

Original Research Article

Study of clinical and etiological profile of new onset seizure in adults reporting to tertiary care centre, Mysore

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ABSTRACT

Background: Overall incidence of seizure is found to be 0.2-0.6 per 1000 population per year. A first seizure mandates individual counselling about the risk of recurrence, the pros and cons of drug treatment. Seizures are usually a manifestation of an underlying pathology which may be genetic, structural or metabolic. Objectives of current study were to study the clinical profile of new onset seizures in adults (greater than 19 years) attending to tertiary care Centre, Mysore and to determine the etiology of new onset seizures in adults reporting to tertiary care centre, Mysore.

Methods: All participants fulfilling the inclusion criteria were interviewed as per proforma. Participant's demographic, social and medical details were recorded in proforma sheet and patients were subjected to neuroimaging studies, EEG and other necessary blood investigations. In all cases the seizure type is classified according to ILAE Classification 2017.

Results: Among 100 cases evaluated for new onset, Majority of the patients were 41 to 60 years. Generalised seizures (95%) were more common than focal seizures.

Among neurological etiological causes, vascular causes (34%) were most common. Most common Non-neurological cause for seizures was alcohol withdrawal (46.67%).

Conclusions: If proper analysis of etiology is made, seizures can be treated accordingly thus reducing the morbidity and mortality associated with it. Primary care physicians play a pivotal role in identifying patients with adult onset seizures and should encourage these patients to undergo neuroimaging so as to arrive at an appropriate etiological diagnosis.

Keywords: Seizures, ILAE, Generalised seizures, Alcohol withdrawal

INTRODUCTION

Of the 70 million persons with seizures worldwide, nearly 12 million reside in India¹; which contributes to nearly one-sixth of the global burden. Overall incidence is found to be 0.2-0.6 per 1000 population per year.¹ Seizures is the one of the most common and frequently encountered neurological condition that imposes heavy burden on individuals, families, and also on healthcare systems². The cumulative lifetime incidence of single seizures and recurrent epileptic seizures (including febrile

seizures) is estimated at 5-10%. Epileptic seizures are responsible for 1% of hospital admissions and 3% of emergency department attendances.² Determining the type of seizure that has occurred is essential for focusing the diagnostic approach on particular etiologies, selecting the appropriate therapy, and providing potentially vital information regarding prognosis. It was also being observed that there was no major hospital based cross sectional studies which evaluated new onset seizures in adults from developing countries especially their clinical and etiological profile both together.

Objectives

Objectives of current study were; to study the clinical profile of new onset seizures in adults (greater than 19 years) attending to tertiary care centre and naming seizures according to the 2010 ILAE classification of seizures and to determine the etiology of new onset seizures in adults reporting to Tertiary care centre, Mysuru.

METHODS

Source of data

Patient presenting with new onset seizures attending the medical emergency department, neurology and medicine outpatient department of Mysore medical college and Research Institute during the period of December 2017 to May 2019.

Study design, duration and sample size

Current study was a cross sectional observational study conducted between December 2017 to May 2019. Total hundred patients were included in the study.

Inclusion criteria

All the participants with age more than 19 years of age reporting with new onset of seizures by history and having EEG abnormality and patients giving valid informed consent were included in the study.

Exclusion criteria

Patients with past history of seizures and patients with pregnancy and postpartum seizure were excluded from the study.

Procedure

The participants were clearly explained about the objectives of the study and informed consent was obtained in local language (Kannada) prior to the administration of the interview schedule. All participants fulfilling the inclusion criteria were interviewed as per proforma and a detailed clinical examination was done. Participant’s demographic, social and medical details were recorded in proforma sheet and patients were subjected to neuroimaging studies and EEG. Other necessary blood investigations were also done. The diagnostic probability was based on clinical data obtained from the patient charts and the results of the EEG and Neuroimaging studies. In all cases the seizure type is classified according to International league against epilepsy (ILAE) classification based on description of seizures by patient and/patient attendants. The etiology of seizures was determined on the basis of medical history, neurologic examination, the EEG recording, and Neuroimaging studies. Data obtained from these patients

were systematically recorded and analyzed using Statistical Package.

The following parameters were analysed; complete hemogram, random blood sugar, renal function test, liver function test, serum electrolytes, computed tomography of brain-plain, electroencephalogram (if required), computed tomography of brain-contrast (if required), cerebrospinal fluid analysis (if necessary, magnetic resonance imaging of brain (if required), magnetic resonance spectroscopy (if required), ABG analysis (as per clinical demand).

Statistical analysis

Statistical analysis was carried out using SPSS version 21.0. (IBM SPSS, US) software with regression modules installed. Descriptive analyses were reported as mean and standard deviation of continuous variables. Chi square test and Fischer exact test were used to establish association, p<0.05 was considered significant.

RESULTS

A total of 100 cases of first episode seizures in adults aged >18years were studied considering the inclusion and exclusion criteria.

Incidence

The number of admissions in department of medicine during the study period was 29867; accordingly the incidence of new onset seizure in present study was 1.12%. Majority of the cases were in late adulthood group, accounting for 54%.

Table 1: Distribution according to age.

Age (years)	N	%
Early adulthood (18-45)	46	46
Late adulthood (>45)	54	54

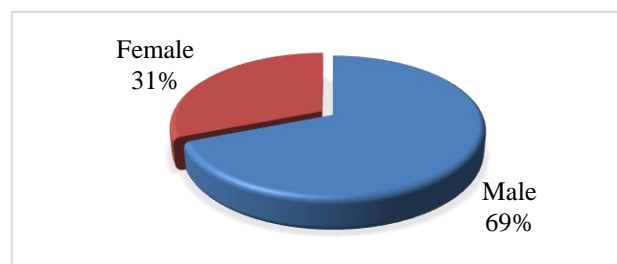


Figure 1: Distribution of according to gender.

Semiology of seizures

The most common type of seizures (semiology) were generalised and seen in 95% of the cases, focal seizures constituted about 5%. Most of cases in our study had duration in between 2 minutes to 2.99 minutes.

Number of episodes

41% of patients had only one episode seizure and 2% cases had status epilepticus.

Distribution of associated symptoms

Among 100 cases, headache was seen in 12%, tongue bite 55%, urinary incontinence 21% , focal deficits in 10% no obvious finding in 16% cases.

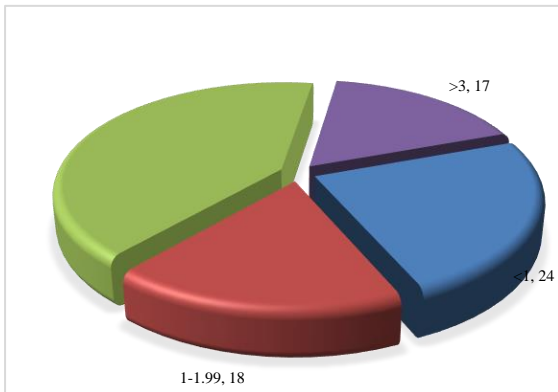


Figure 2: Duration of seizures.

Distribution of related medical and past history

Among neurological causes (N=100), CVT was seen in 26.3% (N=15), CVA In 15.7% (N=9) tuberculoma in 10.4% cases (N=6) cryptococcal meningitis in 3.5% (N=3), tuberculoma in 10.4% cases (N=6) ICSOLs in 15.7% (N=9), basal ganglia calcification 3.5% (N=2), hypertensive encephalopathy and meningoencephalitis in 1.75% cases each.

Table 2: Distribution of related medical and past history.

Parameters	N	%
Substance abuse (alcohol, tobacco)	43	43
Hypertension	40	40
DM	33	33
H/O CVA	15	15
Retroviral disease	5	5
TB	9	9
Past h/o head injury	1	1

Distribution of etiology among ICSOLs (non-infectious)

Among ICSOLs (N=12), glioma was seen in 25% (N=4), GBM in 25% (N=4), and cerebral metastasis in 50% (N=8). Among vascular causes (N=34), CVT in 44.11% (N=15) chronic infarct was seen in 2.64% (N=9), acute infarct in 11.76% (N=4), intraparenchymal hemorrhage in 8.82% (N=3), EDH in 2.94% (N=1) brainstem bleed in 2.94% (N=1) & in hypertensive encephalopathy in 2.94% (N=1).

Distribution of etiology among ALL together causes

Among etiology of all together causes, CVT is the most common cause for new onset seizure in my study accounting for 15% cases (N=15) with alcohol withdrawal (14%) and idiopathic(13%) causes the next most common ones. Hypertensive encephalopathy and meningoencephalitis are the least common ones to cause new onset seizure accounting for 1% cases each.

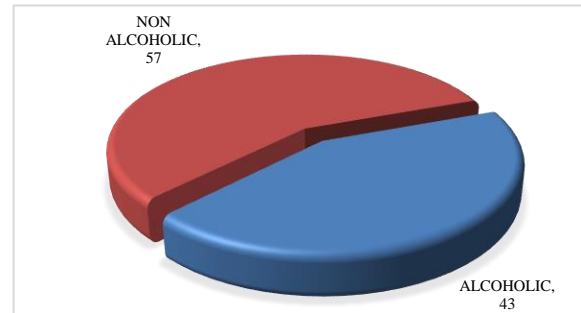


Figure 3: History regarding alcoholism.

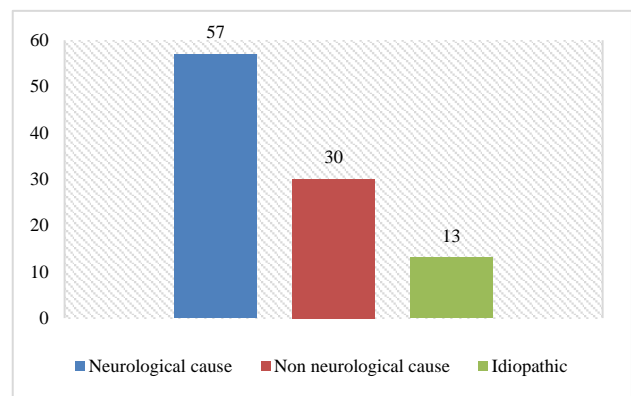


Figure 4: Distribution according to etiology.

Distribution of EEG findings

Out of 100 cases, EEG was done in 45 cases only as demanded by clinical situation. About 14 % had an abnormal EEG record while the rest 31% (n=31) had a normal EEG record.

Distribution of findings in neuro-imaging

Radiological abnormalities in this study were of vascular etiology in 34% (N=34) Including CVT (N=15) CVA (N=9) GLIOSIS (N=9) hypertensive encephalopathy changes (N=1) diffuse cerebral atrophy in 5% (N=5), ICSOLs in 9 % (N=9), others were basal ganglia calcification in 2% (N=2) Brainstem bleed, EDH, meningoencephalitis accounting for 1% cases. In males (N=69) vascular cause was seen in 22% (N=22) among which CVT accounted for 9 cases and CVA 6 cases, scar epilepsy 6 cases, & hypertensive encephalopathy 1% cases (N=1). In non-neurological causes (N=26) among

which alcohol withdrawal accounted for 14% (N=14) uraemia accounted for 8 cases and hyponatremia and hyperglycemia accounted for 3 and 1 cases respectively. Idiopathic cause was found in 7% (N=7), neuro-infection in 5% (N=5), ICSOLs in 5% (N=5) HIE in 1% (N=1) and basal ganglia calcification in 1% (N=1). In females (N=31) vascular cause was seen in 12% (N=12) among which CVT accounted for 6 cases and CVA 3 cases, and scar epilepsy 3 cases. In non-neurological causes (N=4) among which hyponatremia and hyperglycemia accounted for 1 and 3 cases respectively. Idiopathic cause was found in 6% (N=6), neuro-infection in 4% (N=4), ICSOLs in 4% (N=4) and basal ganglia calcification in 1% (N=1).

Table 3: Distribution of etiology among neurological causes.

Etiology among neurological cause	N	%
Cerebral venous thrombosis	15	26.3
Scar epilepsy	9	15.7
Cerebro vascular accident	9	15.7
Icsol (non infectious)	9	15.7
Tuberculoma	6	10.4
Hypoxic ishaemic encephalopathy	3	5.4
Cryptococcal meningitis	2	3.5
Basal ganglia calcification	2	3.5
Hypertensive encephalopathy	1	1.75
Meningoencephalitis	1	1.75
Total	57	100.0

Distribution of etiology in different age group

In the age group of 18-20 years (N=1) vascular cause in form of EDH was seen in 1 case. In the age group of 21-40 years (N=30), idiopathic cause was seen in 5%, vascular in 10% neuro-infection in 4%, non-neurological cause in 9% (N=9), ICSOLs in 1%. In the age group of 41-60 years (N=47), idiopathic cause was seen in 9%, vascular in 16% neuro-infection in 3%, non-neurological cause in 14% (N=14), ICSOLs in 4%. In the age group of >60 years (N=22), vascular in 6% neuro-infection in 2%, non-neurological cause in 10% (N=10), ICSOLs in 4%.

DISCUSSION

The accumulated data from clinical evaluation, biochemical test, EEG and imaging have been analysed and compared with other studies. Similarities and differences have been noted which will help in drawing conclusion from this study. Although, the age of onset of epilepsy can give a clue to the causation but, etiology of epilepsy after the age of 18 are variable in both types and frequencies. The vast variability depends on many factors which could be environmental, genetic and to some extent the level of living. With history, clinical examination, and appropriate investigations, including neuroimaging, if proper analysis of etiology is made, the presenting seizures can be treated accordingly, thus

reducing associated social consequences, morbidity and mortality. There was no major hospital based incidence studies which evaluated new onset seizures in adults from developing countries like India especially the southern part.

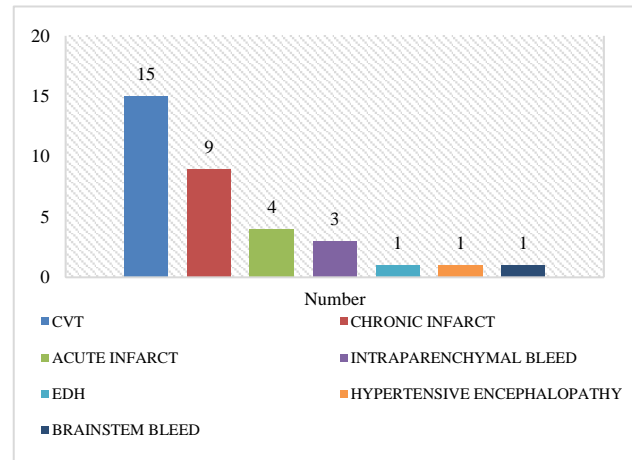


Figure 5: Distribution of etiology among vascular causes.

Table 4: Distribution of etiology among non-neurological causes.

Etiology among non-neurological cause	N	%
Alcohol withdrawal	14	46.66
Uraemia	8	26.66
Hyperglycemia	4	13.34
Hyponatremia	4	13.34
Total	30	100

Distribution of age

In the present study, patients aged less than 40 years were 31%, and >40 years were 69%. Patients aged < 40 years in other studies done by Sheikh et al were 40%, Sander et al were 60.99, Muralidhar et al were 64%, and Chalasani et al were 46.9% and Joshi et al were 52%.³⁻⁷ The finding of first episode seizure as common in less than 40 years age group were in discordance with other studies but shown a hike in incidence in age group 40-60 accounting for 47% in present study which was again in discordance with other studies most likely due to recent increase in middle aged population in India & improving health care facility compared to previous years. In the present study, patients aged >60 years was 22%. In other studies, done by Sander et al were 22.5%, Maria et al was 45.45%, Forsgren et al was 41.8% and Jallon et al was 40.1%.⁸⁻¹⁰ Indian studies revealed Chalasani et al 15.3%, Joshi et al 18.3%.^{6,7} This finding of first seizure in >60 years age group were in concordance with Indian studies but discordance with other studies from developed countries because of increased life expectancy in developed countries, better health care facility and awareness. In developing countries like India, seizures are less notified

because of lack of knowledge, social stigma and financial constraints. The other factor could be that in elderly people, seizures are neglected as compared to young population.

Table 5: Distribution of etiology among all together causes.

Etiology	N	%
Cerebral venous thrombosis	15	15.0
Alcohol withdrawal	14	14.0
Idiopathic	13	13.0
Icsol (non infectious)	9	9.0
Scar epilepsy	9	9.0
Cerebrovascular accident	9	9.0
Uremia	8	8.0
Tuberculoma	4	4.0
Hyperglycemia	4	4.0
Hyponatremia	4	4.0
Hypoxic ishaemic encephalopathy	3	3.0
NCC	2	2.0
Cryptococcal meningitis	2	2.0
Basal ganglia calcification	2	2.0
Hypertensive encephalopathy	1	1.0
Meningoencephalitis	1	1.0
Total	100	100.0

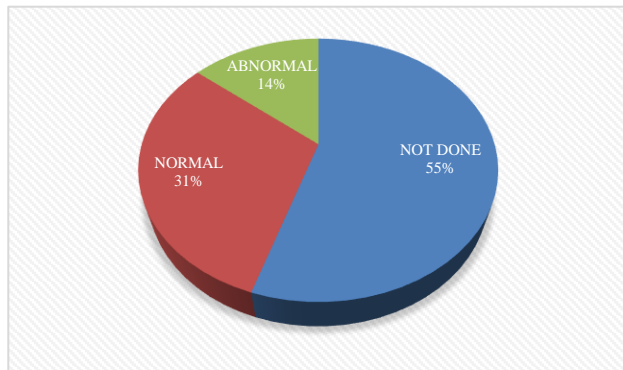


Figure 6: Distribution according to EEG findings.

Type of seizures

Among the type of seizures, generalised seizure in studies by Sander et al was 77.57%, Jallon et al was 31.9%, Sheikh et al was 75.09%, Rajadhyaksha et al was 71%, Rao et al was 65%, Chalasani et al was 56%.^{6,8-10} Focal seizures seen in studies by Rajadhyaksha et al was 29%, Sheikh NA et al was 24.91%, Rao et al was 35%, Chalasani et al was 44%, Ashwin et al was 43%.^{6,11-13} In the present study, generalized seizures including 2 generalized status epilepticus were seen in 95% patients, focal seizures were seen in 5% patients. Generalized seizures as common presentation in the present study is in concordance with the above studies. Focal seizure in the studies done by Jallon et al was 46.2%, King et al was 58% and Murthy et al was 78% which is in discordance

with the present study.^{6,10-15} The reason for generalized seizure preponderance may be related to the literacy level of the bystanders and knowledge, attitude and practice about the disease. People in this area usually consider the obvious tonic-clonic movements as seizures and other forms of seizures are not given importance which could be the probable cause for this disparity incidence of seizure type.

Table 6: Etiology of seizures according to sex distribution.

Etiology	Male	Female	Total
Alcohol withdrawal	14	0	14
Idiopathic	7	6	13
Cerebral venous thrombosis	9	6	15
Scar epilepsy	6	3	9
Cerebro vascular accident	6	3	9
Icsol(non-infectious)	5	4	9
Tuberculoma	1	3	4
Uraemia	8	0	8
Hyperglycemia	1	3	4
Hyponatremia	3	1	4
Hypoxic ishaemic encephalopathy	3	0	3
NCC	2	0	2
Cryptococcal meningitis	2	0	2
Basal ganglia calcification	1	1	2
Hypertensive encephalopathy	1	0	1
Meningoencephalitis	0	1	1
Total	69	31	100

Etiology of seizures

In a study by Jallon et al in which 926 patients were recruited, cryptogenic cause was seen in 49.2%, vascular cause in 31.2%, head injury in 2.8% and neuro-infection in 12.7%. In a study by Sander et al in which 423 patients were recruited, vascular cause was seen in 13.2%, non-neurological cause in 9%, CNS tumours in 6% and neuro-infection in 2%. In a study by Hauser et al non-neurological cause was seen in 21%, vascular cause in 15%, neuro-infection in 15% and CNS tumours in 13%.^{4,11,16} In a study by Rao et al in which 100 patients were recruited, neuro-infection was seen in 36%, vascular cause in 25%, non-neurological cause in 12%, unknown cause in 6% and CNS tumors in 4%. In a study by Chalasani et al in which 98 patients were recruited, neuro-infection was seen in 39%, vascular cause in 26%, non-neurological cause in 15%, unknown cause in 12% and CNS tumors in 3%.¹⁷ In a study by Rajadhyaksha et al in which 260 patients were recruited, Neuroinfection was seen in 35%, idiopathic in 28%, cerebrovascular accidents (CVA) in 12%, and non-neurological cause in 10%. In a study by

Sheik et al in which 144 patients were recruited, cerebrovascular accidents (CVA) was seen in 48.6%, Neuro-infection in 18.7%, CNS tumors in 12.5% and non-neurological cause in 10.4%.³

Table 7: Distribution of patients aged <40 years in different studies.

Study	% of cases <40 years	% of cases 40-60 years
Sheikh et al	40	22
Sander et al	60.99	16.4
Chalasani et al	46.9	37.75
Muralidhar et al	64	22
Joshi et al	52	30
Present study	31	47

Table 8: Distribution of patients aged >60 years in different studies.

Study	% of cases aged >60 years
Maria et al	45.45
Forsgren et al	41.8
Jallon et al	40.1
Chalasani et al	15.30
Joshi et al	18
Present study	22

In the present study, vascular cause was seen in 34% cases, non-neurological cause in 30%, unknown cause in

13%, neuro-infection in 9%, and ICSOLs in 9%. The vascular etiology as a common cause for first episode seizure in adults was seen in the study by Sheik NA et al, Ashwin et al, Joshi et al and also in the present study which is concordance with above study. Vascular basis for the new onset seizure is supported by observation that it is more common in the presence of conventional risk factors for CVD such as hypertension, dyslipidemia etc. In new onset seizure where the cause was idiopathic as seen in the study by Sudhir et al was 12% and in the present study it is 13%.

Distribution of causes of seizures in vascular etiology

In study by Sudhir et al 12 cases of vascular aetiology 6 were thrombotic and 3 were haemorrhagic with no relation between haemorrhage / thrombosis as cause of post stroke acute symptomatic seizures and 3 showed infarcts. In a study by Rajadhyaksha et al among vascular cause, stroke was seen in 60% and cerebral venous thrombosis in 28%. In a study by Rao et al among vascular cause, infarct was seen in 48%, haemorrhage in 36% and cortical venous thrombosis in 12%. In the present study, among 33 vascular cause, CVT was seen in 43.45%, chronic infarct was seen in 27.27%, acute infarct in 12.12%, and intraparenchymal hemorrhage in 9.09% which is in discordance with both studies. This variation may be related to the study population, sample size & prevalence. In the present study, among the patients with infarct& haemorrhage (IC bleed), generalized seizure was the most common type of seizure.

Table 9: Various studies about etiology of seizures.

Study	Vascular	Neuro-infection	Non neurological (including alcohol related)	ICSOLs	Idiopathic
Rao et al	25	36	12	4	6
Sudhir et al	26	39	15	3	12
Rajadhyaksha et al	12	35	19.3	10	28
Ashwin et al	21	17	15	14	18
Joshi et al	40	20	6	10	22
Sheik et al	48.6	18.7	10.4	12.5	0
Present study	34	9	30	9	13

Distribution of non neurological causes of seizures

In a study by Rajadhyaksha et al, among non-neurological (including alcohol related) causes, alcohol withdrawal seizures seen in 46%, hypoglycaemia in 22%, hepatic encephalopathy in 18%, hyponatremia in 12% and hypokalaemia in 2%. In a study by Rao et al among non-neurological seizures, alcohol withdrawal seizures were seen in 33%, hypoglycaemia in 22%, hyponatremia for 22% each and hyperglycaemia and hypocalcaemia in 11% each. In a study by Kanitkar et al alcohol withdrawal was the most common non-neurological cause of adult-onset seizures seen in 31%.¹⁸ In the present study, among

metabolic causes, alcohol withdrawal seizure was seen in 59.7% of the cases, uraemia in 12.9%, hyperglycaemia in 12.9%, hyponatremia in 6.7% Alcohol related seizure was the commonest among non-neurological causes for seizures in present study which is in concordance with observations made by Rao et al, Rajadhyaksha et al and Kanitkar et al.

Strengths of the study

Current study imparts the current scenario of the pattern of new onset seizures in adults in a tertiary care centre as

seizures beginning in young require special care and attention with regard to their aetiology.

Limitations

Limitations of current study were; in addition to the possibility of occasional cases not being reported, an under ascertainment of cases with partial seizures without motor manifestations is likely to occur in persons with poor communication abilities. The major groups with poor communication are persons with MR or dementia, the latter group being common among the elderly. Though CT brain was done in all the patients, many patients didn't undergo MRI brain as per epilepsy protocol in which CT was normal. This would have made some difference in cases in which aetiology was unknown. Because examination of immunological measures is seldom part of a routine seizure evaluation, possible immunological causes for seizures are probably underreported. This was a single-centre study.

CONCLUSION

In terms of today seizure is not cryptogenic, born of ignorance, but is merely disturbance of the normal rhythm of the brain. Etiological spectrum of new onset seizures in our country is different from that observed in developed countries. The aetiology of seizures in adults also varies according to geographic distribution and the culture prevalent in the area. For example, in some states due to easy availability of alcohol seizures due to alcohol withdrawal are more prevalent. Seizure being considered as social stigma, has got many health-related consequences.

Hence proper diagnosis and appropriate management is necessary to prevent further episodes, thus improving the quality of life. With the history and clinical examination, if proper analysis of etiology is made with available investigations, the epilepsy can be treated accordingly thus reducing the morbidity and mortality associated with it. Various risk factors associated with risk of new onset seizures are TB, alcohol, hypertension, old stroke and positive family history.

It is important to avoid an incorrect diagnosis of epilepsy with all its implications for an unclassified paroxysmal event (seizure mimickers). Primary care physicians play a pivotal role in identifying patients with adult onset seizures and should encourage these patients to undergo neuroimaging so as to arrive at an appropriate etiological diagnosis of adult onset seizures. Most of the patients in the present study were from semi-urban and rural areas where substance abuse in the form of alcoholism was contributing to higher incidence of seizures in young adults.

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Conflict of interest: None declared

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

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