DISCUSSION
Epilepsy is a common illness. Five per thousand population seems to be affected (College of General Practitioners, 1966). The overall prevalence rate per 1000 of the general population vary from 1.3 in Pernosa (Lin, 1933) and 1.5 in Niigata, Japan (Sato, 1964) to 9.2 in Warsaw (Kolinski, 1974a) and as high as 19.5 in Bogota, Colombia (Gomez, Aranioz and Torres, 1976). In over half of the studies the rates lie between 4 and 10 per thousand. In most of the studies where rate was lower than 4 per thousand information was obtained solely from a review of medical records or from general practitioners. Considering prevalence rates of 9/1000 (Webley, 1971) and accepting this figure for the whole country millions of epileptics are acceptable. The workload of investigating these patients is a difficult task especially in India where neurological centres with specialized facilities are few. Most of the cases of epilepsy remain undiagnosed for long time as the disease is still not accepted as organic illness by a large number of people in our society. Disease is thought to be caused by devil so many people seek faith in healing by itself. There has been considerable progress in the epileptology over the past two to three decades.

With the help of the sophisticated EEG related techniques, the diagnostic part of the disease is improved. Considering the problem of epilepsy and new developments especially in diagnostic field we had concluded a clinical and EEG study of epilepsy.

**GENERAL DATA ANALYSIS**

**AGE**

Age specific prevalence rates in several studies (Browis et al., 1966; Juel-Jensen, 1974 and Naar et al., 1986) have been found to be lowest in the first decade and rising gradually up to the fourth decade. In this study majority of the cases had first attack at second decade, then there was a gradual decline, while in other studies, majority of the cases had first attack in first decade.

**SEX**

In this study slightly more than one fourth of the patients were females. This finding is exactly similar to the study done by Dinit et al. (1989). Females were seen said to suffer from epilepsy slightly more frequently than males. In Grover's study of 3000 cases the ratio of female to male was 13:12. However the sex incidence is in changing pattern. In one study male/female ratio was 1.5 : 1 (Meliashki, 1977). Similar observations were found by Virmani and Sarmay, 1966; Reddy, 1971 and Agnihotri et al., 1972.
In the present study male dominance might be because of Indian society especially in rural population gives more importance to males because they are the earning members of the family.

**CLINICAL FEATURES**

It is important to know the prevalence of various seizure types in epileptic population. There had been many studies on clinical classification. In the present study, the seizures have been classified on the basis of the classification given by Hareedan and Reynolds (1982). Seizures were classified as generalized, partial secondary generalized and unclassifiable. Gastaut et al (1975) studied 6000 epileptics and they worked out their different classifiable groups and their relative frequency in children and adults. A similar study (Joshi et al, 1977) has been carried out in India. Both these studies were based on classification almost similar to that used in the present study. Primary generalized seizures dominated our series (63%) in comparison to 39% in the series of Gastaut et al (1975), 39% in the series of Joshi et al, 1977 and 51.7% in the study of Bixit et al, 1989. In the above studies of Gastaut et al, 1975; Joshi et al, 1977 and Bixit, 5.3., 1989, the number of cases of absence seizure, was 10%, 3% and 6% respectively. We had seen across a case of Lennox Gastaut syndrome, which is a petit mal variant. This could be because of
a smaller sample of the study. Cases of secondarily generalized was frequently found in our study (23%) as compared to the above study of Castant et al. (1973) (12%) and Joshi et al., 1977 (15%). The study conducted last year in this institution by Dinit S.S. (1989) has shown 34.2% cases of secondary generalized which is approximately similar to this study. In our study the percentage of simple partial seizure was low in comparison to those observed by Joshi et al., 1977 (8%). On the other hand frequency of complex partial epilepsy was almost equal (8.5%) in this study and (7%) in that of Joshi et al., 1977.

FEATURES OF PRIMARY GENERALIZED SEIZURES

This was the commonest type of seizure. The patients included in this study having generalized features and unconsciousness without any focal onset or presence of aura. It included idiopathic and symptomatic epilepsy both. In many patients frequency of seizure was high, 40% of cases had seizures several times a day, bimonthly, weekly or monthly. Earlier to this maximum frequency of seizure was reported by Shevron (1987) where one third of the cases had seizures several times in a month. Figure of our study is higher than the figure in the study conducted by Shevron. This is possibly because in our community people seeks medical advice when the illness gets advanced and disabling.
Out of 124 cases of primary generalized seizures some etiological factors was found in 38(30.6%) cases. In the study of Shervon (1967) some cause or other could be detected in about one third of the cases of all epileptics. The figure were or less nearer to the present study. In the present study etiological factors were in the form of head injury in 20(16.15%) cases, birth anoxia in 6(4.8%) cases, inflammatory brain disease in 4(3.2%) cases. Most of them were intracranial space occupying lesion, febrile, migraine, rheumatic heart disease and tuberculous sclerosis. We had 14(11.23%) cases who was the eldest child of the family. This is possibly because of increased liability of the first born to head injury during birth. In the study of Neuber et al (1986) it was shown that the head injury (20.9%) was the commonest cause of epilepsy and the least common cause was the birth injury (3.3%) while intracranial infections caused epilepsy in 10.9% cases.

Our figures in respect to head injury are less than the above mentioned study. This may be because of the majority of the cases of primary generalized epilepsy having head injury were in the pediatric age group. Children often conceal head injury from their parents; secondly healing of wound is better in childhood. Most of the children do not remember about the injuries which use to occur during playing. As compared to the study of Neuber et al (1986), the incidence of birth injury was
slightly higher, possibly because of lack of sophisticated obstetric services especially in rural population of India.

In this study, migraine, rheumatic heart disease and tuberculous sclerosis were also seen as an etiological factor. Though loss of consciousness at the height of headache is usually syncopal there is slightly increased incidence of epilepsy in migraine sufferers, even in those who have no evidence of cerebral lesion. A possible role of tyramine in the physiological mechanism of the two disorders was postulated by Scott, Moffett and Swash (1972). In present study, 1 case was of rheumatic heart disease having mitral stenosis along with mitral regurgitation but no evidence of cerebral lesion was seen. Epilepsy associated with rheumatic heart disease more often than can be explained by chance. In mitral valve disease small cerebral emboli may cause epilepsy as may a small asymptomatic infant due to intracranial atheroma (Dodge, Richardson and Victor, 1956). In this present study one case had tuberculous sclerosis having adenoma subcortical convulsions. Shagreen patch and normal intelligence and EEG evidence of generalized seizures. Tuberculous sclerosis (Tuberous) is manifested by a clinical triad of convulsive seizure, mental deficiency and adenoma subcortical. Pathological description of tuberculous sclerosis is given by Urich (1976). Our patients had convulsive
seizures and adenoma sebaceum but the intelligence was normal. This is possible because now some partial forms of tuberculous sclerosis is increasingly recognised. The three cases reported in detail by Devoisean and Viasen (1961) were of superior intelligence. Although all the cases had radiological evidence of cerebral involvement as well as lesion of tuberculous sclerosis elsewhere. Legue and Genis (1967) reviewed the records of 71 patients with tuberculous sclerosis studied at the nyc clinic, 26 of the 69 patients on whom there were records of intellectual capacity had normal intelligence, 10 of these 26 had seizures.

Preconvulsive features were present in 7(5.6%) cases. They were in the form of headache, vertigo, disinterest in environment and an abnormal feeling.

Post convulsive features were seen in 62(50%) cases in the form of headache in 10(16.1%) cases, asleep in 12(20.9%) cases, headache and asleep in 25(40.3%) cases, weakness in 6(9.6%) cases and headache in 3(4.8%) cases. Rest of the features were nausea, dizziness, running here and there, sweating and palpitation. These features were found more in adults. According to Laidlaw and Richards (1962) children to not go through post-ictal phase and if these are present then they usually recover completely within a minutes.
On doing neurological examination, 6 cases were mentally retarded, 3 cases had behavioural abnormality, 2 cases had schizophrenia and one case had third nerve palsy.

In present study 6(4.8%) cases were of mental retardation. In the series of 2600 cases of all types of epilepsy including 2000 of generalised epilepsy, Sherven (1967) found neurological deficit in 9.8% cases, mental retardation in 40% and behavioural abnormalities in 30% cases. There were highest number of cases of mental abnormality in the present study which is probably due to birth asxia because most of the deliveries were conducted in the rural area and most of the time history of birth injury or asxia was not elicitable. In a study of Brown et al (1974) it has been shown that out of 94 patients having birth asxia 33 cases had neurological deficit and 46 had convulsions.

No other investigations except EEG, CT scan and CSF examination showed abnormality. VITAL, blood sugar, serum calcium and X-ray skull showed no abnormality.

CT scan could be done only in 17 cases out of which 16 of these cases were normal, 1 had parietal lobe granuloma and 1 had cerebello pontine angle tumour, 1 patient had secondary metastatic deposit and 1 had calcified patch in frontal area.
In CT scan, other studies were conducted by Gastaut (1976) who observed 34.51% abnormal cases in series of 1702 cases. Young et al (1979) scanned 256 children out of which 33% abnormalities were seen. In the present study 1 patient had only 2 seizures at a one month gap, whose CT scan showed a granuloma. Young et al (1983) showed that even a solitary focal seizure is likely to result a structural abnormality.

**EEG FINDINGS AND CLINICAL CORRELATION**

EEG abnormalities were present in 59 (47.50%) cases of generalized epilepsy. This figure is higher as compared to other studies i.e. 30-40% (Kiloh et al., 1983). This could be explained on account of higher number of children, higher frequency of seizures and many EEG were done within twenty four hours of the last attack. Out of 15 patients having seizures several times a day EEG findings were normal only in 3 patients. EEG findings were generalised in 13 patients, hypersynchronia, myoclonic and Lennox Gastaut syndrome in 1 patient each.

We had come across, 9 patients of mental abnormality out of which 2 patients had shown generalised brain damage in the EEG. Generalized convulsions were a common feature of brain damage.

One EEG showed hypersynchronia. Patient was 5 years old, who had encephalitis one year back, had generalized convulsions. He was mentally abnormal. His
EEG showed spike and polyspike discharges on continuously abnormal background of diffuse high voltage arrhythmic slow activity. In a series of children Friedman and Rampiglione (1971) showed hypersynchronous EEGs during the first year of life. There was a mortality of 26% cases. The majority of them died before the age of 3 years. One case of myoclonic epilepsy has shown the typical features of myoclonic epilepsy. EEG showed high voltage spikes and slow waves which were bilaterally synchronous. The spikes were frequently multiple occurring in groups of two to six. This finding was similar to that of Gastaut (1954b) who called these complexes as 'polyspikes and waves'. One case showed the EEG findings of Lennox-Gastaut syndrome, clinically having tonic seizures and most of the time the frequency of spike and wave pattern was two and a half Hz. This finding was more or less similar to the finding of Alcardi (1962), who described the syndrome clinically by brief tonic, myoclonic and tonic seizures and electrically by atleast some 2 Hz spike wave activity. The frequency may even be faster (3 Hz) spike wave paroxysms. Family history was negative.

FEATURES OF SECONDARY GENERALIZED EPILEPSY

In the present study out of 300 cases, 44(16%) cases were of this type of epilepsy. In this study clinically 17 cases were found to have focal features with secondary generalisation, another 27 cases who were
clinically thought to be the cases of primary generalized seizures, were found to have the evidence of focal onset in EEG. This might be possible because of rapid spread of focal discharge.

Majority of the cases (10, 40.9%) had seizures several times in a month. This figure is similar to that of generalized epilepsy.

Aetiological factors were present in 11 (23%) cases in the form of head injury - 8 cases, inflammatory brain disease - 1 case, intracranial space occupying lesion - 1 case. This figure is slightly less than that of primary generalized seizure (26.9%). In a series by Joshi et al (1977) aetiological factors were present in 60% cases. The lesser incidence of aetiological factors was because we could perform CT scan only in 8 cases, which is now the essential investigation in the seizures of focal onset. According to Gastaut and Gastaut (1976) CT scan detects 20% more cerebral lesions than the combination of long established techniques like skull X-ray, EEG and angiography.

Precipitating factors were found in 8 cases (18.1%) in the form of sleep - 4 cases, fatigue - 1 case, awakening - 2 cases and seeing cinema - 1 case.

Preaminatory symptoms were present in 2 cases in the form of headache and dizziness.
CLINICAL SEIZURE PATTERN

Out of 44 cases, 15 cases had focal features in the form of tonic spasms, twitching at the angle of the mouth or in the fingers or clonic movements in the one upper limb and in the lower limb on the same side. Two cases had tingling numbness in lower limbs and one case had abnormal sensation in lower extremities. Autonomic features were present in two cases in the form of epigastric sensation, 27 cases had generalized convulsions.

Associated neurological features were found in 3 cases. These were having mental retardation - 1 case, schizophrenia - 1 case and tubercular meningitis with papillaeoma and third nerve palsy in one case. EEG of this patient showed focal epilepsy of left side with secondary generalization. CT scan had shown parietal lobe granuloma in left side. Clinically he was having focal onset on the right side of the limbs.

EEG FINDINGS AND CLINICAL CORRELATION

In 44 cases, 12 cases had an normal EEG. 17 cases had shown a focus getting secondary generalized and 12 cases had shown a focus in EEG but clinically generalization was seen.

There were 2 such cases who have generalized discharge in EEG but clinically only focal features were seen. Among above cases 4 cases had a central focus.
In 2 cases bilateral focus was seen. This is probably because of mirror image (Kiloh et al, 1983) due to commissural fibres in the brain.

FEATURES OF SIMPLE PARTIAL SEIZURES

In our study out of 200 cases 17(8.5%) cases were of simple partial seizures. The percentage was more or less similar to that of complex partial seizures. Percentage of this series is more (10.6%) than the study conducted last year in this institution. Other studies reported 10% simple partial seizure (Sharvon 1977) whereas 50% and 62% cases of simple partial seizure were reported by Castant et al (1973) and Joshi et al (1977) respectively. Age ranged from 8-40 years. None of them had status epilepticus. In this series also frequency of seizures was high. Out of 17 cases 5 had seizures several times in a week. Predisposing factors were found in 5(29%) cases out of which 3(17.6%) cases had head injury and 2(11.7%) cases had birth anoxia. All the 3 cases of head injury were 2-6 months old. Joshi et al (1977) had found head injury in 12% cases. They found some aetiological factors in 30% cases. Neurological deficit was found in one case in the form of anaesthesia. A lady of 22 years of age had focal clonic movements in her left leg after which she had anaesthesia in the same leg associated with vomiting. Her CT scan
revealed large intracerebral haemorrhage. She died after two days of the epileptic fit. In the simple partial seizure associated neurological deficit was found only in one case as compared to focal with secondary generalization where neurological deficit was seen in 3 cases.

CLINICAL SEIZURE PATTERN

Out of 17 cases, 16 had focal clonic movements and 2 had sensory symptoms in the form of tingling numbness and burning in feet. In all the 9 cases seizure started from finger or thumb except in one case. Out of 17 cases 8 had right sided symptoms and 9 had left sided symptoms. Start of seizure from thumb or finger may be due to representation of hand in brain is under prominent part of skull and is more prone to injuries as compared to toes and angle of the mouth. Post convulsive features were found in 7 cases in the form of weakness, Todd's palsy, headache and sleep.

EEG FINDINGS IN SIMPLE PARTIAL SEIZURE

Out of 17 cases, EEG abnormalities were found in 9 (52%) cases. Out of these 9 cases, all the cases showed focal abnormality. Out of which 3 cases had right sided focus. One case had left sided focus and 3 cases had a central focus.
In above findings 2 cases were having right sided foci and convulsions were occurring in right side. No explanation could be given to this finding. The same finding was observed by Dixit, S.S. (1980).

CT scan could be performed in 4 cases. One showed large intracerebral haemorrhage. EEG of this patient was normal. In study by Yang et al (1983) approximately half of the patients with simple partial seizures had positive scan. In this study only one CT scan had finding. This may be because we were not able to perform CT scan easily because of its cost factor and non availability in this city.

FEATURES OF COMPLEX PARTIAL SEIZURES

Psychomotor epilepsy is a clinical finding while temporal lobe epilepsy is a EEG finding. Not all the cases of psychomotor epilepsy have a temporal lobe focus and not all the patients with temporal lobe focus in EEG exhibit psychomotor seizures (Stevens, 1966). Out of 200 cases, 15 (7.5%) cases turned out to be the case of complex partial seizures.

All the patients were below 30 years of age. Seven were females and ten were males.

Shukla (1978) found that majority of the cases had the onset of seizures below the age of 20 years. Most of them had their first fit before the age of 10 years. This observation was against the earlier belief
that temporal lobe epilepsy was a late form of convulsive disorder. Gibbs et al (1963) found that only 9.3% cases of epileptics below the age of 20 had temporal lobe epilepsy. Stevens (1966) found that temporal lobe epilepsy was the disease of adults. Currie et al (1971) reported maximum incidence of onset of seizure in third and fourth decade of life in their study of 666 cases of temporal lobe epilepsy. However, Aird et al (1967) reported that 48% cases had their first attack in the first decade and over 75% in the first two decades of life. Virmani and Sahney (1966) and Reddy (1971) drawn the similar conclusions. This apparent contradiction may be explained by improvement in the methods of diagnosis and by the fact that in children the initial attacks are not of the classical psychomotor type and are easily missed (Palmer and Taylor, 1970). Most of the patients had onset of seizures from 3 months to 2 years. In the series of Reddy (1971) mean age was 6.43 years. Agnihotri et al (1972) in a series of epilepsy in general, found the mean duration to be 7.9 years. In both these studies patients were either taking irregular treatment or no treatment was taken at all. In this present study out of 15 patients, 5 were taking regular treatment, 7 cases started taking treatment after being fully investigated and none were taking treatment regularly. Explanation for regular treatment in these cases is because the illness in these patients was distressing
and making them unable to perform their professional work. Out of which most distressing was transient loss of memory in 6 cases, and in 6 cases the frequency of seizures was high i.e. daily or biweekly. In the series of Shukla et al (1979) about two thirds of patients had seizures daily or weekly which is more or less comparable with this series. Lesser frequency was reported by Currie et al (1971) where two thirds of the patients had fits twice a month. Out of 15 cases, only 2 (13.3%) cases had an aetiological factors in the form of head injury.

In the study conducted last year in this institution (Dixit, 1989) out of 9 cases only 1 case had aetiological factor in the form of cerebrovascular accident which he had few months prior to the onset of the seizures. This is more or less similar to our study. In the literature workers could not get aetiological factors in 22.9% - 89% of cases of their series (Palesner et al, 1966; Aird et al, 1967; Dodley, 1971 and Wihan, 1974).

Lesser percentage of aetiological factors in this present study may be probably because of the smaller sample and secondly people were not able to go for CT scan (because it is an expensive investigation), which detects 20% more cerebral lesions than the combination of long established techniques ( Skull X-ray, EEG and angiography etc.).
Two (13.3%) cases had a positive family history while family history was positive in 11.1% cases of Dixit (1989) and 14.3% cases of Shukla et al. (1979).

CLINICAL SEIZURE PATTERN

Out of 15 cases, 13 had features of psychomotor epilepsy and 2 cases had features of grand mal epilepsy but EEG had shown a focus in temporal lobe. Aura occurred in 9 (60%) patients out of 15 cases. It was in the form of visual hallucinations in 3 cases, voices heard in the ears in 1, hypersexuality in 1, fear in 1, wandering in 1, somato sensory in 1 and dizziness in 1. Currie et al. (1971) reported visual aura in 16%, auditory in 16% and olfactory in 12%. Aura in the form of laughing and crying can occur in the same patient (Ofton et al., 1971 and Sethi and Surya Rao, 1970).

Aura has been found in 60% of cases (Shukla et al., 1979). The commonest was visual hallucinations (as in this present study) followed by vertigo and epigastric sensation. Olfactory and gustatory auras once said to be diagnostic of temporal lobe seizures are in fact rare (de Jure, 1957 and Bonnaril, 1964). In our study out of 15 cases, behavioural abnormality was found in 1 case. A significant greater number of temporal lobe epilepsies do have emotional disturbances in childhood and psychiatric abnormalities in later part of life, in comparison to patients with grand mal epilepsies (Shukla et al., 1979).
Out of 15 patients of temporal lobe epilepsy one patient became hypersexual during the attack. Abnormal sex behaviour associated with temporal lobe epilepsy has frequently been described in man (Castant and Calem, 1956; Marchini and Sinisi, 1957 and Pierone and Sanders, 1966) and in animals (Kluver and Busch, 1930). Occurrence of hypersexuality in association with temporal lobe epilepsy is rather rare (Taylor, 1966b). In this study of 100 patients only one was hypersexual. A large number of temporal lobe epileptics were found to be hypersexual (Shukla et al., 1979).

Motor phenomena was present in 3 (13.3%) cases in the form of lateral deviation of head, eye and hypotonia. In study of Rossi (1964), 10% of psychomotor epileptics had motor symptoms. In the present study automatism was present in 7 patients in the form of shaking of lips, running, locking up, wandering and walking in a circle. Motor phenomena and automatism have been described under the same heading of automatism (Dichter, 1957). Combination of motor phenomena and automatism is a essential feature of complex partial seizures as majority of the cases had these features.

Out of 15 patients, 3 had generalized tonic clonic seizures and 3 had focal clonic seizures. Several authors include these psychomotor manifestations as a clinical features of psychomotor seizures (Rossi et al.,
1984). Lennex (1960) described psychomotor seizure as characterized by 'automatic' subjective and tonic focal signs.

**EEG FINDINGS**

The investigation which showed positive findings was the EEG in all cases and CT scan in 1 case. EEG showed findings in 10 (66.67%) cases out of 15 cases. In the present series 5 cases had normal EEG. Out of 10 abnormal EEG, all showed a temporal lobe focus. Among these 10 cases of temporal lobe focus 5 cases had very frequent discharges that too got enhanced in sleep recording. Five cases had right temporal focus and 4 had left temporal focus and 1 had bilateral temporal focus.

Only 4 patients could afford CT scan. Granuloma in temporal lobe was observed in one case. EEG of this case showed a mirror image.