

# A Study on Electroencephalography Findings of Patients Visiting the Psychiatric Clinic: An Experience at A Tertiary Care Center in Western Nepal

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## ABSTRACT:

**Introduction:** The electroencephalography (EEG) is the recording of brain's spontaneous electrical activity over a period of time (20-40 minutes) recorded from multiple electrodes placed on the scalp. It is used in seizure disorder, organicity, and psychiatric conditions. There is a paucity of literature with regard to the application of EEG in various conditions in our setting. **Methods:** This was a cross-sectional study, where data of the patients who visited the EEG section of psychiatric clinic from September 15, 2019 to July 14, 2020 were collected retrospectively. The demographic details, EEG details, and the clinical details were recorded and analyzed. **Results:** A total of 110 patients underwent EEG during the study period. Of them, 61 (55.45%) had normal EEG. Among the patients with normal EEG, 60 (98.36%) had clinical history suggestive of seizure disorder. Of the rest 49 (44.55%) patients with abnormal EEG, 48 (97.96%) had history of seizure. Majority patients referred for EEG fell in the prime of their life (1-30yrs). Almost all (98.2%) patients with the history of seizure were taking anti-epileptic drugs. **Conclusion:** EEG is a common investigation done in psychiatric clinic. Nearly half of the patients with seizure disorders will have an abnormal EEG.

**Keywords:** Antiepileptic drug; Electroencephalogram; Inter-ictal epileptiform discharges; Seizure

## INTRODUCTION:

Electroencephalography (EEG) is the recording of electrical activity produced by the firing of neurons within the brain which is recorded for about 20 to 40 minutes from multiple electrodes placed on the scalp. It is one of the tools to assess cerebral function which is based on the work by Hans Berger in the 1930s.[1]

It is a neurological test that uses an electronic monitoring device to measure and record the electrical activity in the brain.[2] The main use

of this non-invasive test is in epilepsy to detect seizure activity, a common problem with estimated worldwide prevalence of 5–30 persons per 1000.[3] The other applications are in the diagnosis of coma, encephalopathy, and brain death.[4]

The use of this neuro-physiological tool has been minimum in psychiatry despite the known relationship between epilepsy and psychosis and other psychiatric manifestations, especially with the temporal lobe abnormalities.[5,6] There is a paucity of reported literature on EEG findings although many institutes conduct EEG in Nepal now. This study aimed to explore the EEG findings among different cases requested for EEG.

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## METHODS:

This was a cross-sectional study conducted in Psychiatric Clinic of Lumbini Medical College and Teaching Hospital, Palpa during period of September 15, 2019 to July 14, 2020. Ethical clearance for the study was obtained from Institutional Review Committee (IRC) of the College(IRC-LMC 11-G/020).

All the patients referred to the EEG section of Psychiatric clinic throughout the study period were included. Incomplete data were excluded.

EEG was done with same EEG machine (16 channels RMS digital) in standard way and the EEG waves were recorded into the computer. The report was then printed out on paper. The primary data was stored in the register of the EEG section. Secondary data was collected by the researchers in a structured proforma and included demographic details, EEG findings, and clinical history of the patients. EEG results were categorized as normal and abnormal. The accuracy of the secondary data was double checked. This data was then entered into Microsoft Excel 2007 and coding was done. Then the data was imported into Statistical Package for Social Sciences (SPSS) software version 16 for analysis. Quantitative data was presented in mean with standard deviation while qualitative data were expressed in frequency and percentages.

## RESULTS:

A total of 110 patients were enrolled into this study. Of them, 60 (54.55%) were male. The rest 50 (45.45%) were female. Thus, males slightly outnumbered females. The mean age of males was 26 years (SD=18.11) and that of females was 24 years (SD =16.67). Further breakdown of age and gender was as shown in Table 1 which showed that the majority of cases (67.27%) sent for EEG fell between 1-30 years verifying that majority was in the prime of life. There were only 4.5% of the patients above 60 years of age and 0.9% under one year.

History of the patients about seizure disorder and its medication are presented in Table 2 which shows all the patients with seizure disorder were under anti-epileptic drug (AED).

A comparison of history of seizure and abnormal EEG is presented in Table 3. It shows that patients without history of seizure may have

abnormal EEG or vice versa.

*Table 1. Age and sex distribution of the study population.*

Age group (years)	Males	Females
<1	0	1
1-10	13	14
11-20	16	9
21-30	9	13
31-40	10	6
41-50	5	3
51-60	4	2
61-70	2	2
71-80	1	0

*Table 2. History of seizure and use of anti-epileptic drug.*

History of seizure	History of AED intake	
	Yes	No
Yes	108	0
No	0	2

*Table 3. EEG findings and history of seizure.*

EEG	History of seizure	
	Yes	No
Normal	60	1
Abnormal	48	1

## DISCUSSION:

We carried out this study to analyze the EEG findings of patients referred to EEG section of Psychiatric Department. It was interesting to note that out of 108 cases with history of seizure, 60 of them had normal EEG. This is natural because it is a known fact that patients with history of seizure may have normal EEG as EEG is only a snapshot of the brain activity.[7,8]

Also interesting to note that out of two patients with no history of seizure, one had still abnormal EEG. Actually inter-ictal epileptiform discharges (IED) are supportive of an underlying seizure disorder but never diagnostic. Without clinical ictal behaviour, EEG with IED is not diagnostic of epilepsy.

EEG reported abnormality in 44.54% in our study, 17.6% in the study by O Sullivan, 11.3 % in

the study by Lam but only 8.2% in the African study. [1,9,10,]This disparity could be due to variation in sample size, sample type as well as interpreter variability.

EEG as an important investigative tool and is more helpful in classifying the type of seizure disorder and also helpful to decide whether to stop the AED. And also selection of appropriate AED, monitoring the therapeutic response especially in absence seizure.[4] It may suggest a possible cause for the seizure disorder and explain why some people have deteriorated. In conjunction with video monitoring, long term EEG recording is critical in evaluation of patients with refractory seizures and for epilepsy surgery.

We still need to determine the type of abnormalities or the type of seizure disorder for optimum management. EEG may also be able to indicate the underlying organic or inorganic cause of seizure disorders such as cerebrovascular disease (CVD) in 15%, tumors in 6%, alcohol induced in 6%, and post traumatic and infective in the rest 2% of cases. Even with EEG and other imaging investigations, the cause of seizure is unknown in 60-70%.[1]

There are a few weaknesses of our study. It was a single-center study with small sample size. Further, the patients with positive EEG findings were not studied further for other pathologies.

#### CONCLUSION:

EEG is a common investigation done in Psychiatric clinic. The majority of patients referred for EEG fell in the prime of their life. Seizure disorder is a common condition referred for EEG. EEG with positive findings in patients without history of seizure and conversely EEG with negative findings in patients with definitive history of seizure are possible.

**Conflict of Interest:** The authors declare that no competing interests exist.

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