

UTILITY OF ELECTROENCEPHALOGRAM AMONG PATIENTS PRESENTING TO PSYCHIATRIC FACILITY

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ABSTRACT

Objective: To determine the utility of EEG and its association with both normal and abnormal results among patients presenting in a private psychiatric facility

Materials and Methods: A total of 15950 patients were seen from June 2013 to June 2016 in a private psychiatric facility in Peshawar and about 1714 patients who underwent EEG investigation for diagnosis and on demand with no prior or current medical history were included in the study using a cross sectional study design. The data was collected in a standardized manner, recorded in a private clinic's database and evaluated on the basis of international classification of diseases (ICD-10) and international classification of headache disorders (ICHD-III).

Results: A total of 1714 patients were identified who had gone through EEG either to confirm their diagnosis or to satisfy patients on their demand regarding the diagnosis. The participants comprised of majority of females (F=1143, 66.6%) and males almost half of the females (M=571, 33.3%) with majority of age ranges between eighteen to thirty years. Electroencephalograms done for assistance in diagnosis was associated with abnormal results while Electroencephalograms done on demand was associated with normal results.

Conclusion: This study determined the incremental value of electroencephalogram in order "to increase the probability of correct diagnosis" among people with psychiatric conditions by showing more abnormal results.

Keywords: Electroencephalogram, utility, psychiatric facility.

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INTRODUCTION

Electroencephalogram (EEG) is a test which detects electrical activities and abnormalities in individual's brain in the form of waves.¹ Although EEG is often used in multiple disciplines of medicine however, it is frequently used in psychiatry to evaluate several brain disorders particularly seizure disorders, neurological disorders, neurodegenerative disorders, sleep disorders and certain forms of psychoses.² The purpose of electroencephalograph is mainly to monitor potential complications such as anesthetic patterns or ischemia, help in early diagnosis of seizure disorders and assist in overall treatment plan.¹⁻⁵

Due to relative similarity in presentation of symptoms of psychogenic non-epileptic and epileptic seizures, EEG due to its incremental value is often recommended by clinicians to objectively confirm the nature of seizure and consequently the diagnosis.^{3, 4}

Psychogenic non-epileptic seizures (PNES) in response to conversion or dissociative disorder superficially get manifested as epileptic seizures however, no brain activity is observed in the former type of seizure.⁶ Psychogenic seizures are paroxysmal events in which individual experiences lack of self-control, apparent loss of consciousness with impaired sensory-motor functioning in response to emotional and psychological distress.⁷ In contrast to psychogenic seizures, epileptic seizures display heightened brain activity with more profound impairment in consciousness and sensory-motor functioning.⁷

In the light of literature review, there is lack of awareness regarding the actual purpose of number of clinical investigations among general population while EEG is not an exception in this regard.⁸ Electroencephalogram is often considered as diagnostic tool however;

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the dire need is to make general population understand about the only incremental utility of EEG along with who and when this investigation needs to be done.⁵

This current study also emphasizes on patients and their family members' misconception about electroencephalogram as a much-needed investigation for their satisfaction regarding diagnosis. It is, therefore hypothesized that all those electroencephalograms which are conducted by a psychiatrist in order to increase the probability of a particular diagnosis will be positively associated with abnormal results. However, those EEGs which were conducted on demand by a patient or family members will show positive association with normal results.

MATERIAL AND METHODS

The present study was conducted using cross-sectional research design. Data was collected retrospectively from the computerized database of a private psychiatric facility of the first author between 2013 and 2016 where patients record is maintained through a software specifically designed for the purpose. A data of each patient is recorded in computer software that includes categories of basic demographics, mental status examination, physical examination, investigations and detailed psychiatric history with most of the diagnosis based on international classification of diseases (ICD-10) with few exceptions where guidance was taken from international classification of headache disorders (ICHD-III).

Moreover, for the purpose of current study, data from a category of "Investigation and Result" was imported from server's database to Microsoft excel by the use of filter option including EEG-DX referred to EEG done for diagnosis and EEG-D referred to EEG on demand for patient's own satisfaction. The data was then finally transferred to SPSS 21 software for statistical analysis.

Total number of 15950 patients were seen and about 1714 patients who underwent EEG investigation for diagnosis and on demand were included in the current study. The inclusion criteria comprised patients who underwent investigation of EEG along with detailed psychiatric history by excluding those who went through any other form of investigation (e.g. CT scan) and had any medical condition.

RESULTS

Socio-demographic variables which were useful for describing the selected data were assessed. A total of 1714 patients were identified who have gone through EEG either to confirm their diagnosis or to satisfy patients on

their demand regarding the diagnosis.

The participants comprised of majority of females (F=1143, 66.6%) and males almost half of the females (M=571, 33.3%) with majority of age ranges between eighteen to thirty years. This suggests the sample comprised more of young female individuals than middle aged and elderly male individuals. Moreover, a significant interaction was found between gender and conducting EEG investigation which suggests more female were approached for their mental health conditions in comparison to males.

Table 1 shows chi square test results to determine the differences between types of investigation and its outcome (Results) among people with psychiatric conditions. The results reveal a statistically significant difference among investigation and results. The results indicate that patients whose EEG was done for diagnosis tend to have more abnormal results as compared to those whose EEG was done on demand since the later ensued normal results.

Table 1: Cross tabulation of Investigation (EEG) and its components with Results (Normal and Abnormal) among individuals with psychiatric conditions (N=1714):

Variables	Categories	Result		X ² P	P
EEG		Normal	Abnormal		
	EEG-DX	258	439	275.96	.001***
	EEG-D	782	235		
		1040	674		

DISCUSSION

In order to evaluate the entire picture emerged on the basis of selected data in the database; a chi square statistics was applied on the data. The relationship was statistically significant for gender and age group where young female participants tend to have more abnormal results than males which are suggestive of a particular gender (female) to suffer and approach more for their mental health issues than males.¹⁰

It was found that overall EEG done for assistance in diagnosis gave statistically significant abnormal results whereas EEG done on demand produced statistically significant normal results among people with psychiatric conditions (Table 1). In current study, the association of abnormal results for diagnostic purposes can be explained

by a number of factors. It expounds mental health professionals being cognizant for competently assessing patient's ongoing psychiatric condition and the importance of much needed investigations to objectively validate their clinical judgment based on patient's subjective experiences and physical examination.¹¹

This study findings are consistent with previously conducted studies where EEG act as a supportive measure in diagnosing epilepsy and seizure disorders¹² and abnormal patterns were mainly observed as well as positively associated among patients highly suggestive of epilepsy¹³⁻¹⁵. Since EEG is one of the effective tools in identifying potential diagnostic condition like epilepsy¹³⁻¹⁶ and number of studies supporting its significant role ranges from detecting artifacts and seizures among newborns,¹⁷ to elderly individuals.¹⁸ However, the most crucial point is that electroencephalogram cannot be used to make or refute any diagnosis because abnormal patterns can be caused by number of various other neurological diseases.¹⁸⁻²⁰

Moreover, there has been significant number of unnecessary and unneeded EEG's done only "on demand" due to patients' lack of proper knowledge about mental health issues and without any indication of organicity hence confirms the association of normal results based on demand investigation. It also pointed towards the increased clinician's burden to review prolonged recordings of unnecessarily done EEG where number of other patients could be given assistance.¹¹ This result points towards "the need of satisfying patients and their family members" through non-invasive yet important and often overlooked means like counseling, psycho-education and psychotherapies than unnecessary investigations.⁹⁻²⁰ Taking such initiative would bring awareness among the general population and insight among health professionals regarding the grave concern for sufferer's informational needs and the role of psychological interventions in saving time, money and human resource by consequently scaling up mental health services in community.

CONCLUSION

This study determined the incremental value of electroencephalogram in order "to increase the probability of correct diagnosis" among people with psychiatric conditions by showing more abnormal results. Large number of normal EEGs conducted on demand reflects upon a general population's mindset of more investigations means more certainty and more competencies over one's field of knowledge.

RECOMMANDTIONS

It therefore, necessitates bringing awareness among general population regarding an important difference between psychiatry and other fields of medicine along with significant role of relational attributes, adequate psychological evaluation and efficient non-invasive interventions in psychiatry.

LIMITATIONS

The data for the current study was collected from the private psychiatry facility of the first author. Broader scale data collection by incorporating government and private sector hospitals would presumably have given different and generalizable results.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Ahmad B: Study Panning, Data Collection.

Shahid N: literature Review writing up.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.