic: 17, ischemic stroke: 15, meningoencephalitis: 8, Rasmussen's encephalitis (RE): 7, granuloma: 6, diabetic- non-ketotic-hyperosmolar-coma (DNKHC): 6, CNS malignancies (primary/secondary): 4, birth injury: 4, cerebral venous thrombosis: 3, CNS tuberculosis: 2, and cerebritis, HIV-related, toxemia of pregnancy, and MERRF one each. SE occurred in 3% of patient in % in study by MURTHY JMK and RAVI Y1 and 10 % in a study by NARAYANAN JT and MURTHY JMK14-19. In our study etiology 8% had SE.

CONCLUSION

From the present study "Etiological study of new onset seizures" the following conclusions were made. 89% of seizures were acute symptomatic seizures in which underlying etiologies can be made. Majority of seizures occurred in patients < 50 years. Etiological spectrum of seizures were varied and included neuroinfection, CVA, Tumour, Metabolic, poisoning and alcohol withdrawal. Neuroinfection and Cerebrovascular accidents accounted for significant number of seizures in all the age groups. Neurocysticercosis is most common cause in Neuroinfection. Cerebral venous thrombosis is an important cause of acute symptomatic seizures among young patients with cerebrovascular diseases.

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Ethical approval: The study was approved by the Institutional Ethics Committee

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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