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### ABSTRACT

#### **Alpha and Theta Band Power Alterations on EEG are Linked to Psychological, but not Somatic, Symptom Severity in Patients with Major Depressive Disorder**

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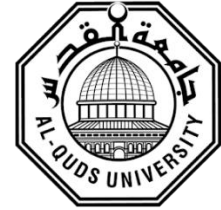
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**Background:** Major depressive disorder (MDD) is a serious psychiatric disorder characterized by low mood, loss of pleasure, and other psychological and somatic symptoms. Previous studies show that MDD is associated with changes in alpha and theta oscillations measured by electroencephalography (EEG). Yet, most studies did not differentiate between subsets of MDD symptoms and their relationship to different brain oscillations.

**Objectives:** To address this question, we grouped MDD symptoms into two main subsets: somatic (e.g., sleep disturbance and fatigue) and psychological symptoms (e.g., low mood and anhedonia).

**Methods:** We correlated psychological and somatic MDD symptoms to the power of the alpha and theta oscillations measured by EEG from six patients with MDD and 34 healthy individuals using 23-channel VirgoEEG amplifier. We computed a fast Fourier transform of the cleaned EEG



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time series to output the power spectrum density (PSD) of various oscillation bands and confined subsequent analysis to the alpha and theta bands.

**Results:** Our results indicate that there is strong positive correlation ( $r > 0.5$ ) between psychological symptoms with both alpha and theta band power in the MDD group (approaching significance). There were no strong or significant correlations between alpha or theta band power and the MDD symptom subsets in the healthy group.

**Conclusion:** Our findings shed an important light on brain oscillations affected by MDD symptom type and severity. Future studies will focus on the diagnostic utility of EEG alpha and theta rhythms in MDD.

**Research Keywords:** Electroencephalography (EEG), alpha oscillation, theta oscillation, major depressive disorder, somatic symptoms, psychological symptoms.