DISCUSSION
A relationship between mood disorder and epilepsy has been suspected for a long time as evident from various works since the time of Hippocrates. But over the years the views regarding origin of mood disorders in epilepsy patients have frequently shifted and the nature and significance of mood disorders in epileptics is still not very clear and despite being probably the commonest psychiatric manifestations they are the least well recognized or described in literature.

The present study was carried out with an aim to study the relationship between epilepsy and mood disorders to identify the possible risk factors. A total of 100 patients of epilepsy were included in the study. This is a hospital based sample and is subject to all biases that a referral hospital case intake has. However, there was no conscious effort to create a selective bias in the sample.

In this study sample males outnumbered females (Table 1) i.e. 61 per cent as compared to 39 per cent. It has been suggested that there is some excess of the epilepsies among males (Lennox, 1960; Neugebauer and Susser, 1979; Pond, 1981; Zilenski, 1982). Some of the Indian studies have also shown higher preponderance of males in such samples 65 : 35, Gopal Krishnan et al. (1968) and 67 : 33, Bagadia et al. (1973). This difference according to Lennox (1960)
is due to a greater need to maintain employment and hence treatment seeking in males, whereas according to Bagadia et al. this difference may arise due to disproportionate hospital attendance in general which is probably more in favour of males. These factors may also partly explain the difference found in this study.

The mean age of the sample was 23.62 years (Table 2) and it was quite similar in both males and females. This is consistent with usually reported age wise incidence of epilepsy, where it is said that nearly half the patients developing epilepsy do so by the age of 15 years. Various studies suggest that a majority of the patients develop epilepsy by the age of 20 years, i.e. 76.8 per cent, Lennox (1960); 83.8 per cent, Bagadia (1973); 60 per cent Satyanaryana Swamy et al. (1986). Though some studies have also quoted a higher mean age e.g. 30.5 years, Becu et al. (1993) but even in that study the mean age of onset of epilepsy was 16.1 years.

The number of Sikhs were marginally more than Hindus in the study (Table 3), i.e. 51 : 49 suggesting a homogenous sample and also in concordance with the view that generally race/religion do not affect the prevalence rate (Shorvon, 1995).

In the present study most of the patients belonged to urban residential area (Table 4), i.e. 61 as compared to 39 from rural background. According to Shorvon (1995) major geographical differences are not reported but some studies have shown higher rates in rural areas. This difference though not significant could have arisen due to easier access to this city situated hospital by the urban people or due to still prevailing lack of awareness among the rural where seizures are believed to be caused by supernatural forces.
Majority of the sample was single, i.e. 59 per cent (Table 5). The remaining 41 per cent had got married. There were no significant sex differences. In the sample predominance of single individuals could be due to relative young age of the sample (mean age 23.62 years) or due to delay/cancellation of marriage caused by the seizures which has been suggested by some of the previous studies (Jacoby et al., 1996).

In this sample majority of the cases had 5-12 years of education, i.e. 69 per cent (Table 6). 17 per cent had education of more than 12 years. Only 14 per cent were either illiterate or had less than 5 years of schooling. This is similar to literacy rate of 76.8 per cent in the study by Bagadia et al. (1973) though epileptic are known to suffer from difficulties in schooling and had higher drop out rates as in Kokkonen et al. (1997). This reasonable literacy level of the sample may be due to changing trends towards educaton or due to urban, student and upper socio-economic predominance in the sample.

In the present study significant number, i.e. 33 per cent were students (Table 7) followed by housewives (24%) and there were only few professionals (1%), servicemen (6%) and businessmen (13%). This may be in part due to occupational difficulties faced by the epileptic patients, e.g. only 4.4 per cent of the sample in the study by Bagadia et al. (1973) had white collar jobs. Unemployment was reported in 13 per cent according to Jacoby et al. (1996).

In this study (Table 8), majority of the patients belonged to middle class (61%) or above (25%). Only 14 per cent of the sample was formed by the lower middle or lower class. Though, epilepsy is almost equally wide spread in all socio-economic strata. But Shorvon (1995) in a review reported a slightly higher prevalence of epilepsy in lower socio-economic group. The higher
prevalence of richer strata in this study could be due to the institute being a private referral centre, so the fear of higher expenditure might have kept away the patients of lower socio-economic group or may be attributed by lack of medical awareness in the poorer socio-economic status.

The seizures predominantly were of generalized nature (Table 9a and 9b), i.e. 79 per cent and majority consisted of tonic, clonic, tonic-clonic type of seizures. 21 per cent of the seizures were classified as partial seizures. This is consistent with prevalence of generalized and partial seizures of 78 per cent and 22 per cent, respectively as reported by Becu et al. (1993). Shorvon (1995) also described ratio of generalized : partial : mixed :: 10 : 3.5 : 3.5. These results are also similar to the results of community based study by Jacoby et al. (1996) where the 12 per cent consisted of partial seizures. 40 per cent were primary generalized (including 10% of myoclonic and absence) and 17 per cent were secondary generalized, while 31 per cent were unclassified. These are in contrast to some of the studies where partial seizure are predominant, e.g. Jagawat et al. (1998). These differences are likely to be due to difference in the selection and classification criterias.

In the current study mean age of onset of epilepsy (Table 10) was 18.23 year and was homogenous across generalized and partial seizures. This is similar to the onset age reproted by Becu et al. (1993) of 16.1 year and 22 years by Jacoby et al. (1996).

In the sample mean number of fits in last year (Table 11) was 11.82. There was a significant difference between the generalized seizures (5.53) and partial seizures (35.48). This could be due to a poorer control of seizures in partial seizures with the anti-epileptic drugs (AED). This is in concordance with
the view that prognosis of partial seizure is poorer than for generalized seizures. A control rate of only 16-43 per cent were observed in partial seizure by Mattson et al. (1985) as compared to 48-53 per cent in cases of generalized seizures. Duncan et al. (1995) also reported poorer prognosis in patients with partial seizures as compared to patients with generalized seizures.

The mean duration of epilepsy was 5.42 years (Table 12), there was no significant difference between the two types of epilepsy. The number of status epilepticus was not frequent in the sample (Table 13), mean number being 0.10. Though it was marginally more common in partial epilepsy but the difference was not significant.

Regarding the use of anti-epileptic drugs in the present study (Table 14,15) there were 19 patients who were not on any AED. These were the ones who were either freshly diagnosed cases of epilepsy and those who had discontinued AED either on their own or under medical supervision, but had recurrence of seizures. Majority of the patients were on one drug (51%), whereas 30 per cent used two or more drugs. This is higher than percentage of patients on polytherapy reported by some of the studies, e.g Reynolds and Shorvon (1981), Schmidt (1982), Thompson and Trimble (1982), Theodre and Porter (1983), Callaghan et al. (1984) and Albright and Bruni (1995) which report that 80 per cent of the patients develop adequate control with one drug only and 10-15 per cent improve with combination of two AEDs, but considering that the sample consisted of patients coming to specialist OPD like psychiatry/neurology of a referral clinic are likely to have been more chronic than the general population surveys and hence these results are comparable to ours.
The patients with partial seizures were more likely to be on polypharmacy (Table 15) mean number 1.48 as compared to 1.05 in generalized seizures. This is again consistent with a view that partial seizure are more likely to have poorer control (Mattson et al., 1985; Duncan et al., 1995).

Among the AED the phenytoin was the most commonly used drug (38%). Significant number of partial seizures patients were on phenytoin. Similarly, phenobarbitone was also used in 21 patients, 14 being of generalized seizures. Carbamazepine is again a commonly used drug (32%).

The relatively higher use of Phenytoin and Phenobarbitone in this sample is likely to be due to the relative inexpensive nature and familiarity with the drugs because of increased use over the years by most of the physicians.

In the current study (Table 17 and 18), 88 patients had no schizoaffective state on BPRS and remaining 12 had possible schizoaffective state. There were no patients with definite Schizoaffective state though psychosis has been reported quite frequently in various studies. There were no definitive schizoaffective patients in the sample due to the reason that during screening the patients with florid psychosis did not cooperate fully and there existed a higher need for cooperation for the use of self-rating scales and hence such cases were not included in the study and also these patients are more likely to be on psychotropic medication which again were screened out as per the exclusion criteria. There was a slightly higher mean score on BPRS in partial seizures as compared to generalized seizure but this difference was not statistically significant. Higher mean scores would be expected in the light of studies which have shown a higher prevalence of psychiatric morbidity including psychosis in partial seizure as compared to generalized seizures, e.g. Trimble (1991) who
reported that out of the epileptics having psychosis 76 per cent had a temporal lobe disturbance.

Anxiety as an emotion has been reported by various studies in patient with epilepsy. In this current study (Table 19, 20, 21 and 22), based on HARS 25 per cent patients suffered from significant anxiety and further 49 per cent had mild anxiety suggesting that a majority (74%) patients suffer from anxiety. Further, it was observed that patients with partial seizure had more significant anxiety, i.e. HARS >15 as compared to generalized seizure (P<0.05). The mean score of HARS was also marginally higher in partial seizures. This difference was also observed on the self-rating scale of PGI N\textsubscript{2}, where majority of the patients of generalized seizures had a non-significant score (0-12), whereas majority of the patients with partial seizure had a score of greater than or equal to 13.

The patients with partial epilepsy had a more preponderance for anxiety and also for severer anxiety. This is similar to the studies by Dongier (1960), Dominian \textit{et al.} (1963), Flor-Henry (1969) and also consistent with study of Taylor (1972) which reported 30 per cent incidence of neurosis in temporal lobe epilepsy as compared to 15.6 per cent among all epileptics and Shukla \textit{et al.} (1979) also reported higher preponderance for anxiety in partial seizures.

The patients having significant anxiety on HARS is bit higher than the reported 16 per cent by Silberman \textit{et al.} (1994) but almost identical to the reported anxiety of 25 per cent on Hospital Anxiety and Depression Scale by Jacoby \textit{et al.} (1996).

In the current sample depression being assessed by HDRS and BDI was found to prevalent in a considerable number (Table 23, 24 and 25). The mean
score on HDRS was 11.06. As many as 65 per cent of the patients had a score of 8 or above which is similar to 55 per cent as reported by Roy (1979) using HDRS. In the total sample, based on HDRS 25 per cent patients suffered from major depression (HDRS >15), 38 per cent patients of partial epilepsy suffered from major depression as compared to 21.52 per cent of generalized seizures (P<0.05).

Mean score on BDI was 12.81 which is similar or marginally higher than most of the studies but there are occasional studies with even higher mean score, e.g. Robertson et al. (1985) reported mean score of 24.85 in a specifically selected sample. Altschuler et al. (1990) reported mean BDI score of 8.5 in absence seizure and 12.2 in some temporal lobe seizures. Hermann (1991) reported a mean BDI score of 8.5 while the sample group of Schmitz et al. (1997) had a mean BDI score of 10.8. These findings are comparable to some of the studies though there exists a considerable variation across different studies. Kramer et al. (1987) reported a significant depression on 72 per cent of patients using BDI. Hermann et al. (1991) and Becu et al. (1993) using BDI reported a prevalence of 37.0 and 41.0 per cent, respectively. Perini et al. (1996) reported 55 per cent prevalence based on BDI and SADS. Schmitz et al. (1997) reported a prevalence of 42.5 per cent.

In the present study psychiatric disturbance in males and females (Table 26) did not show any significant difference on HDRS, PGI N₂, BDI. Only scores on HARS were more in females as compared to males (P<0.05). Jacoby et al. (1996) had also observed that women are more likely to be anxious than men. In depressed epileptic population few studies had more females (Palia and Harper, 1986; Robertson et al., 1987; Hermann and Wyler, 1989) but only
in latter study relationship was significant, on the other hand male gender was over represented in affective disturbances in some studies, e.g. Fenton (1986), Mendez et al. (1986), Altschuler et al. (1990), whereas occasional studies have shown no significant gender differences (Victoroff et al., 1990).

Prevalence of mood disorder according to ICD-10 in the current sample was 42 per cent (Table 27). There was only one case of bipolar mood disorder currently manic. This is consistent with the view that manic disorder is relatively uncommon in epilepsy. Ojemann et al. (1987) documented only three cases of bipolar mood disorder in a series of over 2000 patients and Fiordelli et al. (1993) reported elation in four out of 100 patients. But none of them met the DSM III criteria. Mendez (1994) in a review reported frequency of bipolar disorder as 2-3 per cent.

On the other hand depressive episode and other depressive spectrum disorder were found to be quite prevalent in the current sample i.e. 41 per cent. This is comparable to the prevalence of depression reported by Standage and Fenton (1975) of about 60 per cent. Roy (1979) of 55 per cent, Victoroff et al. (1990) of 62 per cent, Robertson et al. (1994) of 22 per cent and Perini et al. (1996) of 55 per cent.

In the commonest psychiatric disturbance of the sample i.e. depressive spectrum disorders, the commonest symptoms (Table 28) reported were Tension (74%), loss of concentration (73%), lack of energy (63%), lack of self confidence (60%), irritability (57%) and indecisiveness (53%) which were seen by more than half of all the epileptic patients.
While assessing the risk factors for psychiatric disorder in the sample, sex (Table 29) of the patients did not seem to be significant (P > 0.05) which is consistent with the study by Vicoroff et al. (1990).

Residential area did not have a significant difference (Table 30), though the majority of the patients of rural background suffered from mood disorder but the reason of this is not clear it may be caused by higher perceived stigma by the patients of rural background due to prevalent social structure and poorer understanding about the disease process.

Mood disorder across different occupations (Table 31) are difficult to explain and have been rarely discussed in the literature. Noteworthy preponderance for mood disorder was noted among the household/housewives the group which consisted of entirely of women and were also liable to face difficulties with matrimony and other family matters. Possibly this could have contributed to the higher prevalence of mood disorder in this group.

Assessing the risk of mood disorder on different types of epilepsy (Table 33) in this sample it was found that majority of the patients of partial seizure (about 62%) suffered from mood disorder whereas only 36.7 per cent of patients with generalized seizure suffered from mood disorder (P < 0.05). This is similar to the studies which have found higher prevalence of psychiatric disturbance in partial seizures, e.g. Dominion et al. (1963), Taylor (1972), Flor Henry (1973), and Shukla and Katiyar (1987).

In the current study comparison of mood disorder with the number of drugs (Table 34) shows a significant relationship (P < 0.05) of higher psychiatric morbidity with increased use of drugs. Higher number of drug use may also
represent a poorer control which may also effect the emotional state of the patient.

The seizure frequency that is the number of fits in a specific time period was a significant risk factor for mood disorder (Table 35). This is consistent with the view of Jacoby et al. (1996) which showed that anxiety and depression increased from 13 and 4 per cent, respectively among individuals who were seizures free to 44 and 21 per cent respectively among those reporting frequent seizures. It also further added that 62 per cent of the subjects reporting seizure felt stigmatized as compared to only 25 per cent who were now seizure free.

Increased seizure frequency may cause more disruption in person’s life and there exists a greater fear at all times this could add on to the increased risk of psychiatric disturbances in addition to more kindling/metabolism disturbances of the brain areas involved in emotion regulation. Either of these factors or a combination of both may explain the higher risk of mood disorder with increasing frequency in the current study.

Age of onset of epilepsy (Table 36) in this sample did not seem to effect the prevalence of mood disorders. These findings are in concordance with the view of many investigators who have found depressive symptomatology not to be intimately related to Neuro-epilepsy variables like age of onset of epilepsy (Roy, 1979; Trimble and Perez, 1980; Mendez et al., 1986; Fralin et al., 1987; Kramer et al., 1987; Hermann and Wyler, 1989).

The mean duration of epilepsy was more in the group of epileptic patients having longer the duration of active epilepsy higher are the chances of the mood disturbances to take place. This is similar to the study by Robertson et
*al.* (1987), where the author reported that the severity of depression correlated significantly with duration of epilepsy. These are likely to occur due to increased hopelessness about the cure from the disease and due to increased disturbances in the social functioning of the patient.