Patterns and Diagnostic Utility of Electroencephalography (EEG) in a Secondary Hospital: A Retrospective Study from Saudi Arabia

Anas M Albarrak, MD*,**

ABSTRACT

Electroencephalogram (EEG) is a widely used, noninvasive diagnostic tool in neurology. It is frequently employed in assessing epilepsy, altered mental status, and other neurological disorders. However, its overuse in cases where diagnostic efficacy is limited remains a concern, contributing to unnecessary healthcare costs and resource misallocation. This study examines EEG utilization patterns, diagnostic yield, and associated risk factors in a secondary hospital in Saudi Arabia. A retrospective study was conducted at Alkharj Military Industries Corporation Hospital between May and December 2024. All inpatient and outpatient EEGs performed within hospital departments were reviewed. Patient demographics, clinical indications, and EEG findings were extracted from medical records. EEG indications were categorized into epilepsy evaluation, seizure evaluation, sensory changes, motor changes, syncope, altered consciousness, dizziness, post-cardiac arrest, stroke, headache, cognitive dysfunction, and other causes. EEG outcomes were analyzed for statistical associations with patient characteristics using chi-square tests and logistic regression. A total of 227 participants 59.5% male, mean age 49.4 years were included, with 53.3% being inpatients. The most common indications for EEG were seizure evaluation (31.3%), epilepsy assessment (18.0%), and dizziness (13.6%). Abnormal EEG findings were observed in 29% of cases, with generalized slowing (64%) being the most frequent abnormality. Statistical analysis revealed a significant association between EEG abnormalities and male gender (p = <0.01), elderly age (p = <0.01), dizziness (p = <0.01), and post-cardiac arrest (p = 0.03). In contrast, female gender, young adults, and teenagers exhibited lower rates of EEG abnormalities. EEG is frequently used for seizure and epilepsy evaluation, though its diagnostic utility varies. Abnormal findings were more common in elderly males and patients with dizziness or altered consciousness. Refining clinical guidelines for EEG use could improve resource efficiency and diagnostic accuracy. Future research should focus on clearer criteria for its use in different patient populations.

Keywords: Electroencephalography, seizure, epilepsy, neurological disorders

Bahrain Med Bull 2025; 47 (4): 2560 - 2565

* Department of Internal Medicine,
College of Medicine, Prince Sattam Bin Abdulaziz University,
Al-Kharj, Saudi Arabia.

** Department of Internal Medicine,
Al Kharj Military Industries Corporation Hospital.
E-mail: dr.albarrak@gmail.com